EPA
United States
Environmental Protection
Agency

Record of Decision

Newmark Groundwater Contamination Superfund Site
Newmark and Muscoy Operable Units

San Bernardino, California

August 2015

TABLE OF CONTENTS

List of Tables

List of Figures

Appendices

List of Acronyms and Abbreviations

µg/L	micrograms per liter
1,1-DCA	1,1-dichloroethane
3DVA	3-dimensional visualization and analysis
Amsl	Above mean sea level
ARARs	Applicable or relevant and appropriate requirements
BACT	Best available control technology
CAS	Chemical Abstract Service
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
cis-1,2-DCE	cis-1,2-dichloroethene
COC	Contaminants of concern
COPC	Contaminants of potential concern
CSM	Conceptual Site Model
DHS	California Department of Health Services
DTSC	Department of Toxic Substances Control
EPA	U.S. Environmental Protection Agency
ERA	Ecological Risk Assessment
ESD	Explanation of significant differences
Freon-11	Trichlorofluoromethane
Freon-12	Dichlorodifluoromethane
FS	Feasibility study
GAC	Granular activated carbon
GPM	Gallons per minute
HHRA	Human health risk assessment
IC	Institutional Controls
ICGMP	Institutional Controls Groundwater Management Program
IROD	Interim Record of Decision
GAC	Granular activated carbon (liquid phase)
MCL	Maximum contaminant level
MCLG	Maximum contaminant level goal
NCP	National Oil and Hazardous Substances Pollution Contingency
NPDES	National Pollutant Discharge Elimination System
NGFM	Newmark Groundwater Flow Model
NPL	National Priorities List
O&F	Operational & Functional
O&M	Operation & Maintenance
OSAP	Operational Sampling and Analysis Plan
OSRTI	Office of Superfund Remediation and Technology Innovation
OU	Operable Unit
P&T	Pump and Treat
PCE	Tetrachloroethene
Psi	Pounds per square inch
RAOs	Remedial action objectives
RCRA	Resource Conservation and Recovery Act
RI	Remediation investigation
RI/FS	Remedial Investigation/Feasibility Study

ROD	Record of Decision
SARA	Superfund Amendments and Reauthorization Act
SARWQCB	Santa Ana Regional Water Quality Control Board
SBMWD	City of San Bernardino Municipal Water Department
SDWA	Safe Drinking Water Act
SDWS	Safe drinking water standards
SOW	Statement of Work
SPP	Systematic project planning
SCAQMD	South Coast Air Quality Management District
TBC	To be considered
TCE	Trichloroethylene
TIFSD	Technology Innovation and Field Services Division
VOC	Volatile organic compound

PART I: THE DECLARATION

1 Site Name and Location

Newmark Groundwater Contamination Superfund Site
Newmark and Muscoy Operable Units (OUs)
San Bernardino, California

U.S. Environmental Protection Agency (EPA) Identification Number: CAD981434517

2 Statement of Basis and Purpose

This Record of Decision (ROD) presents the Selected Remedy for the groundwater contamination within the Newmark and Muscoy Operable Units (OUs) at the Newmark Groundwater Contamination Superfund Site (Site) in San Bernardino, California in accordance with the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), as amended by the Superfund Amendments and Reauthorization Act (SARA), and, to the extent practicable, the National Oil and Hazardous Substances Pollution Contingency Plan (NCP). This decision is based on information contained in the Administrative Record for this Site.

The State of California, acting through the Department of Toxic Substances Control (DTSC), concurs with the Selected Remedy.

3 Assessment of the Site

EPA has determined that there are potential health risks associated with exposure to hazardous substances, including the chlorinated volatile organic compounds (VOCs) Tetrachloroethene (PCE) and Trichloroethene (TCE), found in Site-related groundwater contamination at the Newmark Groundwater Contamination Superfund Site.

The response action selected in this ROD is necessary to protect the public health or welfare or the environment from actual or threatened releases of hazardous substances into the environment.

4 Description of Selected Remedy

The Selected Remedy in this ROD addresses groundwater contamination at the Site by adopting all of the components and performance requirements of the two interim groundwater *containment* remedies, implemented through previous decision documents[1], along with the

[1] Interim Records of Decisions (IRODs) for the Newmark OU (1993) and Muscoy OU (1995), 2004 Explanation of Significant Differences (ESD), 2005 Consent Decree (CD) between EPA, the US Army, DTSC, and the City of San Bernardino Municipal Water Department (City), and the 2005 CD Statement of Work (SOW) in Appendix D, describing operation and maintenance (O&M) requirements, and the modifications to operational and performance requirements as documented in the Final Operational and Functional (O&F) Determination for the Muscoy OU, dated September 28, 2007.

addition of a new remedial action objective (RAO) to *restore* Site groundwater[2] in the Newmark and Muscoy OUs to its designated beneficial use as an existing municipal and domestic water supply.

The major components of the Selected Remedy include:

- ***Two extraction well networks*** – The networks consist of 14 current and two planned groundwater extraction wells located in the northern and southern areas of the Site, which collectively pump approximately 20,000 gallons per minute of contaminated groundwater to three separate treatment plants for the removal of Site-related VOCs by granular activated carbon.
    - Treated water is delivered to the City's distribution system for further treatment to meet drinking water permit requirements.
- ***Monitoring Wells*** - Over 100 groundwater monitoring wells to monitor the extent, hydraulic control, and cleanup progress of Site-related VOC groundwater contamination.
- ***Institutional controls (ICs)*** [3] - To prevent the use of Site-related contaminated groundwater or spread of contamination to unaffected groundwater areas.

The scope and role of this Selected Remedy is the continuing successful operation of the existing major components to address Site-related VOC groundwater contamination, described above, until all Remedial Action Objectives (RAOs) are met. The RAOs for this response action are: (1) to inhibit migration of groundwater contamination into clean portions of the aquifer; (2) to limit additional contamination from continuing to flow into the Newmark OU plume area; (3) to protect downgradient municipal supply wells south and southwest of the Shandin Hills (Muscoy OU plume area); (4) to restore the aquifer to its designated beneficial use as an existing municipal and domestic water supply (maximum contaminant level [MCL]); (5) to protect the public from coming into contact with contaminated groundwater; and 6) to protect the function and effectiveness of the treatment remedy.

5 Statutory Determinations

The Selected Remedy for this ROD is protective of human health and the environment, complies with federal and state requirements that are applicable or relevant and appropriate (ARAR) to the remedial action (unless justified by a waiver), is cost-effective, and utilizes permanent solutions and alternative treatment (or resource recovery) technologies to the maximum extent practicable.

The Selected Remedy in this ROD also satisfies the statutory preference for treatment as a principal element of the remedy for the following reasons: (1) this remedy addresses

[2] Santa Ana Regional Water Quality Control Board Basin Plan (1995), Chapter 3: Beneficial Uses, Upper Santa Ana River Basin Groundwater Management Zone (Bunker Hill - A).

[3] Implementation of the ICs is achieved through a City Ordinance (San Bernardino Municipal Code, Title 13.25, ordinance MC-1221, passed on March 30, 2006) and an Institutional Controls Groundwater Management Program (ICGMP) Agreement signed in 2010 between the Water purveyors with adjudicated water rights to set their production rates based on a basin-wide Newmark Groundwater Flow Model (NGFM), which was developed for this purpose by the City and the San Bernardino Valley Municipal Water District (SB Water District), and maintained by the City.

groundwater containing dissolved concentrations of contaminants through treatment and (2) this remedy will restore the aquifer through treatment in approximately 17 years.

Because this groundwater remedy will take several years to achieve restoration, resulting in hazardous substances, pollutants, or contaminants remaining on-site above federal and state drinking water standards, a statutory review will be conducted every five years after the initiation of the remedial action[4] to ensure that the remedy is, or will be, protective to human health and the environment.

6 Data Certification Checklist

The following information is included in the Decision Summary section of this ROD. Additional information can be found in the Administrative Record file for this remedial action.

- Chemicals of concern and their respective concentrations (Section 5.5, Page 21).
- Baseline risk represented by the chemical of concern (Section 7, Page 24).
- Cleanup levels established for chemicals of concern and the basis for these levels (Section 7.3, Page 29).
- How source materials constituting principal threats are addressed (Section 11, Page 36).
- Current and reasonably anticipated future land use assumptions and current and potential future beneficial uses of groundwater used in the baseline risk assessment and ROD (Section 6, Page 24).
- Potential land and groundwater use that will be available at the site as a result of the Selected Remedy (Section 12.4, Page 43).
- Estimated capital, annual operation and maintenance (O&M), and total present worth costs, discount rate, and the number of years over which the remedy cost estimates are projected (Section 12.3, Page 42).
- Key factor(s) that lead to selecting the remedy (Section 12.1, Page 36).

[4] The first Five Year Review Report was initiated by the actual remedial action (onsite construction) at the Newmark OU on September 3, 1996. Subsequent Five Year Review Reports are triggered by the previous Five Year Review Report.

7 Authorizing Signature

This ROD documents the Selected Remedy for the groundwater contamination within the Newmark and Muscoy Operable Units (OUs) at the Site. This Remedy is selected by the EPA with concurrence by the California DTSC as indicated by the State concurrence letter (see Appendix A). The Assistant Director of the Site Cleanup Branch, Superfund Division (EPA, Region 9) has been delegated the authority to approve this ROD.

By: _____ Date: _____

John Lyons
Acting Assistant Director,
Site Cleanup Branch
Superfund Division
U.S. EPA Region 9

PART II: THE DECISION SUMMARY

This Decision Summary provides an overview of the site characteristics, the remedial alternatives evaluated, and the comparative analyses of the remedial alternatives that led to the selection of the remedy for the Newmark and Muscoy Operable Units (OUs) at the Newmark Groundwater Contamination Superfund Site (Site). It includes background information about the Site, the nature and extent of contamination to be addressed, and a description of the Selected Remedy and the rationale for remedy selection.

The Decision Summary also describes the involvement of the public, and the environmental programs, regulations and statutes that may be related to or affect the cleanup alternatives considered for this Site. The Decision Summary concludes with a description of the Selected Remedy and a discussion of how it meets the requirements of Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) as amended by the Superfund Amendments and Reauthorization Act (SARA) and the extent practicable, the National Oil and Hazardous Substances Pollution Contingency Plan (NCP).

Documents supporting this Decision Summary are included in the U.S. Environmental Protection Agency's (EPA) Administrative Record for this response action.

1 Site Name, Location, and Brief Description

Site Name: Newmark Groundwater Contamination Superfund Site
Newmark OU and Muscoy OU

EPA Identification Number: CAD981434517

Site Location: The Site is located within the Upper Santa Ana River Basin (also known as the Bunker Hill Basin) in San Bernardino, California, and encompasses a 23 square mile area which includes three OUs, described further below, including the Newmark and Muscoy OUs.

Lead and Support Agencies: In accordance with the NCP, EPA Region 9 is the overall lead agency for this Site and California Department of Toxic Substances Control (DTSC) is the support agency, however, DTSC is the lead agency for operation and maintenance (O&M) of the Newmark and Muscoy OUs groundwater remedies. Under the 2005 Consent Decree (CD), the City is responsible for the O&M of the groundwater remedies. This 2005 CD designated either EPA or DTSC as the "Lead Oversight Agency" depending on which agency has the lead for oversight of the remedial work. EPA transferred the Lead Oversight Agency role for the O&M activities for the Site to DTSC since 2007, after the Muscoy OU remedy was declared Operational and Functional (O&F). The 2005 CD settlement also funds long term O&M activities of the City, any remaining work on the Site by EPA, and oversight activities of both EPA and DTSC.

Site Description: EPA designated three OUs for the Site to address the Site-related volatile organic carbon (VOC) contamination. The Source OU encompasses a 23 square mile area in the Upper Santa Ana River Basin, where efforts to identify potential site-wide sources for the groundwater VOC contaminant plumes have been conducted. As part of this source

identification work, a plume of VOC contaminated groundwater was found which appeared to originate from the Northwest (NW) Source Area of the Source OU and divide into two separate groundwater plumes on two sides of the Shandin Hills as it migrated southward. These two plumes were subsequently designated as the Newmark and Muscoy OUs (Figure 1). The NW Source Area was investigated heavily as part of the work to develop the Newmark and Muscoy OUs Interim RODs (IRODs). The Newmark OU is located almost entirely within the north-central portion of the City. The Muscoy OU is located in the west-central part of the City and within an unincorporated part of San Bernardino County known as the Muscoy community.

This Record of Decision (ROD) addresses the Site-related VOC groundwater contamination within the Newmark and Muscoy OUs at the Site. Any Site-related contamination remaining outside these two OUs will be addressed as part of a future ROD for the Source OU.

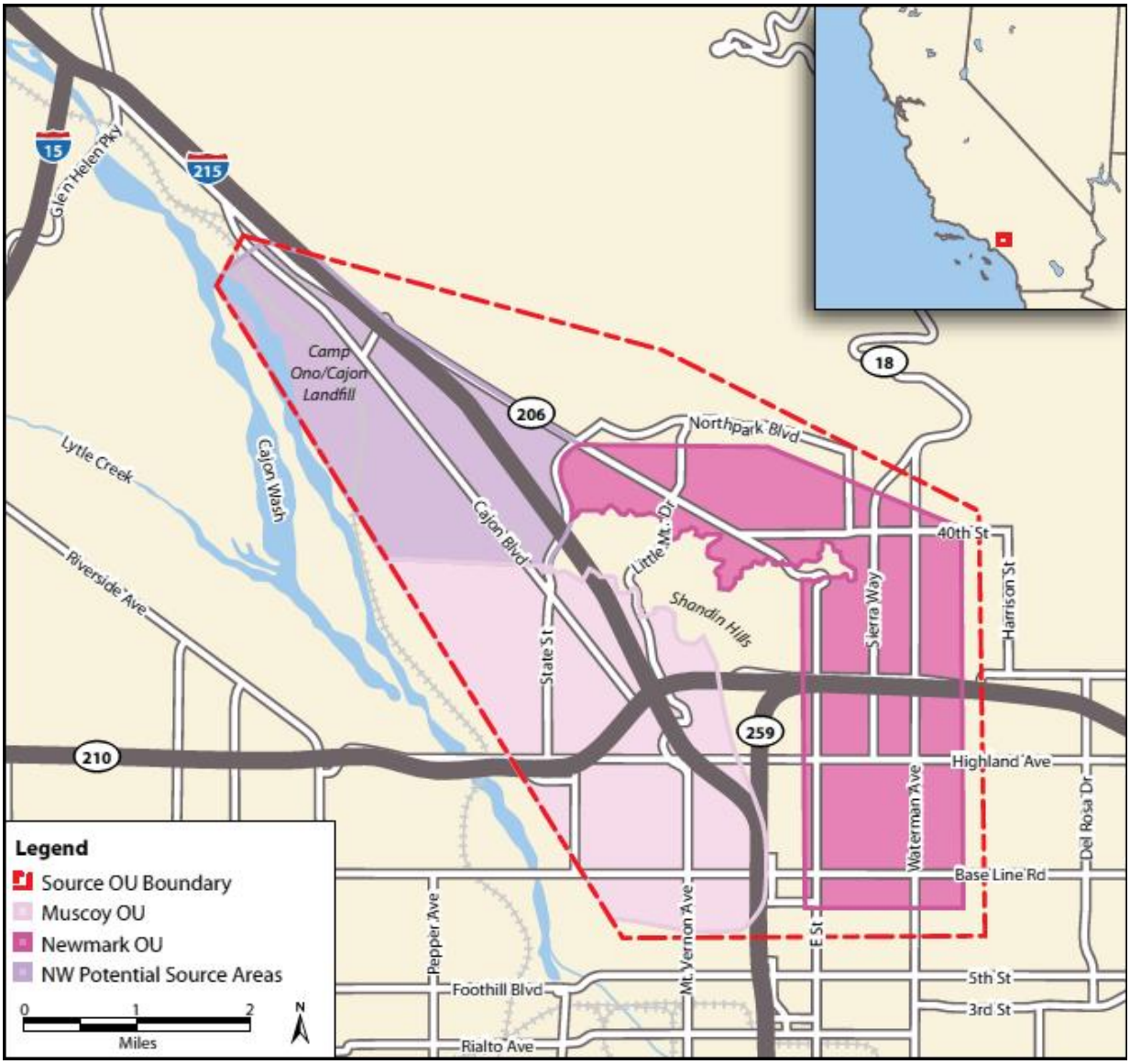

Figure 1: Map of Newmark Groundwater Contamination Superfund Site and OUs. Source: EPA 2014a.

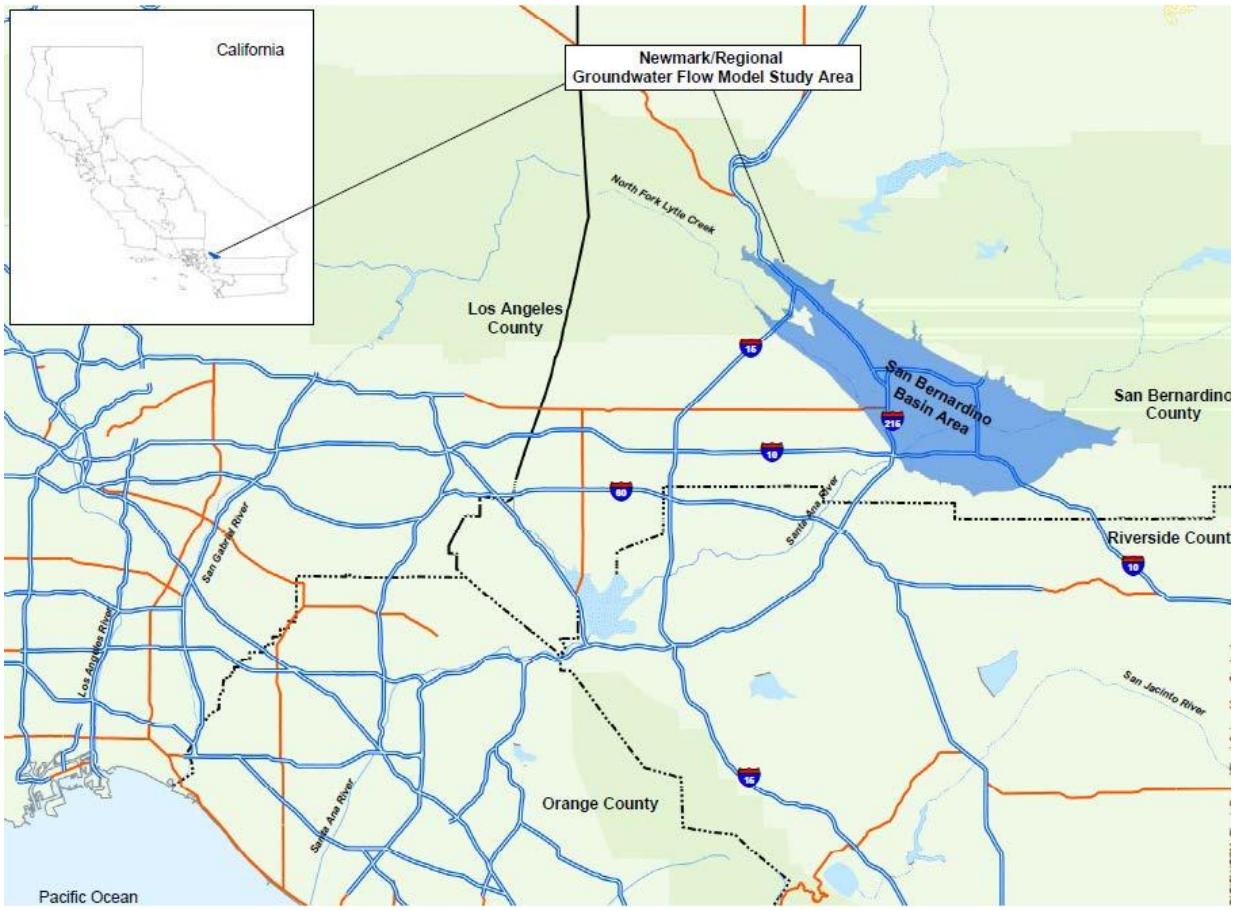

Figure 2. Location Map of San Bernardino Basin Area. Source: EPA 2013

2 Site History and Enforcement Activities

This section discusses the operational history of the Site; the federal, state, and local Site investigations and remedial actions conducted to date; and, the history of CERCLA enforcement activities.

2.1 Site Operational History

VOC groundwater contamination was first discovered in San Bernardino in 1980, when the California Department of Health Services (DHS) initiated a water supply monitoring program to test public water supply wells for the presence of industrial chemicals. The results of this groundwater monitoring and testing program revealed the presence of VOC contaminants in portions of the groundwater of the Upper Santa Ana River Basin.

Groundwater analytical sampling results collected from eight municipal water supply wells identified VOCs, primarily PCE and TCE, at concentrations exceeding federal and state drinking water standards. Other industrial chemicals detected in groundwater analytical sampling results included trichlorofluoromethane (Freon-11) and dichlorodifluoromethane (Freon-12).

Subsequent groundwater investigations conducted 1980-1986 by both DTSC and the Santa Ana Regional Water Quality Control Board (Santa Ana Water Board) found extensive groundwater contamination which resulted in the eventual closure of 20 water supply wells within a 6-mile radius of the future National Priority List (NPL) Site.

On October 30, 1986, DTSC contracted with the City to construct, operate, and maintain four groundwater treatment systems consisting of air stripping and liquid phase granular activated carbon (GAC) units. These systems, located at existing City facilities, were intended to only treat the contaminated water for use as part of the municipal water supply and not contain the groundwater contamination from migrating or cleanup the aquifer. Groundwater contamination was continuing to flow south, threatening more wells operated by the Cities of San Bernardino, Riverside and other communities.

EPA listed the Newmark Groundwater Contamination Site on the NPL on March 31, 1989.

Several investigations were conducted by the Army, EPA, DTSC, the County of San Bernardino, and the City of San Bernardino to identify sources of the original contaminants (e.g., PCE, TCE, Freon-11 and Freon-12) of potential concern (COPC). These investigations were described in detail in the Remedial Investigations and Feasibility Study (RI/FS) Reports developed for subsequent IRODs. These investigations focused primarily on the following facility locations in the NW Source Area: (i) the former Camp Ono, also known as the San Bernardino Engineering Depot, formerly a World War II-era facility operated by the U.S. Army; (ii) the Cajon Landfill**,** an inactive Class II/III landfill consisting of two unlined waste disposal cells which accepted wastes including demolition, septic waste (from septic tanks and chemical toilets), sewage treatment wastes and asbestos; and (iii) the San Bernardino Airport, which was found not to be a suspected source of Site groundwater contamination based on the results of the Newmark OU RI.

In addition, as part of the EPA source investigation efforts conducted since 2010, a search of a commercial online environmental database, and several federal and state databases was performed to identify potential sites of interest; however, none of these was found to be of environmental concern, supporting the investigation-based conclusion that there are no indications of any additional significant sources for the Newmark and Muscoy OUs groundwater contamination. Further details on the identification of known and suspected sources of contamination are provided in Section 5.3.

2.2 Previous Remedial Activities

The Site has undergone a series of remedial activities since groundwater contamination was first discovered in 1980. Figure 3 provides a timeline of regulatory actions, investigations and remedial since 1980. Some of the key events relevant to this ROD are described below.

August 1993: EPA issues an IROD for the Newmark OU groundwater contamination. The Remedial Action Objectives (RAOs) of this IROD include: (1) inhibit migration of groundwater contamination into clean portions of the aquifer; (2) limit additional contamination from continuing to flow into the Newmark OU plume area; and (3) begin to remove contaminants from the groundwater for eventual restoration of the aquifer to beneficial uses.

March 1995: EPA issues an IROD for the Muscoy OU groundwater contamination, with the following RAOs: (1) inhibit migration of groundwater contamination into clean portions of the aquifer; (2) protect downgradient municipal supply wells south and southwest of the Shandin Hills; and (3) begin to remove contaminants from the groundwater for eventual restoration of the aquifer to beneficial uses.

1996 – 2000: Construction of the interim remedy for the Newmark OU is completed in 1998 with the following components: (1) groundwater extraction and treatment facilities at two locations in the aquifer (the North and South Areas); (2) treatment of extracted groundwater using GAC (or air stripping with best available control technology for emissions) at two locations: Newmark Plant in the North Area, the 17th Street Plant and the Waterman Plant in the South Area; (3) pipelines to bring contaminated water from extraction wells to the treatment plants; and (4) monitoring wells to assess the performance of the treatment remedy. The treated groundwater is used as part of the San Bernardino public water supply system for use as potable water per the terms of SBMWD's Water Supply Permit Number 03-13-099P-002 issued by the California Department of Public Health (CDPH). The Newmark OU system is determined to be O&F in October 2000. The City begins O&M of the Newmark OU interim remedy in October 2000, under a Cooperative Agreement with EPA.

2001 – 2007: Construction of the Muscoy OU groundwater extraction and treatment system with: (1) the installation of two extraction wells in 2001 and five downgradient monitoring well clusters in 2002 to help finalize the design of the treatment system; (2) the construction of three additional extraction wells and the treatment system in 2004; (3) the expansion of the existing 19th Street Water Treatment Plant completed in August 2005 to accommodate treatment of contaminated groundwater from the five extraction barrier wells; (4) the connection of pipelines from the Muscoy extraction wells system to all three treatment plants in the South Area; and (5) a booster station connecting the 19th St treatment plant to the San Bernardino Valley Municipal Water District baseline feeder. The treated groundwater is delivered to the San Bernardino public water supply system for use as potable water per the terms of SBMWD's Water Supply Permit Number 03-13-099P-002 issued by CDPH. The Muscoy OU is declared O&F on September 28, 2007. O&M of the Muscoy OU interim remedy starts in October 1, 2007. EPA transfers the Lead Oversight Agency role for the O&M to DTSC.

2004: EPA supplements the Newmark and Muscoy IRODs by issuing an Explanation of Significant Differences (ESD) requiring an institutional controls (ICs) program to protect the performance of the interim remedies. These ICs "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 requires the City to adopt an ordinance or develop a groundwater management program to prevent extraction within the zone of influence of the Newmark and Muscoy systems which could interfere with their integrity.

March 2006: On March 20, 2006, the City adopts the necessary ordinance placing requirements on any new domestic well drilled within the Site management zone (Chapter 13.25 in the San Bernardino Municipal Code). The City Ordinance requires entities that propose to install or modify a production well, or modify artificial recharge practices within a designated management zone, to submit a permit application (or functional equivalent) detailing the

location, construction and pumping rate of the proposed well, or the location and volume of water of a proposed artificial recharge activity.

June 2010: An Agreement to Develop and Adopt an Institutional Controls Groundwater Management Program (ICGMP) is finalized on June 30, 2010, between the City and local water purveyors with adjudicated water rights in the Upper Santa Ana River Basin. The objective of the ICGMP is to avoid spreading contaminated water into clean drinking water wells by determining impact of any new construction or change of operating conditions of existing municipal wells to the Newmark and Muscoy remedy. The impact analysis is supported by the Newmark Groundwater Flow Model (NGFM), the basin-wide groundwater model developed by the City in consultation of all signatories to the ICGMP, and maintained by the City.

2.3 Enforcement Activities

In 2005, a CD was signed between the Army, EPA, DTSC, and the City to settle the case brought by the City against the Army. This 2005 CD established the escrow accounts for the City to perform O&M of the Newmark and Muscoy remedy systems for the next fifty years, and pay for the construction of additional extraction wells as needed. The O&M requirements for the Newmark and Muscoy interim remedies are established in the 2005 CD Statement of Work (SOW) in Appendix D. This settlement also provided funding to EPA for future response costs under CERCLA, and provide an oversight fund for DTSC. Prior to this settlement, EPA funded all construction and O&M costs of the Newmark and Muscoy interim remedies.

In 2007, the United States settled claims against the County of San Bernardino for groundwater contamination associated with the Site. The settlement provided funding to EPA for past and future response costs under CERCLA for the Site.

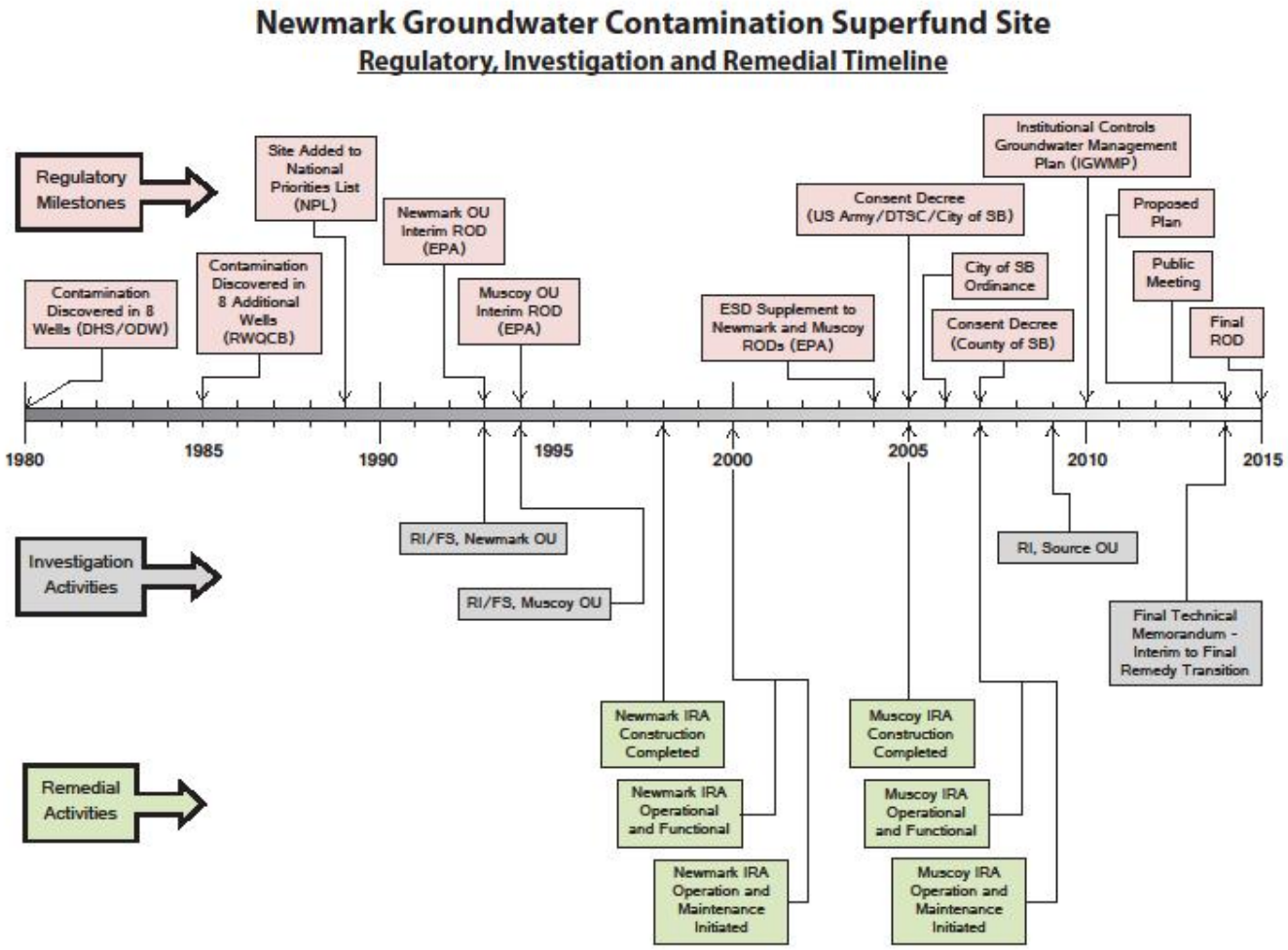

Figure 3. Timeline of regulatory actions.

3 Community Participation

EPA, with the support of DTSC, has kept the community and other interested parties apprised of Site activities through informational meetings, fact sheets, press releases, and public meetings. EPA has conducted community involvement activities to support selection of the Newmark and Muscoy interim remedies in accordance with CERCLA § 117 and the NCP § 300.430(f)(3). Below is a brief chronology of public outreach and community involvement efforts:

Community Involvement Activities for this ROD

- Notice of the public meeting was published in the San Bernardino County Sun newspaper on Thursday, July 31, 2014.
- Post card notices were mailed out to the community to inform the community of the upcoming proposed plan, public comment period, and community meeting.
- The Technical Memorandum, Proposed Plan, and other supporting documents were made available to the public in August 2014. These documents can be found in the Administrative Record file and information repositories maintained at the Cal-State San Bernardino John M. Pfau Library, 5500 University Parkway, PL 401, San Bernardino, California and at the EPA Superfund Records Center, 95 Hawthorne Street, Room 403 S, San Francisco, California.
- EPA's proposed plan describing the preferred alternative for the Newmark and Muscoy OUs final remedy was made available to the public in July 2014. The public comment period began on August 4, 2014 and ended on September 5, 2014. EPA held a public meeting on August 13, 2014 where the proposed plan and preferred alternative were presented and verbal comments were formally recorded. Responses to public comments on the Proposed Plan are summarized in Part III, Responsiveness Summary.
- EPA will announce the availability of this final ROD and make it and the supporting information available through the Administrative Record and information repository for the Site.

4 Scope and Role of Response Action

EPA has divided the Site into three OUs to manage cleanup activities as follows:

OU1 – Newmark Groundwater Plume
OU2 – Muscoy Groundwater Plume
OU3 – Sources

Past Actions for Newmark OU and Muscoy OU:

Interim Remedial Actions: Interim remedies for the Newmark and Muscoy OUs were implemented according to the two IRODs in 1993 and 1995, respectively. Since 2005, these remedies have met the IROD containment criteria and all performance standards as specified in 2005 CD Appendix D SOW and subsequent modifications to operational and performance requirements as documented in the Final O&F Determination for the Muscoy OU (2007 O&F Determination).

Past Actions for Source OU:

Investigation of Potential Sources: Since the implementation of the interim remedies, EPA conducted a comprehensive analysis of all the monitoring data using the 3-dimensional visualization and analysis (3DVA) to determine the sources of the contamination. Although both PCE and TCE are contaminants of concern (COC) at the Site, TCE is currently detected at levels below the state and federal drinking water standards. The trend analyses demonstrate that TCE mimics the behavior of PCE and serves as the basis for applying the results of the PCE plume visualizations to the behavior of TCE in groundwater. Therefore, based on the limited detected presence of TCE in the plumes and the trend analyses, TCE was not further addressed in the 3DVA effort. The results of the 3DVA evaluation was presented in the "*Final Technical Memorandum; Source Identification, Plume Delineation, Restoration Timeframe Estimation and Transition from Interim to Final Remedy; Newmark Groundwater Contamination Superfund Site Source Operable Unit; San Bernardino, California"* (Technical Memorandum) (May 2014), and key findings and conclusions resulting from performing 3DVA for the Source OU are summarized:

- An evaluation of existing Site data revealed there are no active contamination sources which would result in an increase in the concentration or size of the present Newmark/Muscoy plumes. Additionally, a comprehensive search for other potential sources throughout the Source OU using on-line commercial, federal and state environmental database searches was also conducted (see: Section 5.3) which also concluded that there were no other ongoing sources.
- The Muscoy and Newmark OU plumes are one groundwater plume system sourced from the NW Source Area. The 3DVA effort identified that the plume from the NW Source Area bifurcates at the northern edge of Shandin Hills and forms the Muscoy plume to the southwest under high water level conditions or the Newmark plume to the northeast under low water level conditions. 3DVA analysis indicates that an undulating bedrock surface, extensive units of inter-fingered high and low relative hydraulic conductivity alluvial lithologies and fluctuating water table elevations are responsible for the plume's bifurcation.
- The mass of the PCE plume is decreasing with time, resulting in a significant decrease in the potential for the NW Source Area plume to deliver mass to the Newmark/Muscoy plumes. This is evidenced by an estimated PCE mass reduction, using the 5 µg/L isocontour, from 450 pounds in 1997 to 19 pounds in 2012. Using as similar approach for both the Newmark/Muscoy plumes, the combined PCE mass has decreased from approximately 4,500 pounds to 799 pounds in 6 years (2006-2012).
- Estimations to reach federal and state drinking water standards in the Newmark and Muscoy OUs groundwater were derived using mass results from the 3DVA for each treatment area combined with historical monthly PCE removal data from the three treatment systems; however, estimated times to achieve groundwater restoration to federal and state drinking water standards are 17 years for the Newmark OU groundwater plume and 4 years for the Muscoy OU groundwater plume.
- The existing interim remedies appear effective in both containing groundwater contamination and restoring Site groundwater to federal and state drinking water standards within a reasonable timeframe.

- The results of 3DVA were also used as the basis for providing recommendations to improve remedy effectiveness and operation.

Actions Selected in this ROD

Final Actions for Newmark and Muscoy OUs: The actions selected (Selected Remedy) in this ROD addresses groundwater contamination at the Site by adopting all of the components and performance requirements of the two interim groundwater *containment* remedies, implemented through previous decision document[5], along with the addition of a new RAO to *restore* Site groundwater[6] in the Newmark and Muscoy OUs to its designated beneficial use as an existing municipal and domestic water supply.

Future Response Plan

Source OU: An evaluation of the contamination in monitoring well CJ-10 in the NW Source Area is planned. Based on that evaluation, additional response actions may be selected and taken in the future. Well CJ-10 contamination does not impact the plumes being addressed by this ROD. There are no active sources affecting the Newmark and Muscoy plumes.

5 Site Characteristics

This section summarizes information obtained through Site investigations. It includes a description of the Conceptual Site Model (CSM) from the Technical Memorandum which supports the Selected Remedy. The major characteristics of the Site and the nature and extent of contamination are summarized below. Further details are available in the Administrative Record for this remedial action.

5.1 Conceptual Site Model

The CSM was developed with technical support from the EPA's Office of Superfund Remediation and Technology Innovation (OSRTI) Technology Innovation and Field Services Division (TIFSD) to identify the sources of the contamination associated with the Newmark and Muscoy OUs using many years of existing monitoring data, which resulted in a 3DVA CSM.

The results of the 3DVA effort, complemented by the results of the comprehensive environmental database search (described in detail in Section 5.3), indicate that the NW Source Area was the single source of contamination for both the Newmark and Muscoy groundwater contamination plumes, and that there are no current active sources feeding these two plumes

[5] Interim Records of Decisions (IRODs) for the Newmark OU (1993) and Muscoy OU (1995), 2004 Explanation of Significant Differences (ESD), 2004 Consent Decree (CD) between EPA, the US Army, (DTSC), and the City of San Bernardino Municipal Water Department (City), and the 2005 CD and SOW (Appendix D), and the modifications to operational and performance requirements as documented in the Final Operational and Functional (O&F) Determination for the Muscoy OU, dated September 28, 2007.

[6] Santa Ana Regional Water Quality Control Board Basin Plan (1995), Chapter 3: Beneficial Uses, Upper Santa Ana River Basin Groundwater Management Zone (Bunker Hill - A).

from the NW Source Area. There are no indications of any additional significant PCE sources for the Site groundwater contamination located outside of the NW Source Area.

The interim remedies have been successful in both containing the groundwater contamination plumes and simultaneously decreasing the extent of groundwater contamination, allowing an eventual restoration of the aquifer to its beneficial use as an existing municipal and domestic water supply, and could be adopted as components of the final remedial action for the Site groundwater contamination within the Newmark and Muscoy OUs.

Analysis of potential exposure routes during the RI concluded that the only measurable exposure to the VOCs would be through use of untreated groundwater in a domestic water supply. Several state and EPA investigations did not identify VOC contamination at the surface or within ten feet of the soil surface anywhere at the Site. Consequently, direct contact with VOCs via surface soil is not a possible exposure route. Because the depth to contaminated groundwater is greater than 100 feet below ground surface throughout the majority of the Newmark and Muscoy OUs, combined with the negative results from the soil gas investigations at the Site, vapor intrusion is not considered a completed pathway. Exposure through use of untreated groundwater in a domestic water supply is discussed below in Section 7.

5.2 Site Overview

The following Site overview provided the basis for the development of the 3DVA.

The Site boundaries are defined by the Source OU. The Newmark and Muscoy OUs lie within the Site boundaries, which include the San Bernardino Valley, southeast of the San Gabriel Mountains and southwest of the San Bernardino Mountains. Several local topographic highs are present at the Site, most notably Shandin Hills, located to the southeast (Figure 4). 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. The plume from the NW Source Area bifurcates at the northern edge of Shandin Hills and forms the Muscoy plume to the southwest under high water level conditions or the Newmark plume to the northeast under low water level conditions. An undulating bedrock surface, extensive units of inter-fingered alluvial lithology with high and low relative hydraulic conductivity, and fluctuating water table elevations are responsible for the plume's bifurcation.

Regional geology and hydrogeology for the Site is well-documented and complex. Geology beneath the Site is composed of two basic geologic units: unconsolidated sedimentary deposits and bedrock. The unconsolidated sedimentary deposits are water-bearing alluvium derived from the San Gabriel Mountains to the northwest and the San Bernardino Mountains to the northeast. Bedrock beneath the alluvium deposits is identified as the Pelona Schist. The alluvium is highly heterogeneous, made up of clay, silt, sand and gravel (Figure 4). Erosion of the San Gabriel and San Bernardino Mountains formed the confluent alluvial fans at the base of the mountains of the San Bernardino Valley. Although significant faulting exists in the basement bedrock, the overlying sediments show little if any expression of these faults within the boundaries of the Newmark and Muscoy OUs. In addition, the only identified faults that could potentially affect groundwater flow are outside the Newmark and Muscoy OU boundaries.

The Newmark and Muscoy OUs groundwater plumes are located in the Upper Santa Ana River Basin, which is an area of water-bearing alluvial deposits. Lytle Creek flows southeastward in a wide lowland known as the Cajon Wash. Southeastward-flowing Cable Creek occupies the lowland area west of Verdemont Hills, the northernmost promontory in a chain of bedrock hills extending northwestward from Shandin Hills. Approximately 0.5 miles south of Verdemont Hills, the Cable Creek Channel bends to the southwest to join Lytle Creek at a point approximately two miles west of Shandin Hills. Figure 5 shows these and other local hydrologic features.

The Upper Santa Ana River Basin is a 110 miles area 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. Waters flowing throughout all parts of the basin join in a confined "artesian zone" before discharging from the basin where the Santa Ana River crosses the San Jacinto fault line. 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 alluvial aquifer. This confined portion of the aquifer produces a large supply of water for nearby communities. The southern area of the Site transitions into this confined region. Groundwater in the regional aquifer is a valuable resource, currently serving as drinking water for nearly a half-million residents of San Bernardino, Riverside and surrounding communities.

Coarse erosional material (alluvial and river channel deposits) have accumulated in this confined area of the Upper Santa Ana River Basin to depths of 400 to over 1,900 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.

Groundwater elevations in the Muscoy OU area ranges from approximately 1,900 feet amsl (above mean sea level) to approximately 850 feet amsl and flows from the northwest to the southeast parallel to the Loma Linda fault. As groundwater moves downgradient 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).

Stream flow originates from mountainous regions located in proximity to the groundwater basin and is intermittent. During storms, stream flow exits the mountain canyons and enters the valley along its perimeter, where it then feeds the Santa Ana River, Mill Creek, Lytle Creek, and Cajon Creek, and moves across the alluvial fans. While some stream flow undergoes evaporation or is transpired through vegetation, records show that approximately 90 percent of the stream flow recharges the basin. Additional groundwater recharge is provided by the California aqueduct system, which imports water from Northern California. Increased rainfall in the period from 1963 through 1982 contributed to significant recharge to the groundwater basin, resulting in higher natural stream flow and increased streambed percolation. Since 1986, however, recharge has decreased because of drought conditions.

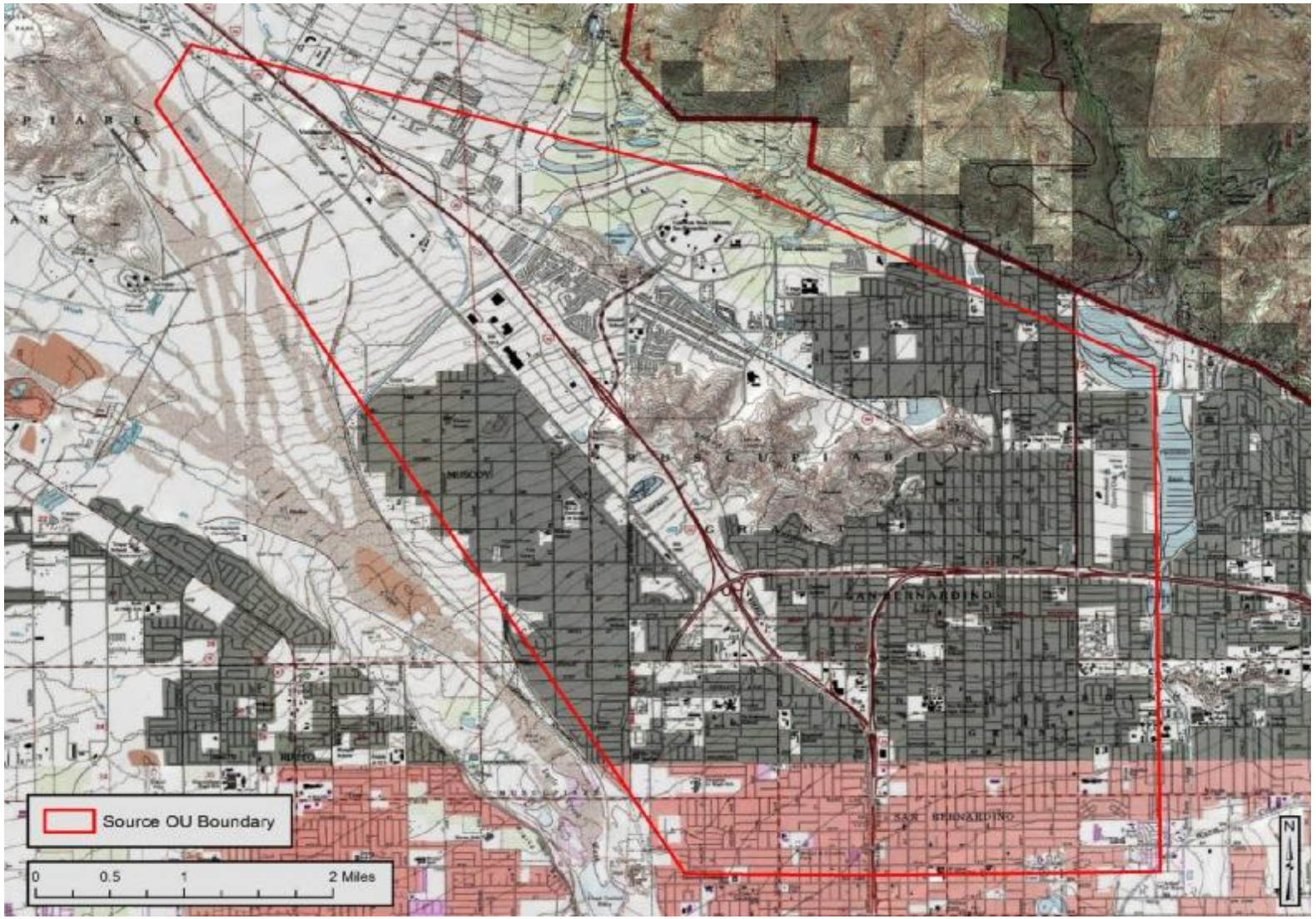

Figure 4. Regional topography. Source: Tetra Tech 2014.

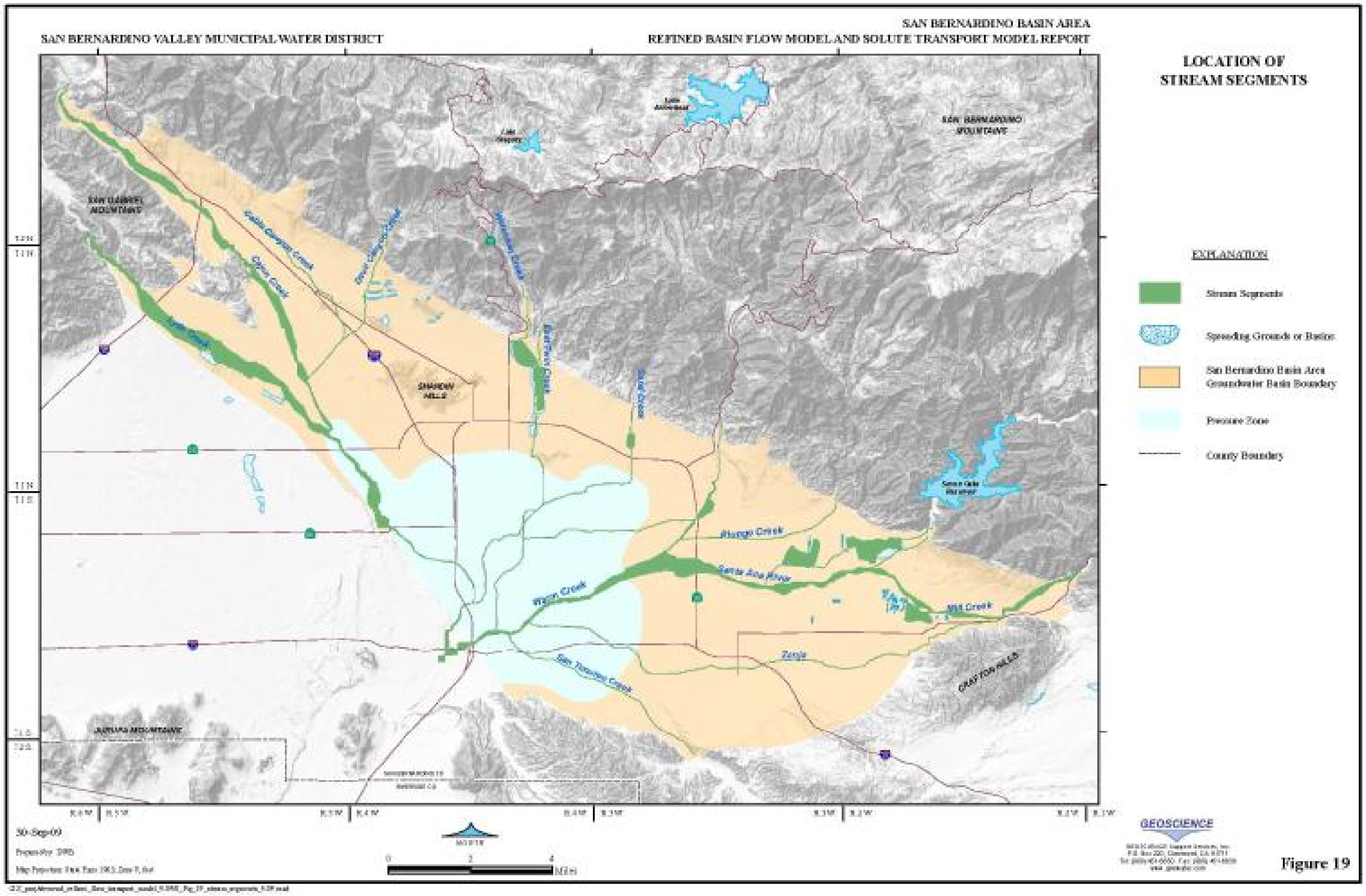

Figure 5. Hydrology of the San Bernardino, California area. Source: Geoscience.

5.3 Suspected Sources of Contamination

The 3DVA-based evaluation indicated that the Newmark and Muscoy plumes were each sourced from the vicinity of the former Camp Ono and Cajon Landfill Facilities located in the NW Source Area:

- Former Camp Ono: Also known as the San Bernardino Engineering Depot, Camp Ono was formerly a World War II-era facility operated by the U.S. Army to provide supplies to Japanese internment camps and military training camps located within California. The 1,770-acre facility operated from 1941 to 1947 and included a laundry, a hospital, a shooting range, a wastewater treatment plant, motor pool areas, an equipment refurbishment area, an oil change ramp, wash racks and a locomotive/tractor servicing area. Source investigations indicated that the PCE and TCE contamination of the groundwater occurred while these chemicals were used as dry cleaning agents and degreasers at the Army facility called Camp Ono during World War II.
- Cajon Landfill: An inactive Class II/III landfill approximately 127 acres in size. The landfill consists of two unlined waste disposal cells of approximately equal size separated by a railroad easement. Each cell was constructed by excavating a pit (below grade), filling the pit with refuse, and covering the pit with excavated material from other areas. The finished height of the two cells ranges from 30 to 40 feet above the surrounding grade. The landfill was operated by the County of San Bernardino between 1963 and 1980. Wastes accepted included demolition, septic waste (from septic tanks and chemical toilets), sewage treatment wastes and asbestos. At closure in 1980, the landfill was covered with a 3-foot layer of silty sand. In response to the deterioration of this initial covering, an engineered cap was installed in 1998.

A comprehensive search of on-line commercial, federal and state environmental databases for potential locations of interest throughout the entire Source OU was conducted to further confirm the NW Source Area as the source for the Newmark and Muscoy plumes. A search of 51 environmental databases identified an initial 1,921 locations. Elimination of duplicate references reduced the total to 1,289 unique locations, of which 27 locations were identified from several State of California databases and 24 were identified from federal databases.

Sites were further sorted based on site type and various indicator attributes to isolate those sites with reasonable potential of having environmental contamination concerns. A final list of 46 sites was resolved from the sorting effort (Figure 6), this list was confirmed by RWQCB and DTSC that none of the 46 sites was being managed under such regulatory action, and thus are not of environmental concern.

There are no indications of any additional significant sources for the Site groundwater contamination located outside of the NW Source Area.

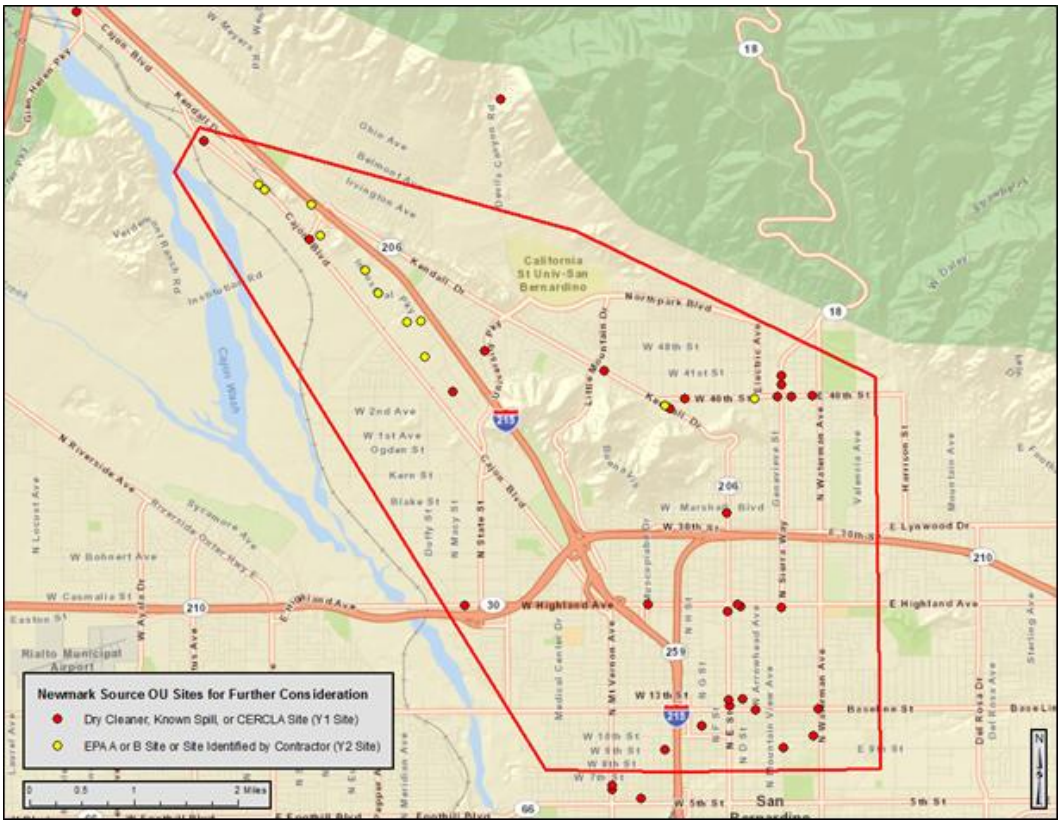

Figure 6. Distribution of 46 final sites of potential interest for further consideration. Source: EPA 2014.

5.4 Remedial Investigation Strategy

The majority of data available for the 2014 3DVA evaluation were collected in 1990 as part of the Newmark RI/FS study, in 1992 as part of the Muscoy OU RI/FS, and from 1997 to 2012 as part of the ongoing O&M of the interim remedies for the Newmark and Muscoy OUs. The sampling plan for these data was designed to collect representative groundwater stratigraphic and contaminant data (1) for use in the human health risk assessment (HHRA) and the ecological risk assessment (ERA) as part of the RI/FS efforts for the Newmark and Muscoy OUs, (2) to characterize the nature and extent of chemical concentrations in groundwater within the Newmark and Muscoy OUs as part of the RI/FS efforts for the Newmark and Muscoy OUs, (3) to evaluate potential sources at the Site as part of the RI/FS efforts for the Newmark and Muscoy OUs and the 3DVA evaluation, and (4) to monitor the effectiveness of the interim remedies in accordance with the 2005 CD and the 2007 O&F Determination.

For further information regarding the remedial investigations conducted for the Newmark and Muscoy OUs, refer to the Newmark OU RI/FS (EPA 1993) and the Muscoy OU RI/FS (EPA 1994).

The 3DVA evaluation used existing site quantitative data (water levels, chemical analytical results, and lithology at set depth intervals) versus data interpretations to document site features

(lithology and hydrogeology and plume characteristics). The following site and environmental data were provided by the site team:

- Locational/geographic data (including site features)
- Geologic data
- Hydrogeologic data
- Groundwater contaminant chemistry data

Public sources of data, such as digital land surface elevation data or aerial maps, were used to supplement site-specific data.

5.5 Nature and Extent of Contamination

The following COC are identified within the Newmark and Muscoy OUs:

Table 1. Contaminants of Concern

CAS #	Contaminant Name	Abbreviation	Operable Unit
127-18-4	Tetrachloroethene (or Perchloroethylene)	PCE	Newmark Muscoy
79-01-6	Trichloroethene	TCE	Newmark Muscoy

Notes: CAS = Chemical Abstract Service.

The Technical Memorandum analysis focused only on PCE analysis. Based on the 3DVA, there are approximately six localized areas of PCE groundwater contamination remaining at detected concentrations above the 5µg/L isocontour, located primarily in five areas south and east of the Shandin Hills, respectively (Figure 7). The mass of the PCE contamination is decreasing with time, resulting in a significant decrease in the potential for the NW Source Area contamination to deliver mass to the Newmark and Muscoy plumes.

The integration of the PCE and relative hydraulic conductivity component visualizations enabled estimation of total PCE mass in the plumes based on soil effective porosities. The mass of PCE comprising any isoconcentration (for example, 5µg/L) was calculated for total plumes and subsets of plumes using the volumetric capabilities provided within the C Tech Development Corporation's Mining Visualization System (MVS) software. The mass of the Source OU-wide PCE plume was calculated for each year (1997 to 2012). The mass of PCE in the NW Source Area in 1997 was calculated to be 450 pounds in 1997 and subsequently decreased to a calculated mass of 19 pounds in 2012 at a PCE isoconcetration level of 5 µg/L (Figure 8). The interim remedy treatment systems are estimated to remove the remaining groundwater contamination (PCE above 5 µg/L) within 17 years in the Newmark OU area and at least 4 years in the Muscoy OU area, given the rate of contamination mass removal in the last 8 years, based on the analysis presented in the 2014 Technical Memorandum (Figure 9). Groundwater from one monitoring well (CJ-10) in the NW Source Area continues to have relatively consistent PCE concentrations that fluctuate between 30 and 50 µg/L. However, the overall mass of PCE

contamination from the NW Source Area has greatly diminished with time and is no longer contributing to the to the Newmark and Muscoy OU plumes.

Figure 7. Map of localized plume areas in 2012 in showing contaminated groundwater at concentrations greater than or equal to 5 µg/L. Source: EPA 2014.

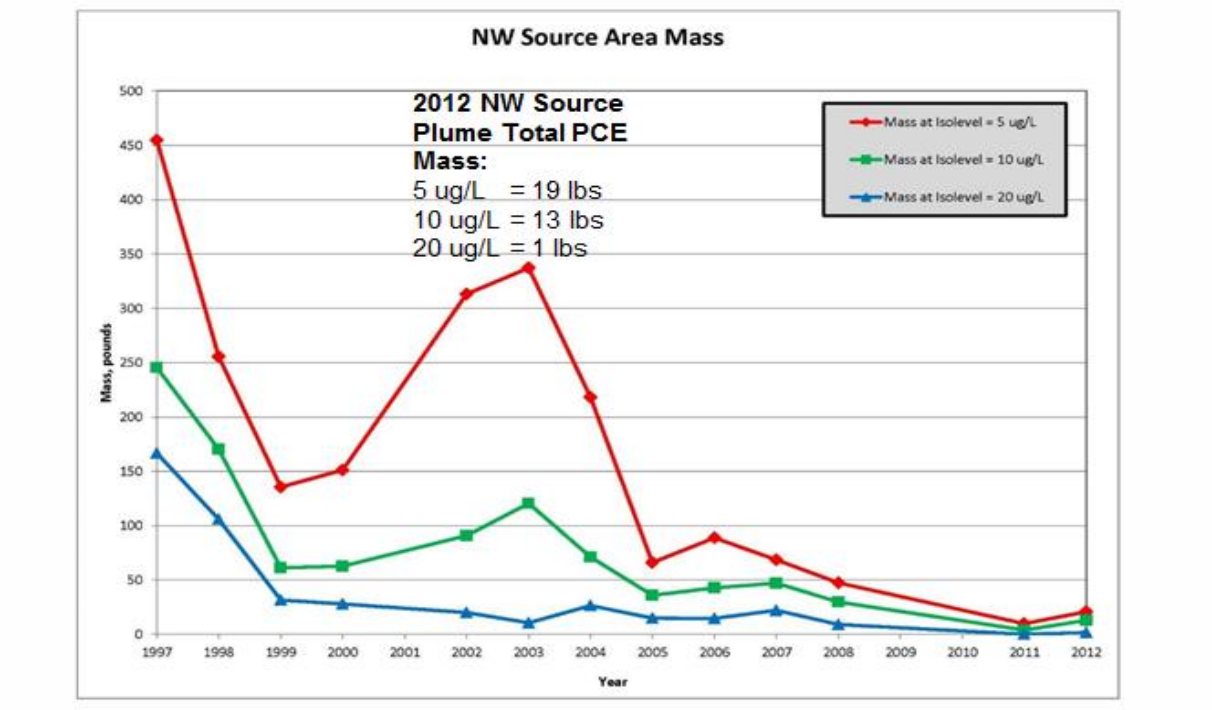

Figure 8. Decreases in mass of PCE in Northwest Source Area from 1997-2012. Source: EPA 2014. Note: Analytical data from the spring of 2011 sampling efforts in the NW Source Area were considered qualitative, but useful for informational purposes for the 3DVA effort.

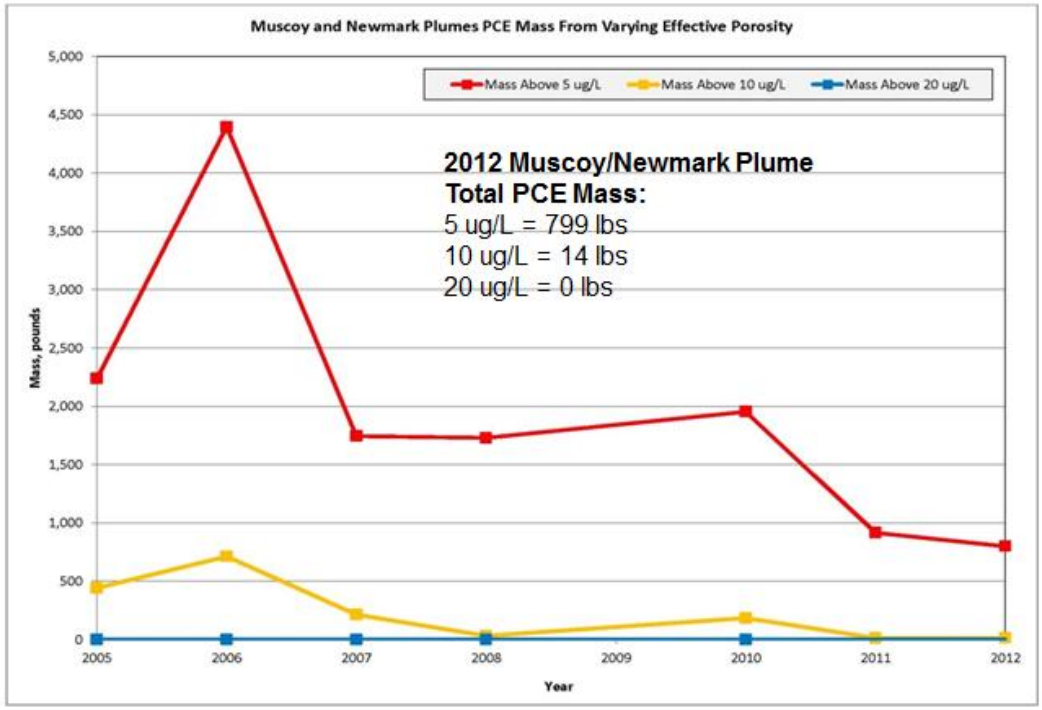

Figure 9. Newmark and Muscoy OU PCE mass calculation over time. Source: EPA 2014.

6 Current and Potential Future Land and Water Uses

This section discusses the current and reasonably anticipated future land, groundwater, and surface water uses at the Site. This information forms the basis for reasonable exposure assessment assumptions and risk characterization conclusions.

6.1 Land Uses

Urban development within the Site has replaced much of the native habitat and landscape. The area covered by the Newmark and Muscoy OUs currently is used for light industrial, commercial, and residential purposes. Future land uses are anticipated to be similar to current land uses and will be unaffected by the Selected Remedy.

6.2 Groundwater

The EPA has established criteria for determining the classification of groundwater based on actual or potential uses and yield in its 1986 "Guidelines for Ground-Water Classification under the EPA Ground-Water Protection Strategy." Under these guidelines the groundwater associated with the Site could be considered Class IB because it is a current source of drinking water. However, for the purposes of this ROD, EPA is determining the Site groundwater to be considered Class IA, which define these groundwater resources as "unusually high value because they are highly vulnerable to contamination and are (1) irreplaceable sources of drinking water to substantial populations, and/or (2) ecologically vital." The Site groundwater is highly vulnerable to contamination and is an irreplaceable source of drinking water to a substantial population. However, it has not been designated as a Sole Source Aquifer by EPA under the Sole Source Aquifer Program established by section 1424(e) of the Safe Drinking Water Act of 1974 (Public Law 93-523, 42 U.S.C. 300 et seq.).

The State Water Resources Control Board (SWRCB), through adoption of Resolution 88-63 (as revised by Resolution 2006-008), has established a California "Sources of Drinking Water Policy." By comparing information contained in this Resolution to know water quality parameters found at the Site, including total dissolves solids and yield, Site groundwater is considered to be suitable for municipal or domestic water supply.

Based on both the federal and state classification systems, the Site groundwater's beneficial use is as an existing municipal and domestic water supply, which currently and historically has been used as a significant portion of the regional water supply.

Surface water is not affected by Site contamination and its current and future beneficial uses will not be affected by the Selected Remedy.

7 Summary of Site Risks

Baseline human health and ecological risk assessments are conducted at Superfund sites to fulfill one of the requirements of the NCP. The NCP (40 CFR Part 300) requires development of a baseline risk assessment at sites listed on the National Priorities List under CERCLA.

The objective of the baseline risk assessment for the Newmark OU and Muscoy OU was to evaluate the human health and environmental risks posed by the contaminated groundwater if it were to be used as a source of drinking water without treatment. Preliminary Baseline Risk Assessments were completed for the Newark OU RI/FS (1993) and the Muscoy OU RI/FS (1994).

Currently, the primary risk driver at the Site is PCE contamination in groundwater that serves as a current source of drinking water, at levels that exceed the federal and state drinking water standards. In 2014, EPA revised the default values for several exposure parameters for residential exposure to in situ groundwater. Therefore, revised human health risks were calculated for ingestion of PCE in drinking water. Results of this reassessment are presented in the 2014 Technical Memorandum.

The baseline risk assessment in the 1993 Newmark OU IROD and the 1995 Muscoy OU IROD provided the basis for the remedy decision in the two IRODs, Therefore, this same baseline risk assessment is used as the baseline risk assessment for this ROD, to support the selection of the interim remedies as final remedy in this ROD.

7.1 Summary of Human Health Risk Assessment

The objective of the HHRA is to evaluate risks under current land use conditions, assuming no remedial action was taken, and under unrestricted land use conditions. It provides the basis for taking action and identifies the contaminants and exposure pathways that need to be addressed by the remedial action. The Newmark and Muscoy OU baseline risk assessment reports provide a good basis for understanding risks to human populations if exposed to contaminated groundwater without treatment.

7.1.1 Identification of Chemicals of Concern

To focus the risk assessment on those contaminants impacting to human health, the chemical results were initially screened to identify COPC. For the ROD, COC are identified as those COPC with risk estimates exceeding the risk threshold levels identified by the EPA and NCP.

COPC identified in the preliminary baseline risk assessments for the Newmark OU and Muscoy OU conducted as part of the RI/FS efforts for the OUs included: PCE, TCE, cis-1,2-DCE, trans-1,2-DCE, 1,1- DCA, Freon 12, Freon 11, Trans-1,2-dichloroethene, 1,2-dichloropropane, and vinyl chloride. PCE and TCE are the COC for the Newmark and Muscoy OUs. At the present time, only PCE remains in groundwater above federal and state drinking water standards.

7.1.2 Exposure Assessment

The exposure assessment evaluates exposure pathways by which people are or can be exposed to the contaminants of concern in different media. Factors relating to the exposure assessment include, but are not limited to, the concentrations that people are or can be exposed to and the potential frequency and duration of exposure.

The preliminary baseline risk assessments for the Newmark OU and the Muscoy OU IRODs evaluated the use of untreated groundwater for domestic purposes. The potential exposure

pathways evaluated were ingestion of untreated drinking water and inhalation of VOCs released from the water into the household air during use, transport of VOCs from groundwater through soil and into ambient air or into a building through the foundation. The vapor intrusion pathway likely does not contribute a significant exposure, risk, or hazard because depth to groundwater at the Site is greater than 100 feet throughout the majority of the Newmark and Muscoy OUs. The exposure routes considered for this ROD are also ingestion of untreated drinking water and inhalation of VOCs released from the water into the house hold air during use (Figure 10). In 2014, EPA revised the default values for several exposure parameters for residential exposure to in situ groundwater. These revisions do not affect the final outcome of the risk assessment.

7.1.3 Toxicity Assessment

Toxicity was assessed in both the preliminary baseline risk assessments and presented in the RI/FS reports for the Newmark and Muscoy OU IRODs.

It is important to note that toxicology values and risk assessment methods have been updated since the preliminary baseline risk assessments were conducted. In particular, mutagens — which include the Site COC TCE – now involve age-dependent adjustment factors that are used to reflect the greater susceptibility of younger receptors to chemicals that are carcinogenic via a mutagenic mode of action. As part of the recently conducted 2013 Five-Year Review, changes to toxicity values to Site COC were evaluated. This evaluation used a program that is part of the EPA's Integrated Risk Information System, which updates risk assessment toxicity values as newer scientific information is made available. Changes to toxicity values were identified for Site COC PCE, TCE, cis-1,2-DCE, carbon tetrachloride and methylene chloride. These updated values would result in a change in calculated cancer and noncancer risk values for the Site. In 2014, additional changes to toxicity values for PCE resulted in a change to calculated cancer and noncancer risk values for the Site. These toxicity values and default exposure parameters used in these updated calculations are summarized in the May 2014 EPA Regional Screening Level Table, with the exception of the use for the California modified toxicity value for PCE.

Outstanding toxicological issues have not been identified at the Site.

7.1.4 Risk Characterization

In the RI/FS reports (March 1993 and December 1994) supporting the Newmark and Muscoy IRODs, EPA calculated the human health risk posed if no steps were taken to clean up the contaminated Site groundwater. In 2014, the cancer risk value and noncancer hazard values for PCE were recalculated by EPA to reflect the most up to date scientific information available. The calculations using modified toxicity values for PCE did not change the risk findings for groundwater for the Site.

In 2014, the cancer risk value and noncancer hazard values presented in the RI/FS were recalculated by EPA to reflect the most up to date scientific information available. The revised risk calculations and results include revisions to toxicity values for PCE as well as to default exposure parameters for residential receptors. For ingestion of PCE contamination in groundwater, the cancer risk value ranged from 1.8E-05 to 7.7 E-06 and the noncancer hazard quotient ranged between 0.13 and 0.22. EPA concluded that the contamination in the

groundwater does not pose an unacceptable cancer risk or noncancer risk. For carcinogens, EPA's acceptable risk range is between 1.0E-04 (1 in 10,000) and 1.0E-06 (1 in 1,000,000). For non-cancer risk, the acceptable hazard quotient value is below 1. The calculations using modified toxicity values for PCE did not change the risk findings for groundwater for the Site.

PCE concentrations in groundwater still exceed the federal and state drinking water standards. This exceedance requires the continued treatment of contaminated groundwater before it can be served as drinking water. Because the levels of PCE in groundwater are still above MCLs and the water is being served as drinking water it is necessary to take further action to address this risk.

There are currently no unacceptable human health risks at the Site. The current groundwater extraction and treatment systems and ICs implemented at the Site prevent exposure and are protective of human health.

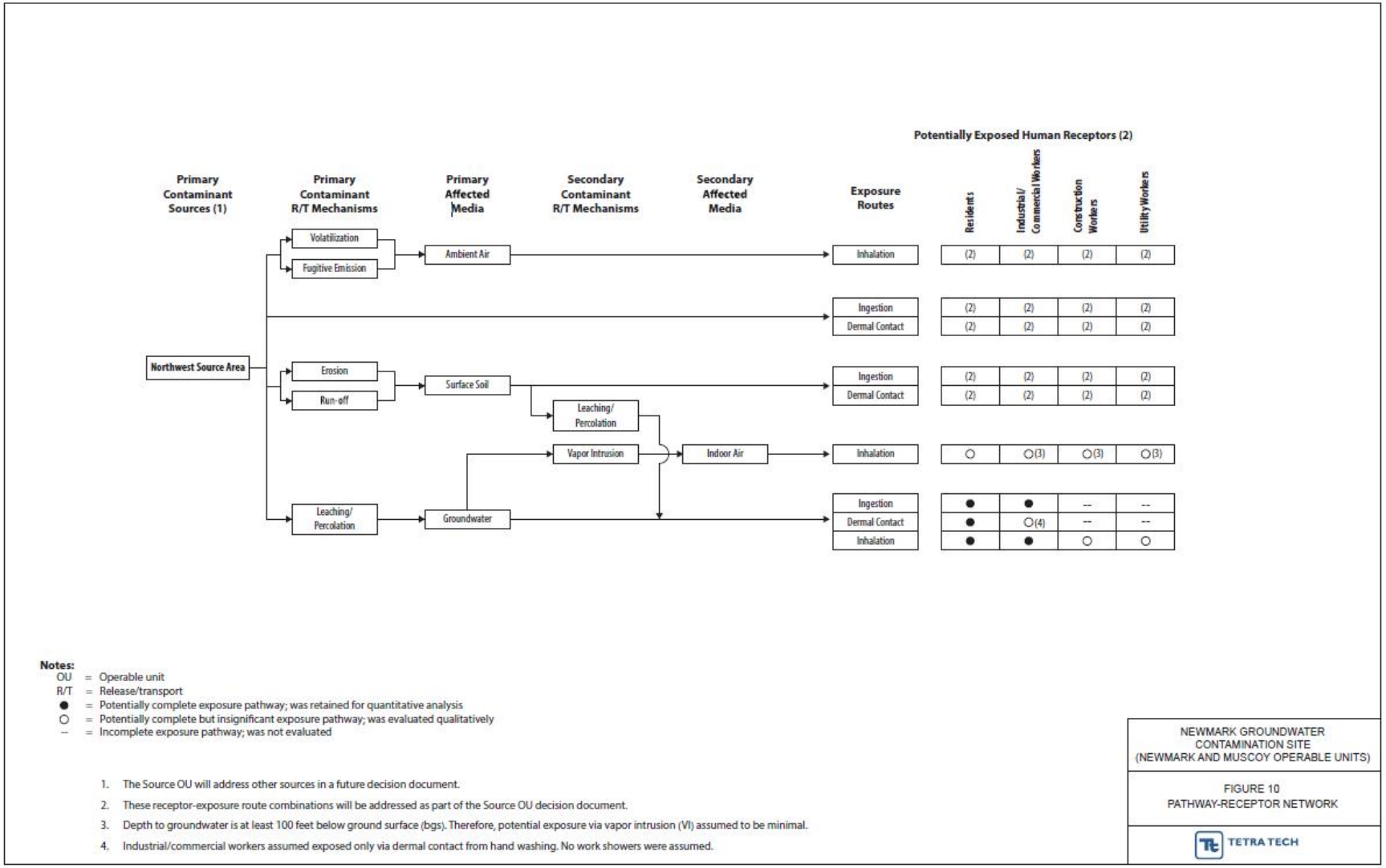

Figure 10. Exposure Scenarios using Pathway-Receptor Network – Source: EPA 2014.

7.2 Summary of Ecological Risk Assessment

An environmental risk assessment (ERA) was also completed in the Newmark and Muscoy OUs RI/FS to determine if any plants or animals within the Site could be threatened or at risk from Site-related contamination. Given the present developed condition of the Site and the major exposure pathway consideration of contaminated groundwater, there was no expectation for significant impact to potential environmental receptors. As discussed in the IROD issued for the Newmark OU in 1993, urbanization "has replaced habitat potential; therefore no significant number of receptors appeared to be present" and that "there was no indication that future Site plans would reinstate habitat and thereby recreate a potential for environmental receptors in the future." Although there has been increased development in the area since the two IRODs, the ERA is still valid. In addition, findings in the ERA also indicated that there was no evidence of surface or near surface soil contamination and no surface water discharge of contaminated groundwater. As a result, a complete exposure pathway to potential ecological receptors does not exist, and there is no ecological risk present on the Site.

7.3 Basis for Remedial Action

The Technical Memorandum presented the current status of the Site:

- The concentrations of TCE, and byproducts cis-1,2-DCE, trans-1,2-DCE and 1,1- DCA are below MCLs in all Site wells.
- There are currently six localized areas of PCE groundwater contamination remaining at concentrations greater than the current MCL at 5 µg/L (Figure 7).
- Existing data indicate no active sources that would result in an increase in the concentration or size of the present Newmark/Muscoy plumes and specifically no evidence of ongoing sourcing from the NW Source Area.
- The mass of PCE in the NW Source Area in 1997 was calculated to be 450 pounds in 1997 and subsequently decreased to a calculated mass of 19 pounds in 2012 at a PCE isoconcentration level of 5 µg/L (Figure 8).
- The interim remedy treatment systems have been successful in not only containing the spread of the contamination, but also to steadily reducing the contamination mass. The existing remedies are estimated to remove the remaining groundwater contamination (PCE above 5 µg/L) within 17 years in the Newmark OU area and at least 4 years in the Muscoy OU area, given the rate of contamination mass removal in the last 8 years (Figure 9).

All the above factors support EPA decision to proceed to a final ROD to restore the aquifer to beneficial use. The response action selected in this final ROD to continue with the current remedy systems is necessary to complete the cleanup of the remaining PCE and TCE contamination in the Newmark and Muscoy OUs above the federal and state drinking water standards for Site COC.

8 Remedial Action Objectives

Consistent with the NCP and RI/FS Guidance, EPA developed RAOs for the protection of human health and the environment. The Selected Remedy in this ROD addresses groundwater

contamination at the Site by adopting all of the components and performance requirements of the two interim groundwater *containment* remedies, implemented through previous decision documents[7], along with the addition of a new RAO to *restore* Site groundwater[8] in the Newmark and Muscoy OUs to its designated beneficial use as an existing municipal and domestic water supply.

The following RAOs have been established for the both the Newmark and Muscoy OU final remedies:

1) Inhibit migration of groundwater contamination into clean portions of the aquifer;
2) Limit additional contamination from continuing to flow into the Newmark OU plume area;
3) Protect downgradient municipal supply wells south and southwest of the Shandin Hills;
4) Restore the aquifer (Site groundwater) to its designated beneficial use as an existing municipal and domestic water supply (MCLs);
5) Protect the public from coming into contact with contaminated groundwater; and
6) Protect the function and effectiveness of the treatment remedy.

9 Description of Alternatives

EPA evaluated two cleanup alternatives for the Site: (1) No Action and (2) Current Remedies. No other remedies were evaluated because the current treatment systems and ICs have been effective at reducing contaminant concentrations, preventing contaminant migration and preventing exposure to humans. The existing treatment systems have inhibited the spread of groundwater contamination into unaffected groundwater areas, and have removed sufficient contaminant mass to allow for restoration of groundwater to the cleanup level for PCE within a reasonable timeframe.

9.1 Description of Remedy Components

ALTERNATIVE 1: No Action - This alternative serves as a baseline to compare other alternatives and is evaluated to determine the risks that would be posed to public health and the environment if no action were taken to treat or contain the contamination. Under this baseline alternative, there would be no groundwater monitoring or cleanup activities and no ICs would be in place to prevent human exposure to contaminated groundwater. This alternative was considered in both IRODs and not selected as preferred alternative in either of them.

ALTERNATIVE 2: Adopt Interim Groundwater Remedies as Final Groundwater Remedies. - Alternative 2 would adopt the current interim groundwater remedies for the Newmark and Muscoy OUs to restore the Site's groundwater to its beneficial use as an existing municipal and domestic water supply. Alternative 2 would consist of the following components:

[7] IRODs for the Newmark OU (1993) and Muscoy OU (1995), 2004 ESD, 2005 CD between EPA, the US Army, DTSC, and the City, and the 2005 CD SOW (Appendix D), and the modifications to operational and performance requirements as documented in the Final O&F Determination for the Muscoy OU, dated September 28, 2007.
[8] Santa Ana Regional Water Quality Control Board Basin Plan (1995), Chapter 3: Beneficial Uses, Upper Santa Ana River Basin Groundwater Management Zone (Bunker Hill - A).

- Two extraction well networks, one in the North Area (North Plant Extraction Well Network) with three extraction wells, and one in the South Area (Newmark/Muscoy Plumes Front Extraction Well Network) which includes the Newmark and the Muscoy Extraction Wells with 13 extraction wells at ten well locations forming a leading edge barrier. Two of the 13 extraction wells are to be installed as part of a planned extraction well network expansion to enhance capture of the Muscoy plume (Stantec, 2014).
- Three existing treatment plants: the Newmark, Waterman, and 19th Street Treatment Plants. The Newmark plant in the North Area mainly treats the north extraction wells, while the Waterman and 19th Street plants treat the Newmark/Muscoy Plumes Front Extraction Well Network in the South Area. Pipelines connect these barrier wells to both treatment plants and provide operational flexibility for treatment. Treated water is delivered to the City's distribution system for further treatment for domestic water supply.
- There are over 100 groundwater monitoring wells at the Site to monitor the extent and progress of the cleanup of the contaminated groundwater.
- ICs to prevent the use of contaminated groundwater and the spreading of the contamination through pumping using the following: (1) an existing City Ordinance implemented by the City in 2006 that require entities that propose to install or modify a production well, or modify artificial recharge practices within a designated management zone, to submit a permit application (or functional equivalent) detailing the location, construction and pumping rate of the proposed well, or the location and volume of water of a proposed artificial recharge activity, and 2) the use of the ICGMP Agreement between the City and several water purveyors to manage production rates so as not to spread contaminated water into their clean drinking water wells. The NGFM is used by the City and the ICGMP as the technical basis for all ICs decisions.
- O&M will follow the requirements of the 2005 CD Appendix D SOW and 2007 O&F Determination.

9.2 Common Elements and Distinguishing Features of Each Alternative

There are no common elements for Alternatives 1 and 2. However, there are two distinguishing features of both alternatives.

Estimated Time to Reach Federal and State Drinking Water Standards: Alternative 2 would meet the PCE federal and state drinking water standards in about 17 years in the Newmark OU area and in about four years in the Muscoy OU area. Specifically, the estimated times to achieve restoration for the contamination captured by the three treatment plants for PCE in groundwater at or above federal and state drinking water standards are: Newmark Plant - 17 years and Waterman Plant - nine years (Newmark OU area) and the 19th Street North Plant - four years (Muscoy OU area). Estimations were derived using mass results from the 3DVA evaluation for each treatment plant (Newmark, Waterman, and 19th Street North) combined with trend analysis of historical monthly PCE removal data from the three treatment plants. TCE is currently below its federal and state drinking water standard in the aquifer. Alternative 1 with No Action would not likely achieve cleanup levels for several decades and would result in the spreading of contamination to currently uncontaminated portions of the drinking water aquifer.

Resource Recovery: Alternative 2 would recover contaminated groundwater for reuse by extracting the contaminated groundwater and treating it so that it can be used for drinking water. Potable water is a limited resource in southern California. Alternative 1 with No Action would not recover the contaminated groundwater for reuse and would allow the spread of contamination to currently uncontaminated portions of the drinking water aquifer.

9.3 Expected Outcomes of Each Alternative

Alternative 1 would not result in the restoration of the drinking water aquifer to federal and state drinking water standards in a reasonable timeframe and it would allow the spread of contamination to currently uncontaminated portions of the drinking water aquifer. Under Alternative 1 there would be no recovery or reuse of the contaminated groundwater. In addition, Alternative 1 would not protect against the pumping and use of contaminated groundwater, which would potentially expose human population to contaminated groundwater that exceeds the federal and state drinking water standards. Because the levels of PCE in groundwater are still above MCLs and the water is being served as drinking water, this Alternative would fail the threshold criteria for protecting human health and compliance to ARARs, therefore it is necessary to take further action to address this risk.

Alternative 2 would restore the groundwater aquifer to federal and state drinking water standards in an estimated 17 years in the Newmark OU area and in an estimated four years in the Muscoy OU area.

In addition, Alternative 2 would prevent the spread of contamination to currently uncontaminated portions of the aquifer, allowing for the continued beneficial use as drinking water. Under Alternative 2 the valuable groundwater resource would continue to be recovered and reused through extraction, treatment, and distribution to the City municipal water supply system. After achievement of the PCE cleanup level is confirmed, the ICs on the use of the aquifer could be removed allowing for unlimited use of and unrestricted exposure to the groundwater.

Further details are provided in the 2014 Technical Memorandum.

10 Summary of Comparative Analysis of Alternatives

Section 121(b)(1) of CERCLA presents several factors that, at a minimum, EPA is required to consider in its assessment of alternatives. Building upon these specific statutory mandates, the NCP established nine evaluation criteria to be used in assessing the individual remedial alternatives. The nine evaluation criteria are as follows:

- Overall protection of human health and the environment
- Compliance with ARARs
- Long-term effectiveness and performance
- Reduction of toxicity, mobility, or volume through treatment
- Short-term effectiveness
- Implementability
- Cost

- State Acceptance
- Community Acceptance

A detailed analysis was performed on the alternatives using the nine evaluation criteria in order to select a final remedy. The sections below present the criteria and a brief narrative summary of the alternatives and the strengths and weaknesses according to the detailed and comparative analysis.

Overall Protection of Human Health and the Environment

Overall Protection of Human Health and the Environment addresses whether a remedy provides adequate protection of human health and the environment and describes how risks posed through each exposure pathway are eliminated, reduced or controlled through treatment, engineering, or ICs.

Alternative 1 would not be protective of human health and the environment because it would not restore the drinking water aquifer to its beneficial use, would not stop the spread of contamination to currently uncontaminated portions of the drinking water aquifer, and would not keep potential users from pumping and using contaminated groundwater. Because the levels of PCE in groundwater are still above MCLs and the water is being served as drinking water, Alternative 1 would fail this criteria, therefore it is necessary to take further action to address this risk.

Alternative 2 would provide protection of human health and the environment. Alternative 2 would be protective of human health and the environment by restoring the contaminated groundwater to its beneficial use as drinking water, preventing exposure to contaminated groundwater, and preventing the spread of contaminated groundwater to currently uncontaminated portions of the drinking water aquifer.

Compliance with Applicable or Relevant and Appropriate Requirements (ARARs)

Compliance with ARARs addresses whether a remedy will meet all of the applicable or relevant and appropriate federal and state requirements or justifies a waiver from such requirements.

Alternative 1 would not trigger ARARs because no action would be taken.

Alternative 2 would restore the contaminated groundwater to the relevant and appropriate MCLs for PCE and TCE and therefore would comply with these chemical-specific ARARs. Alternative 2 would also comply with action-specific ARARs.

Long-Term Effectiveness and Permanence

Long-Term Effectiveness and Permanence refers to expected residual risk and the ability of a remedy to maintain reliable protection of human health and the environment over time, once cleanup levels have been met. This criterion includes the consideration of residual risk that will remain onsite following remediation and the adequacy and reliability of controls.

Alternative 1 would provide no long-term effectiveness or permanence because the risk from contaminated groundwater will not be addressed and there is no control in place.

Alternative 2 would achieve a permanent cleanup. Alternative 2 would restore the aquifer to its beneficial use as an existing municipal water supply, and would include groundwater level monitoring and sampling to aid in evaluating the treatment effectiveness.

The ICs would be part of the long-term management to protect the function and the effectiveness of the treatment systems and to prevent exposure to contaminated groundwater. This alternative would be implemented for at least 17 years and the treatment that would be provided is considered irreversible.

Reduction of Toxicity, Mobility, or Volume through Treatment

Reduction of Toxicity, Mobility, or Volume through Treatment refers to the anticipated performance of the treatment technologies that may be included as part of a remedy.

Alternative 1 would not reduce the toxicity, mobility, or volume of the PCE and TCE contamination in groundwater because there is no treatment.

Alternative 2 would reduce the volume of PCE and TCE by removing it from the groundwater using extraction. The PCE and TCE in the extracted groundwater would be removed from the groundwater by the GAC. Alternative 2 would reduce the toxicity, mobility, or volume of PCE and TCE through treatment. The 3DVA evaluation indicates that the current treatment system has successfully been removing VOC mass from the aquifer with approximately 800 pounds of PCE total mass remaining (as of 2012) at a concentration of 5.0 µg/L or greater. Treatment system performance reporting indicates that, 2,922.2 pounds of estimated cumulative mass has been removed as of December 2013.

Short-Term Effectiveness

Short-Term Effectiveness addresses the period of time needed to implement the remedy and any adverse impacts on human health and the environment that may be posed to workers, the community, and the environment until cleanup levels are achieved.

Alternative 1 would not be protective in the short-term because it would allow for the spread of PCE and TCE contamination to currently uncontaminated portions of the aquifer and it would not prevent the use of contaminated groundwater.

Alternative 2 would continue to provide short-term effectiveness through extraction and treatment of contaminated groundwater and implementation of ICs to prevent the spread of contamination and use of contaminated groundwater. In addition, Alternative 2 poses no new risks to workers and community members. The treatment systems are already built and any potential adverse impacts through their O&M would be controlled through existing worker health and safety programs.

Implementability

Implementability is the technical and administrative feasibility of a remedy from design through construction and operation. Factors such as availability of services and materials, administration feasibility, and coordination with other governmental entities are also considered.

Both Alternatives are equally implementable.

Alternative 1 takes the current groundwater extraction and treatment system off-line.

Alternative 2 involves no change to the current treatment systems and ICs are currently in place requiring only continued implementation of the current system.

Cost

Cost includes estimated capital costs, annual O&M costs and net present value of capital and O&M costs.

Alternative 1 would have minimal costs because no action is taken.

Alternative 2 is already actively cleaning up the contaminated groundwater and requires only minimal additional construction to accommodate approved extraction well site expansion, with a capital cost estimated at $2,225,000 (Stantec, 2014). The estimated costs of the Selected Remedy are summarized below:

Estimated Capital Cost (Muscoy OU Well Site Expansion)	$2,225,000
Estimated Annual O&M Cost:	$2,317,700
Estimated Net Present Value (Total Physical System) Cost:	$20,138,000
Estimated Time to Achieve RAOs	at least 17 years
Total estimated long term O&M Cost (present value, total future costs over the lifetime of the project, with O&M, discounted at a rate of 7 percent per year).	$50,000,000

State Acceptance

State Acceptance considers whether the State concurs with the EPA's remedy selection and the analyses and recommendations of the proposed plan (see Appendix A).

The California DTSC has reviewed the Proposed Plan for the final remedy and concurs with EPA's proposed preferred alternative.

Community Acceptance

Community Acceptance addresses the public's general response to the remedial alternatives and proposed plan.

This ROD includes a responsiveness summary that presents public comments on this remedy decision and the EPA responses to those comments. Despite the small number of comments

received, the community supports the continued implementation of the interim remedial actions for the Newmark and Muscoy OUs.

11 Principal Threat Wastes

The NCP establishes an expectation that treatment will be used to address the principal threats at a site whenever practical. Engineering controls, such as on-site or off-site containment, may be used for wastes that pose a relatively low long-term threat or where treatment is impractical (NCP Section 300.430(a)(1)(iii) and Superfund Publication 9380.3-06FS, November 1991 "A Guide to Principal Threat and Low Level Threat Wastes").

The concept of principal threat and low-level threat wastes is applied on a site-specific basis when characterizing source material. Source material is defined as material that includes or contains hazardous substances, pollutants, or contaminants that act as a reservoir for migration of contamination to groundwater, to surface water, to air, or acts as a source for direct exposure.

Principal threat wastes are those source materials considered to be highly toxic or highly mobile which cannot be reliably contained or that would present a significant risk to human health or the environment should exposure occur.

This response action addresses only groundwater containing dissolved concentrations of contaminants and does not involve principal threat wastes. There are no principal threat wastes in the Newmark and Muscoy OUs based on EPA's interpretations of past investigations and visualizations.

12 Selected Remedy

Based upon consideration of the requirements of CERCLA, the detailed analysis of the alternatives, and public comments, EPA has selected **Alternative 2: Adopt Interim Groundwater Remedies as Final Groundwater Remedies** as the final remedy to address the contaminated groundwater associated with the Site. The current remedies have successfully met the objectives of IRODs to "inhibit contamination migration and begin to remove contaminants from the groundwater plume for eventual restoration of the aquifer to beneficial uses." Under continuing operation, the selected remedy will restore the groundwater to the federal and state drinking water standards for PCE and TCE within an estimated time frame of 17 years and achieve the RAOs for the final remedial action to address contaminated groundwater at the Site.

12.1 Summary and Description the Rationale for the Selected Remedy

Based on information currently available, the EPA believes the Selected Remedy meets the threshold criteria and provides the best balance of tradeoffs among the other alternative with respect to the balancing and modifying criteria. The Selected Remedy is protective of human health and the environment and complies with ARARs. It also provides a long-term effective and permanent solution to the Site's groundwater contamination by restoring the contaminated drinking water aquifer to beneficial use by reducing PCE and TCE concentrations in the groundwater to the federal and state drinking water standards (MCL) using proven and reliable treatment technologies in a reasonable time frame. Adoption of the current interim remedies for

the Newmark and Muscoy OUs is readily implementable and will continue to provide short-term effectiveness at a reasonable cost while recovering and reusing an important water resource. The Selected Remedy is acceptable to the State of California and the community.

12.2 Description of the Selected Remedy

The existing remedy has been addressing the cleanup of these COC with the corresponding MCLs:

Table 2. Contaminants of Concern and Corresponding MCLs

Contaminants of Concern	MCL (µg/L)
Tetrachloroethene (PCE)	5
Trichloroethene (TCE)	5

This section describes the following elements of the Selected Remedy: (1) physical systems, (2) operation and maintenance activities, (3) groundwater system performance monitoring, (4) ICs, (5) groundwater completion requirements.

12.2.1 Physical Systems

This section provides a brief description of the facilities with their locations shown in Figure 11.

Newmark System:

The extraction systems include three extraction wells (EPA 006, 007 and Newmark 003) in the north area (Newmark North Area). The North Area extraction 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. The three Newmark North extraction wells are treated at the Newmark treatment plant near the intersection of West 42nd Street and Western Avenue. The Newmark North facilities also include five monitoring well clusters (MW 004A/B, MW 007A/B, MW 009A/B, MW 016A/B and MW 017A/B) that will be used to monitor water levels and VOCs for evaluating the effectiveness of the Newmark North extraction well network.

The five Newmark South Area extraction wells (EPA 001 through 005) are approximately 800 to 1200 feet deep and screened over a total of 420 to 730 feet. The wells are generally installed in an east - west line oriented perpendicular to groundwater flow near Baseline Street. The extraction wells are connected to separate treatment facilities through appropriately sized buried piping that generally follows surface streets. EPA 002-005 extraction wells are currently treated

at the Waterman Plant on Waterman Avenue (near the intersection of LeRoy Street and 31st Street). EPA 001 extraction well is treated at the 19th Street Plant (of the Muscoy System, described below). The Newmark Plume Front facilities also include six monitoring well clusters (MW 010A/B, MW 011A/B/C, MW 012A/B, MW 013A/B/C, MW 014A/B and MW 015A/B) that are used to monitor water levels and VOCs for evaluating the effectiveness of the Newmark Plume Front extraction well network.

Muscoy System:

The extraction system includes six extraction wells (EPA 108 – EPA 112 and EPA 108S), all located near Base Line Road near the southern edge of the plume. The wells are approximately 490 to 1260 feet deep and screened over a total of 225 to 1250 feet. Two new extraction wells (EPA 109S and EPA 112S) are currently planned at the location of EPA 109 and EW-112. The wells are generally installed in an east - west line oriented perpendicular to groundwater flow near Baseline Street. The Muscoy Plume facilities also include eight monitoring well clusters (MW 128A/B/C, MW 129A/B/C, MW 130A/B/C, MW 135A/B/C, MW 136A/B/C/MW 141A, MW 137A/B/C, MW 138A/B/C and MW 139A/B/C) that will be used to monitor water levels and VOCs for evaluating the effectiveness of the Muscoy Plume extraction well network.

Site-Wide Facilities:

Site-wide monitoring facilities are included as part of monitoring operations to provide additional Site-wide groundwater level monitoring and sampling facilities. The Site-wide monitoring facilities are used to aid in evaluating the combined effectiveness of the Newmark and Muscoy OU extraction networks, to provide Site-wide background groundwater elevations, and to evaluate Site-wide contamination. Site-wide monitoring points include a mix of active and inactive production wells and monitoring wells and to aid in performance analysis of the treatment systems.

The detailed description of the remedy system as designed and built are summarized in Appendix B.

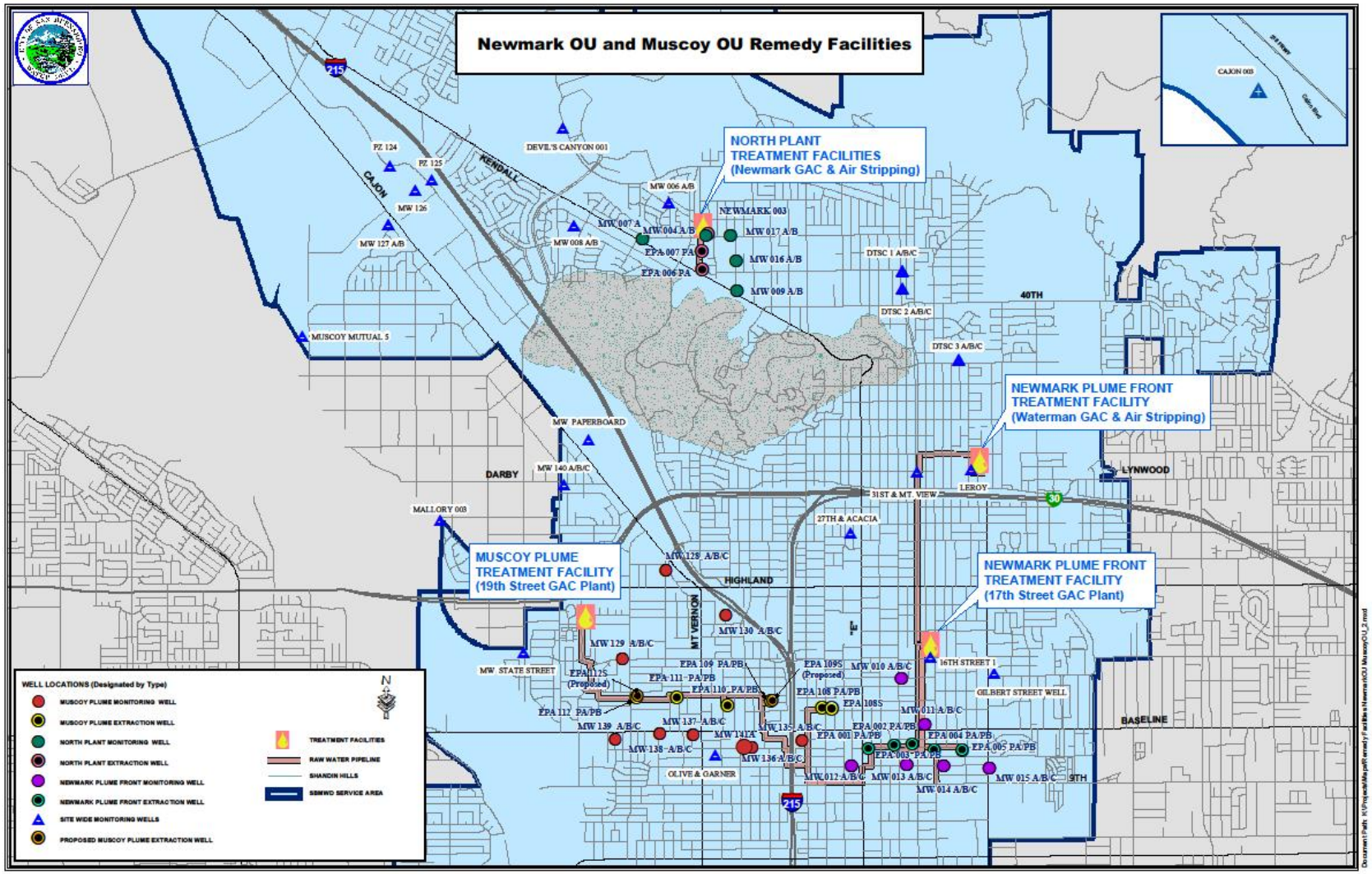

Figure 11. Map of interim remedial action treatment plants and extraction well networks. Source: Tetra Tech 2014.

12.2.2 Operation and Maintenance Activities

Following the entry of the 2005 CD, the City developed the following documents which serve as the basis for the O&M of the Newmark and Muscoy remedies, as well as mitigation activities if the performance measures are not met.

- Operational Sampling and Analysis Plan – Newmark and Muscoy OU Interim Remedial Actions (October 2009)
- Muscoy and Newmark OUs – Final Operation and Maintenance Plan Muscoy OU (October 2009)
- Final Quality Assurance/Quality Control Plan – Newmark and Muscoy OU Interim Remedial Actions (October 2009)
- Final Baseline Mitigation Plan - Newmark and Muscoy OU Interim Remedial Actions (September 2009)

Over a hundred monitoring wells provide basin wide contamination monitoring data. These are described in the documents cited above. The O&M of the Selected Remedy will continue to be conducted in accordance with the requirements of the 2005 CD as implemented in the documents cited above. O&M activities include:

- O&M of the extraction well networks, including extraction pumps, associated with the three treatment plants;
- O&M of underground piping and pumping used to convey extracted groundwater to the three treatment plants;
- O&M of the GAC units in the three treatment plants;
- Testing of influent quality to the treatment plants and the effluent quality from the treatment plants;
- O&M of the distribution system that conveys treated groundwater to the municipal water supply system;
- O&M of the monitoring well networks;
- Monitoring of chemical concentrations and water levels and analysis of data to assess effectiveness of groundwater capture and contaminant reductions in the groundwater; and
- Monitoring and enforcement of the ICGMP to ensure the effectiveness of ICs

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

As part of O&M activities, the City prepares and submits semi-annual O&M progress reports to EPA and DTSC. Each progress report provides a description of routine maintenance performed,

problems encountered, process improvements implemented, and deviations from the operational requirements of the 2005 CD and as modified by the 2007 O&F Determination for extraction well operations, treatment plant operations, and water level monitoring.

12.2.3 Groundwater System Performance Monitoring

Two sets of performance criteria are to be evaluated periodically based on the data collected during the operation and monitoring of the treatment facilities: 1) performance based on capture of the water flow and 2) performance based on contaminant concentration downgradient of the Newmark/Muscoy Plumes Front Extraction Wells Network.

Flow performance is determined by analyzing water levels over three month periods, using monthly particle capture analysis methods established in the 2005 Operational Sampling and Analysis Plan (OSAP), to ensure an inward cone of depression at the extraction wells in the Newmark/Muscoy Plumes Front Extraction Wells at target capture rates of 90 percent particle capture for Newmark, 80 percent for the Muscoy shallow aquifer, and 85 percent for the Muscoy intermediate zone.

Contaminant concentration performance is based on evaluating reported VOC concentrations for groundwater samples collected from monitoring well clusters located downgradient of the Newmark/Muscoy Plumes Front Extraction Wells. Reported concentrations from groundwater analytical sampling results are compared to criteria established in the 2005 CD SOW and 2007 O&F Determination, which includes contaminant trend criteria and criteria for comparison to drinking water MCLs. The evaluation of contaminant concentration 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.

Compliance summaries for flow performance and contaminant capture performance are given in each O&M Progress Report.

12.2.4 Institutional Controls

The current ICs implemented at the Site will remain in effect as part of the Selected Remedy with DTSC oversight. ICs are in place to ensure protectiveness at the Site is maintained during operation of the remedies and to prevent exposure to contaminated groundwater, including a City ordinance that requires a new permit for any new, non-municipal well or a change in existing well pumping conditions. An ICGMP for municipal wells requires consultation with the municipal water district to confirm impacts to the basin's groundwater balance for any new wells. Basin groundwater use is supported by the NGFM, which is maintained by the City and its specialty modeling consultants.

12.2.5 Groundwater Completion Requirements

The groundwater model referenced below will be used in determining: (1) whether the aquifer has been restored pursuant to the ROD, i.e. restored to below the MCLs for PCE and TCE; and (2) whether the Work required by the 2005 Consent Decree has been completed. "Groundwater Model" refers to the groundwater model defined in the 2005 Consent Decree, updated according

to the terms of the SOW accompanying that Decree, using the most recently updated set of groundwater data.

However, nothing in this Record of Decision is intended to alter or abrogate the provisions of the 2005 Consent Decree (including all of the Performance Standards as defined in paragraph 4, page 24 of that Decree) or the 2005 Statement of Work (or any amendments to the Consent Decree or Statement of Work that predate this ROD) that must be satisfied before terminating the Work required under that Decree and certifying completion of requirements under that Decree. The provisions of those enforcement instruments will continue to remain in full force and effect and settlement funds may continue to be used for the purposes provided for therein. EPA anticipates entering into an amended Consent Decree that will add the restoration requirements provided in this ROD.

12.3 Summary of the Estimated Remedy Costs

The Selected Remedy is currently cleaning up the contaminated groundwater and requires only minimal additional construction to accommodate recently approved extraction well site expansion for the Muscoy OU (Stantec, 2014). The estimated costs of the Selected Remedy are summarized below:

Estimated Capital Cost (Muscoy OU Well Site Expansion)	$2,225,000
Estimated Annual O&M Cost:	$2,317,700
Estimated Net Present Value (Total) Cost:	$20,138,000
Total estimated long term O&M Cost (present value, total future costs over the lifetime of the project, with O&M, discounted at a rate of 7 percent per year).	$50,000,000

Combined annual operating costs for the Newmark and Muscoy OUs were provided in the 2013 Five-Year Review. These costs include labor, utilities, materials, sampling and analysis, maintenance, and administrative fees for approved activities as specified in the 2005 CD.

The annual combined Newmark and Muscoy OU System O&M costs from April 2005 to June 2012 are presented in Table 3 below. These costs include labor, utilities, materials, sampling and analysis, maintenance, and administrative fees for approved activities as specified in the 2005 CD.

Table 3. Annual Combined Newmark and Muscoy OU System O&M Costs. Source: EPA 2013.

Date Range	Total Cost (Rounded to the nearest $1,000)
April 2005 – December 2005	$1,200,000
January 2006 – December 2006	$2,200,000
January 2007 – June 2007	$1,200,000
July 2007- June 2008	$2,700,000
July 2008- June 2009	$2,000,000
July 2009- June 2010	$1,900,000
July 2010- June 2011	$1,900,000
July 2011 – June 2012	$1,400,000
July 2012 – June 2013	$2,300,000

12.4 Expected Outcomes of the Selected Remedy

The expected outcomes of the Selected Remedy relate to the future use of the groundwater at the Site and the anticipated socio-economic impacts of restoring the groundwater to beneficial use. Land use is not affected by the Selected Remedy.

Available Uses of Groundwater upon Achieving State and Federal Drinking Water Standards

Implementation of the Selected Remedy is projected to successfully restore the groundwater aquifer to federal and state drinking water standards (Table 2) for Site COC within 17 years for the Newmark OU area and within four years for the Muscoy OU area. Specifically, the estimated times to achieve restoration for the contamination at or above the federal and state drinking water standards by three treatment facilities for PCE in groundwater are: Newmark Plant - 17 years and Waterman Plant – nine years (Newmark OU area) and 19th Street North - four years (Muscoy OU Area). All other Site COC in groundwater are below federal and state drinking water standards (MCL).

Anticipated Socio-Economic Impacts

With limited sources of clean water and increasing needs for clean water resources, restoration of this important water resource will also have positive socio-economic impacts by expanding the volume of clean drinking water available in an area.

13 Statutory Determinations

This section describes how the Selected Remedy satisfies the statutory requirements of CERCLA Section 121 as required by the NCP Section 300.430(f)(5)(ii) and to explain the Five-Year review requirements for the Selected Remedy. A description of how the Selected Remedy meets these requirements is presented in the following sections.

13.1 Protection of Human Health and the Environment

The Selected Remedy protects human health and the environment by restoring contaminated groundwater to the federal and state drinking water standards in the long-term, and by preventing spread of PCE and TCE contamination into currently uncontaminated portions for the aquifer and use of contaminated groundwater in the short-term while restoration is being achieved. Extracted groundwater is treated to drinking water standards and water supply permit requirements before being distributed to the City's municipal water supply system. The Selected Remedy controls exposures to humans in the short-term through extraction and treatment of contaminated groundwater and eliminates exposure to humans in the long-term through restoration of the groundwater to its beneficial use. Implementation of the Selected Remedy will not pose unacceptable short-term risks or cross-media impacts.

13.2 Compliance with ARARS

Section 121 (d)(2)(A) of CERCLA specifies that Superfund remedial actions must meet any federal standards, requirements, criteria, or limitations that are determined to be legally ARARs.

An ARAR may be either "applicable", or "relevant and appropriate", but not both. The NCP, 40 CFR Part 300, defines "applicable" and "relevant and appropriate" as follows:

- Applicable requirements are those cleanup standards, standards of control, or other substantive environmental protection requirements, criteria, or limitations promulgated under federal or state environmental or facility siting laws that specifically address a hazardous substance, pollutant, contaminant, remedial action, location, or other circumstance found at a CERCLA site. Only those state standards that are identified by a state in a timely manner and that are more stringent than federal requirements may be applicable. "Applicability" implies that the remedial action or the circumstances at the site satisfy all of the jurisdictional prerequisites of a requirement.
- Relevant and appropriate requirements are those cleanup standards, standards of control, and other substantive environmental protection requirements, criteria, or limitations promulgated under federal environmental or state environmental or facility siting laws that, while not "applicable" to a hazardous substance, pollutant, contaminant, remedial action, location, or other circumstance at a CERCLA site, address problems or situations sufficiently similar to those encountered at the CERCLA site that their use is well suited to the particular site. Only those state standards that are identified in a timely manner and that are more stringent than federal requirements may be relevant and appropriate.

On-site CERCLA actions must comply with the substantive requirements of all ARARs. Off-site activities must comply with both substantive and administrative requirements of all applicable laws. Substantive requirements are requirements that apply directly to actions or conditions in the environment.

Administrative requirements are those mechanisms that assist in the implementation of the substantive requirements (such as reporting, record keeping, and permit issuance), but do not in and of themselves define a level or standard of control. (See 55 Fed. Reg. 8756). ARARs fall into three broad categories, based on the manner in which they are applied at a Site.

These categories are as follows:

- **Chemical-Specific ARARs.** Chemical-specific ARARs are health- or risk-based concentration limits, numerical values, or methodologies for various environmental media (i.e., groundwater, surface water, air, and soil) that are established for a specific chemical that may be present in a specific media at the Site, or that may be discharged to the Site during remedial activities. These ARARs set limits on concentrations of specific hazardous substances, pollutants, and contaminants in the environment. Drinking water maximum contaminant levels (MCLs) are examples of chemical-specific ARARs.
- **Location-Specific ARARs**. Location-specific ARARs are federal and state restrictions placed on the concentration of a contaminant or on activities to be conducted because they are in a specific location. Examples of restricted locations include flood plains, wetlands, historic places, and sensitive ecosystems or habitats.
- **Action-Specific ARARs**. Action-specific ARARs are technology- or activity-based requirements which determine how a remedial action must be performed. Examples are Resource, Conservation and Recovery Act (RCRA) regulations for hazardous waste treatment, storage or disposal.

Neither CERCLA nor the NCP provides across-the-board standards for determining whether a particular remedy will result in an adequate cleanup at a particular site. Rather, the process recognizes that each site will have unique characteristics that must be evaluated and compared to those requirements that apply under the given circumstances. Therefore, ARARs are identified on a site-specific basis from information about specific chemicals at the site, specific features of the site location, and actions that are being considered as remedies.

As part of the 1993 Newmark and 1995 Muscoy OU RODs, chemical- and action-specific ARARs were identified for the Site. Transitioning the currently operating interim remedies to the final Selected Remedy requires that the ARARs established for the Site be modified to reflect a change in focus from containment to restoration.

A summary of the ARARs that apply to the Selected Remedy is provided below. A State environmental requirement is selected as the ARAR if it is more stringent than a federal requirement.

TABLE 4: Summary of Applicable or Relevant and Appropriate Requirements Identified in the Newmark Groundwater ROD

Item No.	Requirement	Citation	Federal or State Requirement	Description	ARAR Determination
Chemical-Specific ARARs					
1	Primary Drinking Water Standards (Non-zero MCLGs and MCLs)	Drinking Water Act, 40 CFR, Part 141.	Federal	MCLGs are goals under the SDWA which are set at levels at which no adverse health effects will occur and allow an adequate margin of safety. MCLs are promulgated and enforceable maximum concentrations of drinking water priority pollutants that are set as closely as feasible to MCLGs, considering best technology, treatment techniques, and other factors. The NCP states that primary drinking water standards are legally applicable only to drinking water at the tap, but are relevant and appropriate as cleanup standards for groundwater and surface water that have been determined to be current or future drinking water sources. Under CERCLA 121(d)(2)(A), remedial actions shall attain MCLGs where relevant and appropriate. The NCP provides that where an MCLG has been set at a level of zero, the MCL for that contaminant shall be attained.	Relevant and appropriate
		22 CCR, Div. 4, Ch. 15, Articles 4, 4.5, and 5.5, Sections 64431 et seq., 64444.	State	Establishes standards for public water supply systems, including primary MCLs. State MCLs must be more stringent than Federal MCLs. States MCLs are incorporated into State and Regional Water Quality Board Water Quality Control Plans as water quality objectives (WQOs) for protection of current and potential drinking water supply sources. MCLs are some of the applicable upper-end objectives for ambient groundwater and surface water where the water is a source of drinking water, as defined in the Water Quality Control Plans.	Relevant and appropriate
2	Water Quality Control Plan, Bunker Hill Basin (Basin Plan)	23 CCR Div. 4, Ch. 1, Article 6, Section 3950; Water Code Sections 13140 and 13240.	State	The Porter-Cologne Water Quality Control Act established authority of the SWRCB and RWQCB to regulate discharges into Waters of the State. The Basin Plan establishes beneficial uses and the water quality criteria based upon such uses (WQOs). The Basin Plan serves to protect the beneficial uses and water quality of the surface and groundwater in the Bunker Basin.	Relevant and appropriate
Action-Specific ARARs					
3	Standards Applicable to Generators of Hazardous Waste	CCR Div. 4.5, Ch.11, Articles 1, 3, and 5, Section 66261; Ch.12, Articles 1-4, 9, Sections 66262, 66264.	State	Establishes standards for generators of RCRA and California hazardous wastes, including those for hazardous waste determination, accumulation, and disposal. These requirements would be ARARs for waste generated during the groundwater remediation, e.g., soil cuttings, purge water from groundwater sampling, spent carbon from the treatment systems.	Relevant and appropriate
4	Air Quality Standards	Coast Air Quality Management District Regulations XIV, Rules 1401, 401, 402, and 403.	State	Requires Best Available Control Technology be used for new stationary operating equipment and regulates emissions of toxic air contaminants from equipment like air strippers.	Applicable

13.2.1 Chemical-Specific ARARs

The chemical-specific ARARs at the Newmark and Muscoy OUs are discussed in the subsections below.

13.2.1.1 Federal Drinking Water Standards

Safe Drinking Water Act (SDWA), 42 U.S.C. S300f et seq., National Primary Drinking Water Regulations, 40 CFR Part 141.

Federal MCLs and MCLGs

EPA has promulgated MCLs under the Safe Drinking Water Act (SDWA) to protect public health from contaminants that may be found in drinking water sources. Although these requirements are only applicable at the tap for water provided directly to 25 or more people or which will be supplied to 15 or more service connections, they are relevant and appropriate to groundwater that is a current or potential source of drinking water. The MCL for PCE of 5 µg/L is an ARAR for the restoration of the groundwater to its beneficial use as drinking water supply.

The only site-related VOC above its MCL is PCE. (The MCLG for PCE is 0.0 µg/L and thus is not being used an ARAR). All other site-related VOCs identified in the interim RODs for the Newmark and Muscoy OUs are below their respective MCLs or non-zero MCLGs in the Site groundwater.

13.2.1.2 State Drinking Water Standards

California Safe Drinking Water Act, Health and Safety Code, §4010 et seq., California Code of Regulations, Title 22, Division 4, Chapter 15, §64401 et seq.

California Maximum Contaminant Levels (MCLs): 22 CCR 64444

The State of California has established drinking water standards for sources of public drinking water, under the California Safe Drinking Water Act, Health and Safety Code Sections 4010 et seq. California MCLs for VOCs are set forth at 22 CCR 64444.5. Several of the state MCLs are more stringent than federal MCLs. In these cases, EPA has determined that the more stringent state MCLs for VOCs are relevant and appropriate for both the restoration of contaminated groundwater to beneficial use and for the treated water prior to distribution to the City's municipal water supply system. There are also some chemicals where state MCLs exist but there are no federal MCLs. EPA has determined that these state MCLs are relevant and appropriate for the restoration of contaminated groundwater to beneficial use.

The only site-related VOC above its State MCL is PCE. The state MCL for PCE is 5.0 µg/L. Since the state MCL is not more stringent, the federal MCL is the ARAR.

Table 5. Chemical -Specific Applicable or Relevant and Appropriate Requirements at the Newmark and Muscoy OUs for Restoration to Beneficial Use and Treated Water Transferred to Public Water Supply Agency.

Compound	ARAR (µg/L)	Regulation
Newmark Operable Unit		
1,1 Dichloroethane (1,1-DCA)[1,4]	5	California MCL
cis-1,2-Dichloroethene (cis-1,2-DCE)[1,4]	6	California MCL
1,2-Dichloropropane[1,4]	5	California MCL
Tetrachloroethene (PCE)[1,4,5]	5	Federal MCL
1,1,1-Trichloroethane (1,1,1-TCA)[1,4]	200	California MCL
Trichloroethene (TCE)[1,4,5]	5	Federal MCL
Dichloromethane (Methylene chloride)[1,4]	5	Federal MCL
Chloroform[1,4]	80	Federal MCL
Carbon tetrachloride[1,4]	0.5	California MCL
Muscoy Operable Unit		
1,1-DCA[2,4]	5	California MCL
cis-1,2-DCE [2,3,4]	6	California MCL
TCE [2,3,4,5]	5	Federal MCL
PCE [2,3,4,5]	5	Federal MCL
Dichlorodifluoromethane (Freon 12)[4]	___	___
Trichlorofluoromethane (Freon 11)[4]	150	California MCL

[1] Listed as contaminant of potential concern in the 1993 Newmark OU IROD
[2] Listed as a contaminant of concern in the 1995 Muscoy OU IROD
[3] Listed as chemicals of potential concern in the 1995 Muscoy OU IROD
[4] Listed as contaminants of concern in the 2008 and 2013 FYR Reports
[5] Listed as contaminants of concern in 2014 Newmark and Muscoy OUs ROD

13.2.2 Location-Specific ARARs

No special characteristics exist in the Newmark or Muscoy OUs to warrant location-specific requirements.

Therefore, EPA has determined that there are no location-specific ARARs for the Selected Remedy.

13.2.3 Action-Specific ARARs

The action-specific ARARs for the Selected Remedy are discussed below.

13.2.3.1 Air Quality Standards

Clean Air Act, 42 U.S.C. §7401 et seq.

California Health & Safety Code §39000 et seq.

South Coast Air Quality Management District Rules 401, 402, 403, 1301-13, 1401

The treatment of VOCs by air stripping, whereby the volatile chemical compounds are emitted to the atmosphere, triggers action- specific ARARs with respect to air quality.

The Clean Air Act, 42 U.S.C. §7401 et seq., and California Health & Safety Code §39000 et seq., regulate air emissions to protect human health and the environment, and are the enabling statutes for air quality programs and standards. The substantive federal and state ambient air quality standards are implemented primarily through Air Pollution Control Districts. The South Coast Air Quality Management District (SCAQMD) is the district regulating air quality in the San Bernardino area.

South Coast Air Quality Management District (SCAQMD) Regulation XIV, Rule 1401

The SCAQMD has adopted rules that limit air emissions of identified toxics and contaminants. The SCAQMD Regulation XIV, consisting of Rule 1401, on new source review of carcinogenic air contaminants is applicable to the Selected Remedy. SCAQMD Rule 1401 requires that Best Available Control Technology (T-BACT) be employed for new stationary operating equipment, so the cumulative carcinogenic impact from air toxics does not exceed the maximum individual cancer risk limit of ten in one million (1×10^{-5}). EPA has determined that this T-BACT rule is applicable for the Selected Remedy because carcinogenic compounds such as PCE and TCE are present in groundwater, and release of these compounds to the atmosphere may pose health risks exceeding SCAQMD requirements.

SCAQMD Rules 401, 402 and 403

The SCAQMD also has rules regulating the visible emissions from a point source (Rule 401), prohibiting emissions that are odorous or causes injury, nuisance or annoyance to the public (Rule 402), and regulating down-wind particulate concentrations (Rule 403). EPA has determined that these rules are also applicable to the Selected Remedy.

13.2.3.2 Hazardous Waste Management

California Hazardous Waste Control Act, Health & Safety Code, Division 20, Chapter 6.5

The State of California has been authorized to enforce its own hazardous waste regulations (California Hazardous Waste Control Act) in lieu of the federal RCRA program administered by the EPA. Therefore, state hazardous waste regulations in the California Code of Regulations (CCR), Title 22, Division 4.5 are now cited as ARARs instead of the federal RCRA regulations.

Under 22 CCR Section 66261.31, certain "spent" halogenated solvents, including TCE and PCE, are listed hazardous wastes (RCRA waste code F002). Although TCE, PCE and certain other halogenated solvents are the COC in the groundwater at the Newmark and Muscoy OUs, the source of these contaminants has not yet been determined, and the contaminants cannot therefore be definitively classified as listed RCRA hazardous wastes. However, the contaminants are sufficiently similar to listed RCRA hazardous wastes that EPA has determined that the following portions of the state hazardous waste regulations are relevant and appropriate to the Selected Remedy:

VOC Treatment Plant Requirements: 22 CCR, 66264.600 .603, and 66264.111-.115

22 CCR Sections 66264.600 - .603 require 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.

22 CCR Sections 66264.111 - .115 state that 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.

14 Other Performance Standards

The NCP authorizes EPA and the state to identify advisories, criteria, guidance or proposed standards to-be-considered (TBCs) that may be helpful or useful in developing CERCLA remedies.

(See NCP, 40 CFR Sections 300.400(g)(3) and 300.430(b)(9)). Such TBCs are identified in the RI/FS and may be selected by EPA as requirements for the remedial action in the ROD.

EPA has determined that certain substantive standards for the construction of public water supply wells published by the State of California (the California Water Well Standards) and identified as TBCs in the RI/FS should be requirements for the Selected Remedy. While these standards have not been specifically promulgated as an enforceable regulation and are therefore not ARARs, all groundwater facilities designed, located and constructed to produce drinking water must be constructed in accordance with these standards. Since the Selected Remedy involves the transfer of the treated water to the public water supply agency, EPA has determined that the remedial action will comply with substantive Water Well Standards for construction of water supply wells, such as sealing the upper annular space to prevent surface contaminants from entering the water supply.

14.1 Off Site Requirement

The State of California Department of Public Health Drinking Water Division published its Policy Memo, 97-005, addressing extremely impaired sources of groundwater, where the Newmark Site is located. Per the terms of this policy, the Newmark and Muscoy OU extraction wells are explicitly considered extremely impaired sources since they were installed to intercept known contaminants of health concern. For such contaminated groundwater, the state requires drinking water well permit limits of non-detect for PCE and TCE, which have been consistently written into the production well permits for this remedy.

14.2 Cost Effectiveness

In the EPA's judgment, the Selected Remedy is cost-effective. In making this determination, the following definition was used: "A remedy shall be cost-effective if its costs are proportional to its overall effectiveness." (NCP §300.430(f)(1)(ii)(D)). This was accomplished by evaluating the "overall effectiveness" of those alternatives that satisfied the threshold criteria (that is, were both protective of human health and the environment and ARAR-compliant). Overall effectiveness was evaluated by assessing three of the five balancing criteria in combination (long-term

effectiveness and permanence; reduction in toxicity, mobility, and volume through treatment; and short-term effectiveness). Overall effectiveness was then compared to costs to determine cost-effectiveness. The relationship of the overall effectiveness of the Selected Remedy was determined to be proportional to its costs and hence the Selected Remedy represents a reasonable value for the money to be spent.

14.3 Utilization of Permanent Solutions and Alternative Treatment (or Resource Recovery) Technologies to the Maximum Extent Practicable

EPA has determined that the Selected Remedy represents the maximum extent to which permanent solutions and alternative treatment (or resource recovery) technologies can be utilized in a practicable manner at the Site. The Selected Remedy incorporates permanent solutions by removing PCE and TCE contamination from the groundwater through extraction. The water resource is then recovered for reuse as drinking water by removing the PCE and TCE contamination from the groundwater using GAC.

14.4 Preference for Treatment as a Principal Element

The remedy in this final ROD for the Newmark and Muscoy OUs does satisfy the statutory preference for treatment as a principal element of the remedy for the following reasons: (1) this remedy addresses groundwater containing dissolved concentrations of contaminants through treatment and (2) this remedy will restore the aquifer through treatment in approximately 17 years.

14.5 Five-Year Review Requirements

Pursuant to CERCLA Section 121, 42 U.S.C. Section 9621, because hazardous substances remain on-site above health-based levels, the EPA has been conducting a site-wide review once every five years since the commencement of onsite construction for the Newmark OU interim remedy (EPA 2008), the first of the three treatment systems to be completed and designated operational and functional. These reviews will continue to be conducted to ensure that the Selected Remedy continues to protect human health and the environment.

15 Documentation of Significant Changes from Preferred Alternative of Proposed Plan

To fulfill the requirements of CERCLA 117(b) and NCP [40 CFR § 300.430(f)(5)(iii)(B) and 300.430(f)(3)(ii)(A)], a ROD must document and discuss the reasons for any significant changes made to the Proposed Plan.

The Proposed Plan was released for public comment in July 2014. The public comment period began on August 4, 2014 and ended on September 4, 2014. The Proposed Plan identified Alternative 2: Current Remedies as the Preferred Alternative for groundwater remediation at the Newmark and Muscoy OUs. EPA reviewed all written and verbal comments submitted during the public comment period and determined that no significant changes to the remedy, as originally identified in the Proposed Plan, were necessary or appropriate.

REFERENCES

California Environmental Protection Agency. 2014. *Environmental Screening Levels*. July 14. Online Address: http://www.waterboards.ca.gov/sanfranciscobay/water_issues/programs/esl.shtml

City of San Bernardino- Board of Water Commissioners. 2006. *City of San Bernardino Board of Water Commissioners public utilities ordnance.* Revised August 17.

Geoscience Support Services, Inc. (Geoscience). 2009. *San Bernardino Basin Area Refined Basin Flow Model and Solute Transport Model Report*. Prepared for San Bernardino Valley Municipal Water District, August 21.

San Bernardino Municipal Water Department. 2010. *Institutional Controls Groundwater Management Program Agreement.* September 25.

Stantec. 2009. *Final Baseline Mitigation Plan, Newmark and Muscoy Operable Unit, Interim Remedial Actions*. Prepared for EPA Region IX, California Department of Toxic Substances Control, and City of San Bernardino Water Department. October.

Stantec. 2009. *Final Operation and Maintenance Plan, Newmark and Muscoy Operable Unit, Interim Remedial Actions*. Prepared for EPA Region IX, California Department of Toxic Substances Control, and City of San Bernardino Water Department. October.

Stantec. 2009. *Final Quality Assurance/ Quality Control Plan, Newmark and Muscoy Operable Unit, Interim Remedial Actions*. Prepared for EPA Region IX, California Department of Toxic Substances Control, and City of San Bernardino Water Department. October.

Stantec. 2009. *Operational Sampling and Analysis Plan Muscoy Operable Unit, Newmark and Muscoy Operable Unit, Interim Remedial Actions*. Prepared for EPA Region IX, California Department of Toxic Substances Control, and City of San Bernardino Water Department. October.

Stantec 2014, *Muscoy Extraction Well Network Status Report and Mitigation Plan*, *Newmark Groundwater Contamination Superfund Site, San Bernardino, California.* Prepared for California Department of Toxic Substances Control and EPA Region IX and the City of San Bernardino, May 15, 2014.

State Water Resources Control Board (SWRCB). 1988. Adoption of Policy Entitled "*Sources of Drinking Water*". SWRCB Resolution No. 88-63 (as revised by Resolution No. 2006-0008). May.

Tetra Tech. 2014. *Final Technical Memorandum; Source Identification, Plume Delineation, Restoration Timeframe Estimation and Transition from Interim to Final Remedy; Newmark Groundwater Contamination Superfund Site Source Operable Unit; San Bernardino, California.* May.

U.S. District Court for the Central District of California. 2005. *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.

U.S. District Court Central District of California. 2007. *Consent Decree, the United States of America vs. the County of San Bernardino, California.* December 28.

U.S Environmental Protection Agency (EPA). 1986. *Guidelines for Ground-Water Classification Under the EPA Ground-Water Protection Strategy*. EPA No. 440/6-86/007. November.

EPA. 1993. *Newmark Operable Unit Remedial Investigation/Feasibility Study Report*. March.

EPA. 1993a. *Newmark Ground Water Contamination Record of Decision – Newmark OU*. August.

EPA. 1994. *Muscoy Operable Unit Remedial Investigation/Feasibility Report*. December.

EPA. 1995. *Newmark Ground Water Contamination Record of Decision – Muscoy OU*. EPA/ROD/R09-95/133. March.

EPA. 2002. *OSWER Draft Guidance for Evaluating the Vapor Intrusion to Indoor Air Pathway from Groundwater and Soils.* EPA530-D-02-004. November.

EPA 2004a. *Explanation of Significant Differences (to 1993 and 1995 Interim RODs), Newmark and Muscoy Operable Units*.

EPA. 2005. *Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens*. Risk Assessment Forum. Washington, D.C. EPA/630/R-03/003F. March. On-line address: http://cfpub.epa.gov/ncea/raf/recordisplay.cfm?deid=160003

EPA, 2007b. *Final Operational & Functional (O&F) Determination, Muscoy Operable Unit, Newmark Groundwater Contamination Superfund Site*. Correspondence with City of San Bernardino and California Department of Toxic Substances Control. September 28.

EPA. 2008. *First Five-Year Review Report for Newmark Groundwater Contamination Superfund Site*. September.

EPA. 2009. *Risk Assessment Guidance for Superfund: Volume 1 Human Health Evaluation Manual (RAGS) Part F*.

EPA. 2011. *Environmental Cleanup Best Management Practices: Effective Use of the Project Life Cycle Conceptual Site Model*. Quick Reference Fact Sheet. EPA-542-F-11-011. July.

EPA. 2013a. *Memo: Guidance for Evaluating Completion of Groundwater Remedial Actions.* OSWER 9355.0-129. November 25.

EPA. 2013b. *Second Five-Year Review Report for Newmark Groundwater Contamination Superfund Site*. September.

EPA. 2014a. *Groundwater Remedy Completion Strategy: Moving Forward with the End in Mind.* OSWER Directive 9200.02-144. May.

EPA. 2014b. *U.S. EPA Proposed Final Cleanup Plan*. Newmark Groundwater Contamination Superfund Site. San Bernardino, CA. July.

EPA. 2014c. Regional Screening Levels (Formerly PRGs). May. On-line address: http://www.epa.gov/region9/superfund/prg/

URS Group, Inc., formerly, URS Corporation (URS). 1994. *Operable Unit Remedial Investigation/Feasibility Study Report (OU 1), Newmark Superfund Site*.

URS.1994. *Final Remedial Investigation/Feasibility Study Report, Muscoy Plume Operable Unit (OU 2), Newmark Superfund Site*.

URS. 2008b. *Newmark Groundwater Contamination Superfund Source Operable Unit Remedial Investigation/Feasibility Study Soil Gas Data Gaps Investigation, Report of Findings*.

Weiss Associates. 2001. *Final Subsurface Investigation Report, Soil Gas Survey Lower Apex Parcel and Cat Pit Area San Bernardino Engineering Depot, San Bernardino, California*.

Weiss Associates. 2002. *Final Subsurface Investigation Report, Institution Road Groundwater Wells MW-COE-002 and MW-COE-003 and Soil Borings at Army Wastewater Treatment Plan, San Bernardino Engineering Depot, San Bernardino, California*.

PART III: RESPONSIVENESS SUMMARY

This Responsiveness Summary provides responses to comments received by the United States Environmental Protection Agency (EPA) regarding the Proposed Plan for the Newmark Groundwater Contamination Superfund Site (Site). The Proposed Plan, which was issued during July, 2014, presents the EPA's preferred alternative for a final cleanup remedy of contaminated groundwater at the Newmark and Muscoy Operable Units (OUs) in San Bernardino, California. The EPA presented the Proposed Plan during a public meeting on August 13, 2014 and questions and comments were received during the public meeting. Comments received and the EPA's responses are provided herein. A transcript of the meeting is on file in the administrative record for this site online at www.epa.gov/region9/newmark, and is available for review at the following locations:

John M. Pfau Library
Cal-State San Bernardino
5500 University Parkway, PL 401
San Bernardino, CA 92407
(909) 537-5090
Hours:
Monday – Thursday 8am – 10pm

EPA Superfund Records Center
95 Hawthorne Street, Room 403 S
San Francisco, CA 94105
(415) 820-4700
Hours:
Monday – Friday 8:30am – 5:00pm

At the time of the public review period (August 4, 2014 through September 5, 2014), the Proposed Plan was available to the public for review and comment on EPA's preferred alternative, Alternative 2, which consists of continuing groundwater extraction and treatment, ongoing groundwater monitoring, and institutional controls (ICs) to protect performance of the groundwater treatment system and prevent exposure to contaminated groundwater.

No written comments were received during the public comment period. The following is a summary of comments received during the public meeting and EPA responses. After revision and consideration of the oral comments received, EPA determined that no significant changes to the remedy, as originally identified in the Proposed Plan, were necessary or appropriate. This Record of Decision (ROD) documents the selected remedy with no changes from the Proposed Plan.

1 Stakeholder Comments and Lead Agency Responses

The 2014 Proposed Plan for Newmark Groundwater Contamination Superfund Site Proposed Plan was reviewed by support agencies California Department of Toxic Substance Control

(DTSC) and the City of San Bernardino Municipal Water Department (SBMWD), who provided comments. The lead agency (EPA) provided responses to these support agency comments, which are documented in Appendix C. Based on support agency comments and lead agency responses to comments, the Proposed Plan was revised as necessary and released for public comment on August 4, 2014. A public meeting was held on August 13, 2014 where oral comments were received regarding the Proposed Plan. The oral comments and EPA's responses are provided in Section 3.1.2 below.

1.1 Public Comments

1.1.1 Comment No. 1 (from Ms. Pierce)

My name is Lisa Pierce from Redlands, California. And my comment is about why the criteria for 17 years is considered a feasible time frame for cleanup, given that our recent challenges with drought and water supply is more impacted than ever. And so now we need to find more supplies and more valuable clean supplies. So it seems to me that one of the benefits would be to potentially determine if other monies could be found to expedite the process.

EPA Response to Comment No. 1:

The 17 year cleanup timeframe is considered a feasible timeframe because it is based on measured contaminant removal rates for the site over the last eight years. The current pump and treat system has been extremely effective, accomplishes ROD objectives, and does not adversely impact water supply in the basin. Given recent challenges with drought and water supply, the water supply production facilities in the City of San Bernardino currently meet demand. The EPA and its support agencies do not believe more monies for additional extraction wells would expedite the process, since a more aggressive extraction array would drop basin groundwater levels; thus reducing groundwater plume treatment efficiency.

1.1.2 Comment No. 2 (from Ms. Pierce)

And another comment is -- maybe it's a clarification question -- but what are some of the -- I guess I wondered were there any other alternatives besides one and two, because it seems another alternative would be the more expensive alternative of cleaning up quicker. And I guess that would be kind of in line with why wasn't there a third alternative to move it quicker.

EPA Response to Comment No. 2:

No other remedies were evaluated because these interim pump and treat systems along with ICs, have been very effective at reducing contaminant concentrations, preventing contaminant migration, and preventing exposure to humans. Since the interim remedies have been so successful, the EPA and support agencies do not believe evaluating a third alternative for groundwater cleanup at the site was warranted, since the current systems exceed treatment expectations.

1.1.3 Comment No. 3 (from Mr. Mulvihill)

My name is James Mulvihill. I'm a San Bernardino resident and also City Council Member for the 7th Ward. My background is not in science, it's in city planning. And just from the information presented, it would seem that over time, the extent of the contaminated areas is going to be diminishing. So that 17-year time perspective is not a constant in terms of the specific extent of it, so over time there will be less and less. I'm assuming that's what the case is going to be, so the issue is going to be diminishing through that 17-year period. In fact, one of the areas that has been contaminated is going to be eliminated entirely. So again, my background is not in science so I really can't say anything about the science of it, but it just seems that with the information provided and the fact that the infrastructure is already there, so what we are looking at then is the O&M (operation and maintenance) for the existing structures that are already there. And the estimate you give, that the net present value of that is $17 million, but of course, that is simply looking at that, over time, the expenditure of the funds that are there. So it seems to me that the EPA is – has done -- made a proper selection of alternatives. And I think it's fortunate. I'm not quite sure -- I was involved with the actions back in the mid-1990s, and at that time it was a stopgap measure: put these barrier wells to stop the spread of the plume on what we thought would be permanent. But it seems it's a beneficial remedy and we are fortunate about that. I think with regard to the contaminants, I think that's all I have to say. Thank you.

EPA Response to Comment No. 3:

The EPA appreciates and acknowledges the commenter's positive feedback. Also, remediation timeframes and associated O&M costs will continue to be evaluated during the CERCLA (Comprehensive Environmental Response, Compensation, and Liability Act) five year review process for the Site.

1.1.4 Comment No. 4 (from Ms. Ruble):

Hi. Jane Hunt Ruble, and I'm a resident of Muscoy. And they have answered a lot of the questions I was going to ask. But I have a concern about, are you still -- after the 17 years, are you still going to have the monitoring sites, like there is one up the street from me. Are they still going to be in place after this 17-year period? Are they still going to be monitoring this process? That's all.

EPA Response to Comment No. 4:

Once the remedy is complete, the EPA and City of San Bernardino will evaluate the functional role of each monitoring well. Consideration will be given to those wells needed to maintain basin management. For example, wells needed to measure groundwater levels and gauge seasonal fluctuations may remain in place. Any wells that are not considered essential for these purposes will likely be removed.

1.1.5 Comment No. 5 (from Mr. Litchfield):

Good evening. Matt Litchfield. I'm the Director of Water Utility, San Bernardino Municipal Water Department. One of my principal responsibilities is the operation of the remedy that's

been in place now for a number of years. And as you can see from Mariam's presentation, it's working very well. First of all, I want to say the water department supports the Proposed Plan as it is presented here tonight, and correspondence has been given out. And I also want to say that the water department and staff really appreciate the relationship with the EPA and with the State Department of Toxic Substance Control. This relationship has been fostered over many years of cooperation, and it works very well and has worked in this process, as well. I want to say that for the record, and obviously we want to continue that good relationship with EPA and the State. The plan does recognize our operating permit departments, for drinking water compliance is our chief concern long term. And it preserves all the institutional controls and performance requirements outlined in the consent decree and the statement of work that's embodied within. I want to say that the department supports it, and I look forward to continuing the relationship we have with all of the agencies here. Thank you.

EPA Response to Comment No. 5:

The EPA appreciates and acknowledges the commenter's positive feedback.

1.1.6 Comment No. 6 (from Ms. Pierce):

I know I had one other comment, that when I worked at the Water Research Institute at Cal State, we had a very large program about support issues. And I'm a little surprised and I would comment that I think your ability to put the word out to the public maybe could have been a little better. Obviously, you properly put it in the newspaper, which nobody reads anymore. So I think in the future it might be valuable for the EPA and other agencies to make more concerted effort to be in touch with the people. There were a lot of people that were mailed information about this topic, and obviously having the doors locked outside doesn't make for a very public accessible event. So I think for future reference, it's important to have that explicit opportunity to know about the event and to get to the event, public access.

EPA Response to Comment No. 6

The EPA apologizes for any inconvenience the locked doors may have caused. We do acknowledge that the doors were inadvertently locked for a time period at or before 6 PM, which prevented access to the meeting for a few people, including a DTSC representative, an EPA representative, and one community member. Once the doors were unlocked, these individuals were able to access the building and join the meeting prior to the start of the presentation. The doors were open and the meeting was accessible for the entire presentation of the Proposed Plan, participation in comments and discussions on the Proposed Plan for the Site, and the oral comment session. Please note that all public notification activities required for the Proposed Plan, such as sending out postcard announcements to the community and publishing public notices in local newspapers, were performed in compliance with National Contingency Plan regulations.

1.2 Written Comments

No written comments were received during the public comment held from August 4 through September 5, 2014.

APPENDIX A

California Department of Toxic Substances Control Concurrence Letter

Department of Toxic Substances Control

Matthew Rodriquez
Secretary for
Environmental Protection

Miriam Barcellona Ingenito, Acting Director
5796 Corporate Avenue
Cypress, California 90630

Edmund G. Brown Jr.
Governor

September 29, 2014

Ms. Miriam Fawaz
US EPA, Region 9
75 Hawthorne St., SFD-7-3
San Francisco, CA 94105

RECORD OF DECISION (ROD), NEWMARK AND MUSCOY OPERABLE UNITS (OUs), NEWMARK GROUNDWATER CONTAMINATION SUPERFUND SITE (NGCSS), SAN BERNARDINO, CALIFORNIA

Dear Ms. Fawaz:

The Department of Toxic Substances Control (DTSC) received the above referenced document via email on September 8, 2014. This ROD is the final ROD for the two OUs of the NGCSS. It adopts the selected remedies in the existing interim RODs for Newmark and Muscoy OUs. According to the ROD, a future ROD will be issued to address contamination in the vicinity of a monitoring well, CJ-10 in the northwest Source Area.

DTSC has completed the review of the ROD. All DTSC's comments have been adequately addressed and we do not have further comments to be forwarded to EPA. DTSC concurs with the selected remedy in the ROD. If you have any questions, please contact me at 714-484-5436 or Stephen Niou at (714) 484-5458.

Sincerely,

Robert M. Senga, Supervisor
Brownfields and Environmental Restoration Program

APPENDIX B

Remedy Systems Description

Table B-1: Design Specifications for Extraction/Treatment Systems and Extraction Rate Requirements (from CD/SOW)

Extraction Well Design Flow Rate Specifications [1]				
	Newmark OU Extraction Rates (gpm)			Muscoy Plume Extraction Rates (gpm)
	North Plant Extraction Wells	Newmark/Muscoy Plumes Front Extraction Wells		
Extraction Wells/Extraction Terminology	North Plant Treatment Facilities	Waterman Treatment Plant[2]	17th Street Treatment Plant	19th Street Treatment Plant
EW -1		1,700		
EW -2		1,700		
EW -3			2,000	
EW -4		1,700		
EW -5		1,700		
EW -6	1,000			
EW -7	1,300			
Newmark -3	1,600			
EW -108/EW-108S				1,300/600
EW -109/EW-109S (in design)				1,300/TBD
EW -110				2,500
EW -111				2,500
EW -112/EW-112S (in design)				1,300/TBD
Total Extraction Rates		6,800	2,000	
		8,800		8,900
	3,900	17,700		
	21,600			
Total Extraction Rates With Maintenance Allowance (gpy assuming 330 days of operation)		3.231E+09	9.504E+08	
		4.182E+09		4.229E+09
	1.853E+09	8.411E+09		
	1.026E+10			
Extraction Rate Pump Specifications				
Design Extraction Rate (gpm)	3,900	8,800		8,900
Design Extraction Rates With Maintenance Allowance (gpy assuming 330 days of operation)	1.853E+09	4.182E+09		4.229E+09
Target Extraction Rate	variable	variable		variable
Maximum Routine Extraction Rate	NA	10,008		10,008

Maximum Routine Extraction Rates With Maintenance Allowance (gpy assuming 330 days of operation)	NA	4.756E+09	4.756E+09
Non-Routine Extraction Rates (gpm)	NA	>10,008	>10,008
Non-Routine Extraction Rates With Maintenance Allowance (gpy assuming 330 days of operation)	NA	>4.756E+09	>4.756E+09

Treatment Plant Design Specifications

Component	Newmark OU Treatment Facilities (gpm)			Muscoy OU Treatment Facilities (gpm)
	North Plant Treatment Facilities	Newmark/Muscoy Plumes Front Treatment Facilities		
		Waterman Treatment Plant(2)	17th Street Treatment Plant	19th Street Treatment Plant
Size of GAC Vessels (lbs of carbon)	20,000	20,000	20,000	30,000
Number of Pairs	7	8	3	12
GAC Design Flow Rate Per Pair(3) (gpm)	696	637	650	972
Total Design Plant Flow Rate (gpm)	4,872	5,096	1,950	11,664
Maximum Flow Per Vessel	750	750	750	1,050
Maximum Flow Per Plant	5,250	6,000	2,250	12,600
Effective Capacity Per Vessel (96% of maximum in gpm)	720	720	720	1,008
Effective Capacity (96% of maximum in gpm)	5,040	5,760	2,160	12,096
		7,920		
	25,056			
Effective Capacity (96% of maximum in gpy)	2.395E+09	2.737E+09	1.026E+09	5.748E+09
		3.764E+09		
	1.191E+10			
Percent Additional Effective Capacity Over Design Extraction Rate	29%	13%		
	16%			

Notes:
GAC = Liquid phase granular activated carbon
Units = Gallons Per Minute (gpm) or Gallons Per Year assuming 330 days (gpy)
(1) - Extraction well design specification flow rates are based on the Newmark Groundwater Model prepared by EPA
(2) - A portion of the water extracted from EW-1, EW-2, EW-4 and EW-5 will be conveyed to the 19th Street Plant to remain within effective plant capacities at Design Extraction Rates
(3) - Based on design rates presented in the 100% Design Report for each treatment facility
NA - Not applicable

Table B-2 (OSAP Table 4-1)

CD/SOW EPA Monitoring Program Sampling Locations and Rationale

Well Name	Rationale for Monitoring [1]
EXTRACTION WELL MONITORING	
Newmark OU North	
Extraction Wells and Associated Piezometers	
EPA 006 EPA 006PA	To monitor treatment plant influent and plume concentrations.
EPA 007 EPA 00 7PA	To monitor treatment plant influent and plume concentrations.
Newmark 3	Monitoring treatment plant influent and plume concentrations.
Monitoring Wells	
MW 004A MW 004B	Monitoring points within northern portion of Newmark Plume
MW 007A MW 007B	Monitoring points within northern portion of Newmark plume; provides extraction system "early warning" points for contaminant migration.
MW 009A MW 009B	Monitoring points within northern portion of Newmark plume used to monitor groundwater extraction system effectiveness.
MW 016A MW 016B	Monitoring points downgradient from the Newmark plume front extraction well network.
MW 017A MW 017B	Monitoring points downgradient from the Newmark plume front extraction well network.
Newmark OU South	
Extraction Wells and Associated Piezometers	
EPA 001 EPA 001PA EPA 001PB	To monitor treatment plant influent and plume concentrations.

Well Name	Rationale for Monitoring [1]
EPA 002 EPA 002PA EPA 002PB	To monitor treatment plant influent and plume concentrations.
EPA 003 EPA 003PA EPA 003PB	To monitor treatment plant influent and plume concentrations.
EPA 004 EPA 004PA EPA 004PB	To monitor treatment plant influent and plume concentrations.
EPA 005 EPA 005PA EPA 005PB	To monitor treatment plant influent and plume concentrations.
Monitoring Wells	
MW 010A MW 010B MW 010C[2]	Monitoring points downgradient from the Newmark plume front extraction well network.
MW 011A MW 011B MW 011C	Monitoring points downgradient from the Newmark plume front extraction well network.
MW 012A MW 012B MW 012C[2]	Monitoring points beyond extraction wells used to monitor groundwater extraction system effectiveness.
MW 013A MW 013B MW 013C	Monitoring points beyond extraction wells used to monitor groundwater extraction system effectiveness.
MW 014A MW 014B MW 014C[2]	Monitoring points beyond extraction wells used to monitor groundwater extraction system effectiveness.
MW 015A MW 015B MW 015C[2]	Monitoring points beyond extraction wells used to monitor groundwater extraction system effectiveness.

Well Name	Rationale for Monitoring [1]
Muscoy OU	
Extraction Wells	
EPA 108	To monitor treatment plant influent and plume concentrations.
EPA 108S EPA 108PA EPA 108PB	
EPA 109 EPA 109PA EPA 109PB EPA 109PC	To monitor treatment plant influent and plume concentrations.
EPA 110 EPA 110PA EPA 110PB EPA 110PC EPA 110PD EPA 110PE	To monitor treatment plant influent and plume concentrations.
EPA 111 EPA 111PA EPA 111PB EPA 111PC EPA 111PD	To monitor treatment plant influent and plume concentrations.
EPA 112 EPA 112PA EPA 112PB	To monitor treatment plant influent and plume concentrations.
Monitoring Wells	
MW 128A MW 128B MW 128C	Monitoring points upgradient from the Muscoy Plume extraction well network
MW 129A MW 129B MW 129C	Monitoring points upgradient from the Muscoy Plume extraction well network

Well Name	Rationale for Monitoring [1]
MW 130A MW 130B MW 130C	Monitoring points upgradient from the Muscoy Plume extraction well network
MW 135A MW 135B MW 135C	Monitoring points downgradient from extraction wells, used to monitor groundwater extraction system effectiveness.
MW 136A MW 136B MW 136C MW 141A	Monitoring points downgradient from extraction wells, used to monitor groundwater extraction system effectiveness.
MW 137A MW 137B MW 137C	Monitoring points downgradient from extraction wells, used to monitor groundwater extraction system effectiveness.
MW 138A MW 138B MW 138C	Monitoring points downgradient from extraction wells, used to monitor groundwater extraction system effectiveness.
MW 139A MW 139B MW 139C	Monitoring points downgradient from extraction wells, used to monitor groundwater extraction system effectiveness.
SITE-WIDE MONITORING	
Active Production Wells	
16th & Sierra	Production well used as monitoring point within mid-portion of Newmark plume.
23rd & E	Production well used to define current western Newmark plume boundary.
27th & Acacia	Production well used to define current western Newmark plume boundary.
31st & Mt. View	Production well monitoring mid-point of Newmark plume.

Well Name	Rationale for Monitoring [1]
Cajon 3	Production well upgradient from Newmark and Muscoy plumes; serves as background well for the source area.
Devil Canyon 1	Monitoring point upgradient from Newmark Plume.
Gilbert	Production well used to monitor downgradient/cross-gradient southeastern edge of Newmark plume.
Leroy	Production well monitoring current boundary of eastern portion of Newmark plume.
Mallory 3	Production well used to define current southwestern/mid-portion of Muscoy plume.
Muscoy Mutual 5	Production well cross-gradient from the Muscoy plume.
Olive & Garner	Production well located downgradient between Newmark and Muscoy extraction wells.
Inactive Production Wells	
MW Paperboard	Monitoring point used to monitor mid-portion of the Muscoy plume and groundwater effects of the Shandin Hills.
MW State	Monitoring point used to define current southwestern Muscoy plume boundary.
Monitoring Wells	
DTSC 001B DTSC 001C	Monitoring point within the northern mid-portion of the Newmark plume.
DTSC 002B DTSC 002C	Monitoring point within the northern mid-portion of the Newmark plume.
DTSC 003A DTSC 003C	Monitoring point within the northern mid-portion of the Newmark plume.

Well Name	Rationale for Monitoring [1]
MW 006A MW 006B	Monitoring points upgradient from Newmark Plume; used to define Newmark plume northern boundary.
MW 008A MW 008B	Monitoring points within northern portion of the Newmark plume; provides extraction system "early warning" points for contaminant migration.
MW 126	The EPA/URS rationale was not provided in the Site-Wide FSP as this well was not included in that program.
MW 127A MW 127B	Monitor points in the southern mid-portion of the suspected source area.
MW 140A MW 140B MW 140C	Monitoring point used to monitor mid-portion of Muscoy plume.
PZ 124	The EPA/URS rationale was not provided in the Site-Wide FSP as this well was not included in that program.
PZ 125	The EPA/URS rationale was not provided in the Site-Wide FSP as this well was not included in that program.
USGS Wells [5]	
Encanto Park A Encanto Park B Encanto Park C	Monitoring points downgradient from the Muscoy Plume extraction well network to be used for flow performance analysis and occasional sampling at SBMWD's discretion
Meadowbrook Park A Meadowbrook Park B Meadowbrook Park C	Monitoring points downgradient from extraction wells, used to monitor groundwater levels.

Well Name	Rationale for Monitoring (1)
Sierra High School A Sierra High School B Sierra High School C	Monitoring points side-gradient from the Newmark Plume Front extraction well network to be used for flow performance analysis

Notes:

(1) Based on the rationale provided in the Site-Wide FSP (URS, 2005)

(2) The indicated wells appear to have inadvertently been excluded from the SOW list of wells to be sampled. SBMWD will add these wells to the sampling program if directed to in writing by the EPA.

(4) Per URS site wide FSP or other historical documents if not included in the URS site wide FSP (URS, 2005A).

(5) These are wells maintained by the USGS and are not part of the SOW specified well list. As long as USGS collects transducer based water level readings and makes them readily available, SBMWD will voluntarily use these data.

CD Consent Decree
EPA United States Environmental Protection Agency
FSP Field Sampling Plan
SOW Statement of Work (entered with CD March 23, 2005)
OU Operable Unit

APPENDIX C

State and Local Agency Comments Regarding the Proposed Plan for Newmark Groundwater Contamination Superfund Site

SQUIRE PATTON BOGGS

Squire Patton Boggs (US) LLP
2550 M Street, NW
Washington, DC 20037

O 202-457-6000
F 202-457-6315
squirepattonboggs.com

Russell V. Randle
T 202-457-5282
russell.randle@squirepb.com

VIA ELECTRONIC MAIL

July 15, 2014

Thelma K. Estrada, Esq.
Assistant Regional Counsel
U.S. EPA, Region 9
75 Hawthorne St.
Mail Code RC-2
San Francisco, CA 94105

Re: Newmark Groundwater Contamination Site
Brief Comments of City of San Bernardino Municipal Water Department
Concerning Draft Final Source OU Proposed Remedial Action Plan
Announcement

Dear Thelma:

On behalf of the City of San Bernardino Municipal Water Department, I am writing to convey our thanks and brief comments on the draft final Source OU Proposed Remedial Action Plan Announcement.

The City's main comment is to thank EPA heartily for the constructive way it has addressed the City's concerns in this updated draft. This latest effort seems to have captured the essence of what we had worked out cooperatively in our conference call in late June. This is consistent with EPA's strong support as a partner over more than two decades in addressing the contamination at this Site and protecting the public.

The City has one substantive comment, which is to clarify that the installation of two new wells at the Muscoy OU, recently approved by EPA, is part of the existing plan EPA is continuing here. I have enclosed a few minor revisions to the draft final document to reflect this clarification.

Once again, the City of San Bernardino very much appreciates the effort that EPA and each of you, Mariam, Kim, Richard, and others at EPA, have made to reach this happy point in the efforts to remedy the Newmark groundwater contamination. If EPA desires the City to comment at the planned hearing, our comments simply will expand on this theme. We look forward to EPA's rapid approval of the final ROD.

You and I should separately discuss the most efficient way to amend the Consent Decree so that it reflects the final ROD and makes clear the terms for certification of completion. In my view, very small changes and a new appendix, including the ROD, should be sufficient to address these concerns. This discussion can await adoption of the ROD.

Please let me know if you have any questions. Best regards.

Sincerely,

Squire Patton Boggs (US) LLP

Russell V. Randle
Counsel for the City of San Bernardino Municipal Water Department

cc: Stacey Aldstadt, Matt Litchfield, Mark Eisen for the City

For EPA: Mariam Fawaz, Kim Hoang, Richard Hiett

For DTSC: Stephen Niou, Steven Kosakayo, Olivia Karlin

Enclosure

Figure 2 Legend

Change "...Treatment System Extraction Wells" to "...Treatment System Extraction Well Sites". This change is to accommodate for the two extraction wells at the EPA 108 Site (i.e. EPA 108 and EPA 108S) and setup for the two planned extraction well site expansions (addition of EPA 109S and EPA 112S) without modifying the figure to show these additional extraction well locations.

Page 5, Paragraph 2:
Implementation of the Interim Remedies resulted in the construction of two extraction and treatment systems: 1) the North System in the Newmark OU includes three Extraction Wells and the Newmark Treatment Plant to limit additional contamination from continuing to flow into the Newmark OU plume area, and 2) the South Barrier System for both the Newmark and Muscoy OUs includes ten Extraction Well Sites (one of the sites includes two extraction wells)s and the two Waterman and 19th Street Treatment Plants to pump and treat contaminated water to inhibit migration of groundwater contamination into clean portions of the aquifer and to begin to remove contaminants from the groundwater plume for eventual restoration of the aquifer to beneficial uses.

Page 9, Alternative 2: Adopt the Interim Groundwater Remedies as Final Groundwater Remedies, First Paragraph:
Alternative 2 would adopt the implementation of the current interim groundwater remedies as described above for the restoration of the Site's groundwater to its beneficial use as municipal and domestic water supply. The current P&T systems would continue to operate, the groundwater monitoring network would be maintained, and the ICs would remain in effect. EPA recently approved the planned expansion of two of the 19th Street Treatment System Extraction Well Sites to include an additional extraction well at each site will proceed under this alternative. This change was made as part of the Muscoy OU to assure continued compliance. Groundwater would continue to be pumped to the three treatment plants and treated with GAC (see: Figure 4) to off Site water supply permit requirements and used as part of the municipal water supply. This Alternative would not change any of the operational groundwater contamination criteria or potable water supply criteria embodied in the 2005 CD between the City of San Bernardino and state and federal regulatory agencies.

*Estimated Capital Cost (for Muscoy OU from prior settlement):..... **$2,225,000***
*Estimated Annual O&M Cost:..... **$2,317,700***
*Estimated Net Present Value (Total) Cost:..... **~~$17,913,000~~20,138,000***
*Estimated Time to Achieve RAOs:..... **at least 17 years***

Page 10, Implementability
Because Alternative 2 involves no change to the current treatment systems, beyond the recently approved expansion of two of the extraction well sites, and ICs are currently in place, this alternative is highly implementable.

Page 10, Cost

Alternative 2 is already actively cleaning up the contaminated groundwater and ~~does not requires any~~ only minimal additional construction to accommodate the recently approved extraction well site expansion, with a capital cost estimated at $2,225,000. The estimated long-term O&M cost of this remedy has a Net Present Value estimate of $50 M (total future costs over the lifetime of the project, with O&M, discounted at a rate of 7% per year).

Department of Toxic Substances Control

Miriam Barcellona Ingenito, Acting Director
5796 Corporate Avenue
Cypress, California 90630

Matthew Rodriquez
Secretary for
Environmental Protection

Edmund G. Brown Jr.
Governor

July 22, 2014

Ms. Miriam Fawaz
US EPA, Region 9
75 Hawthorne St., SFD-7-3
San Francisco, CA 94105

DRAFT FINAL PROPOSED PLAN (PP), NEWMARK GROUNDWATER CONTAMINATION SUPERFUND SITE (NGCSS)

Dear Ms. Fawaz:

The Department of Toxic Substances Control (DTSC) received the above referenced document on July 10, 2014. The PP presents EPA's preferred remedy for the NGCSS Newmark and Muscoy Operable Units. The preferred remedy is to adopt the existing remedies provided in the interim RODs and the Explanation of Significant Differences.

As our past comments have been adequately addressed, DTSC does not have further comments to be forwarded to the US EPA. If you have any questions, please contact me at (714) 484-5458.

Sincerely,

Stephen Niou

Stephen Niou, P.E.
Brownfields and Environmental Restoration Program