First Five-Year Review Report
for
Newmark Groundwater Contamination Superfund Site
San Bernardino, California

September 2008

U.S. Environmental Protection Agency, Region 9
San Francisco, California

Approved by: Date:

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List of Acronyms

AOC	Administrative Order on Consent
ARARs	Applicable or Relevant and Appropriate Requirements
bgs	below ground surface
CDHS	California Department of Health Services
CDPH	California Department of Public Health
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
COC	Chemical of Concern
COPC	Chemical of Potential Concern
CVRWQCB	Central Valley Regional Water Quality Control Board
CW	City Well
DHS	Department of Health Services (State of California)
DTSC	Department of Toxic Substances Control (State of California)
EE/CA	Engineering Evaluation/Cost Analysis
EPA	U.S. Environmental Protection Agency
ESD	Explanation of Significant Differences
FS	Feasibility Study
FYR	Five-Year Review
FSP	Field Sampling Plan
GPM	gallons per minute
HASP	Health and Safety Plan
IAG	Interagency Agreement
ICs	Institutional Controls
IRIS	Integrated Risk Information System
LPGAC	Liquid Phase Granular Activated Carbon
MCL	Maximum Contaminant Level
MNA	Monitored Natural Attenuation
MSL	mean sea level
mg/kg	milligrams per kilogram
mg/L	milligrams per liter
µg/kg	micrograms per kilogram
µg/L	micrograms per liter
NCP	National Oil and Hazardous Substances Pollution Contingency Plan
NPDES	National Pollutant Discharge Elimination System
NPL	National Priorities List
O&M	Operation and Maintenance
OU	Operable Unit
PCBs	Polychlorinated biphenyls
PCE	Tetrachloroethylene
ppb	parts per billion
ppm	parts per million
PRP	Potentially Responsible Party
PRG	Preliminary Remediation Goal
RA	Remedial Action

RAL	Remedial Action Level
RAO	Remedial Action Objective
RCRA	Resource Conservation and Recovery Act
RD	Remedial Design
RI	Remedial Investigation
RI/FS	Remedial Investigation/Feasibility Study
ROD	Record of Decision
RP	Responsible Party
RPM	Remedial Project Manager
RSL	Regional Screening Level
RWQCB	Regional Water Quality Control Board
SBMWD	San Bernardino Municipal Water Department
SBVMWD	San Bernardino Valley Municipal Water District
SCADA	Supervisory Control and Data Acquisition
SOP	Standard Operating Procedure
SVE	Soil Vapor Extraction
SVOC	Semi-Volatile Organic Compound
TAT	Technical Assistance Team
TCE	Trichloroethylene
USACE	U.S. Army Corps of Engineers
USGS	United States Geological Survey
VOC	Volatile Organic Compound

Executive Summary

The U.S. Environmental Protection Agency (EPA) Region 9 has conducted the first five-year review (FYR) of the Newmark Groundwater Contamination Superfund Site (Newmark Site) in San Bernardino, California. The purpose of this FYR is to determine whether the remedial actions (RAs) implemented at the site are protective of human health and the environment. This FYR is required because hazardous substances remain on-site above the risk-based levels determined in the Records of Decision (RODs), thereby preventing unlimited use and unrestricted exposure. The methods, findings, and conclusions of the review are documented in this report. In addition, this report summarizes issues identified during the review and includes recommendations and follow-up actions to address them. The triggering action for this review was the Remedial Action on-site construction start date of the Newmark Operable Unit in 1996.

The Remedial Action Objectives (RAOs) presented in the two Newmark OU and Muscoy OU Interim RODs were developed to meet the following specific cleanup objectives for the Newmark and Muscoy OUs:

• To inhibit migration of groundwater contamination into clean portions of the aquifer;

• To limit additional contamination from continuing to flow into the Newmark OU plume area;

• To begin to remove contaminants from the groundwater plume for eventual restoration of the aquifer to beneficial uses (this is a long-term project objective rather than an immediate objective of the interim action.)

To address the above RAOs, pump and treat systems were selected as the interim remedies for both OUs. The Newmark OU treatment system has been in Operation and Maintenance (O&M) since 2000, the Muscoy OU system since 2007. This is the first FYR for the Newmark site.

A FYR site inspection took place on February 12 - 14, 2008. Following the site visit, the U.S. Army Corps of Engineers (USACE) met with the EPA Operable Unit (OU) 1 and 2 Remedial Project Manager (RPM), the California Department of Toxic Substances Control (DTSC), the San Bernardino Municipal Water Department (SBMWD) representatives and their consultants. The DTSC representatives were interviewed following the February 14th meeting. Other interviewees including the Operable Unit (OU) 3 RPM, the California Department of Public Health (CDPH), the San Bernardino Municipal Water Department (SBMWD) consultant, and the Santa Ana Regional Water Quality Control Board were interviewed by phone following the site visit. The FYR start was advertised in local newspapers to solicit public input. EPA and SBMWD followed with community interviews. Data reviews, ARAR and Risk Assessment reviews were also conducted. While there have been changes in the toxicity values for trichloroethylene (TCE) and tetrachloroethylene (PCE) since the RODs were issued, these changes did not affect the protectiveness of the remedies, since there is no exposure to contaminated water.

Institutional Controls have been implemented through a City of San Bernardino ordinance on well construction permits and a temporary agreement among all water purveyors to hold water

production rates steady until the basin-wide groundwater model is developed for groundwater management. The ordinance was passed in 2006 (San Bernardino Municipal Code, Title 13.25, ordinance MC-1221, passed on 03-30-06) (Ordinance or City Ordinance). However, SBMWD is not enforcing the Ordinance against several water purveyors with water rights within the management zone, with which SBMWD has entered into an Agreement to Develop an Institutional Controls Groundwater Management Program (Groundwater Management Agreement).

The results of the FYR show that the remedy at the Newmark Site is protective of human health and the environment because exposure pathways that could result in unacceptable risks are being controlled.

Five-Year Review Summary Form

SITE IDENTIFICATION		
Site name *(from CERCLIS)*: Newmark Groundwater Contamination		
EPA ID (*(from CERCLIS)*: CAD981434517		
Region: 9	**State: CA**	**City/County: San Bernardino/San Bernardino**
SITE STATUS		
NPL status: √ Final □ Deleted □ Other (specify)		
Remediation status (choose all that apply): □ Under Construction √ Operating □ Complete		
Site Wide FYR √ YES □ NO	**Construction completion date:** n/a	
Has site been put into reuse? √ YES □ NO		
REVIEW STATUS		
Lead agency: √ EPA □ State □ Tribe □ Other Federal Agency _____		
Author name: Kim Hoang		
Author title: Remedial Project Manager	**Author affiliation: U.S. EPA**	
Review period: 11 / 14 / _2007 to 9 /23 /2008_		
Date(s) of site inspection: _02 / 12-13 / _2008_		
Type of review: √ Post-SARA □ Pre-SARA □ NPL-Removal only □ Non-NPL Remedial Action Site □ NPL State/Tribe-lead □ Regional Discretion		
Review number: √ 1 (first) □ 2 (second) □ 3 (third) □ Other (specify) _____		
Triggering action: √ Actual RA Onsite Construction at OU # 1 □ Actual RA Start at OU#____ □ Construction Completion □ Previous Five-Year Review Report □ Other (specify)		
Triggering action date *(CERCLIS)*: 09/03/1996		
Due date *(five years after triggering action date)*: _09/03/ 2001		

Five-Year Review Summary Form cont'd.

Issues:

Protectiveness Issues
None noted

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

1.0 INTRODUCTION

This is the first site-wide FYR report of Remedial Actions for the Newmark Groundwater Contamination Site (Newmark Site or Site) located in the city of San Bernardino, California (San Bernardino or City). The site has been divided into three OUs: the Newmark OU, the Muscoy OU, and the Source OU. The Newmark OU includes a large but diffuse plume of volatile organic compound (VOC) contamination of a drinking water aquifer in north-central San Bernardino. The Muscoy OU includes a similar plume in the northwestern portion of San Bernardino (and portions of the unincorporated area known as Muscoy). The Source OU was designated to find site-wide sources for the contaminant plumes. Several source investigation studies were conducted in the areas northwest of the Shandin Hills in San Bernardino. Refer to Figure 1 for a site map. This FYR report addresses all OUs, but the protectiveness is only evaluated based on the two completed interim remedies for the Newmark and Muscoy OUs. The Source OU, which is in the remedial investigation/feasibility study (RI/FS) phase of the Superfund process, does not involve discrete contamination apart from the Newmark and Muscoy OUs.

The purpose of FYRs is to determine whether the remedy at a site is protective of human health and the environment. The methods, findings, and conclusions of reviews are documented in FYR reports. In addition, FYR reports identify issues found during the review, if any, and identify recommendations to address them.

The EPA is preparing this FYR report pursuant to the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) § 121 and the National Oil and Hazardous Substances Pollution Contingency Plan (NCP). CERCLA §121(c) states:

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

The EPA interpreted this requirement further in the NCP; 40 CFR § 300.430 (f) (4) (ii) states:

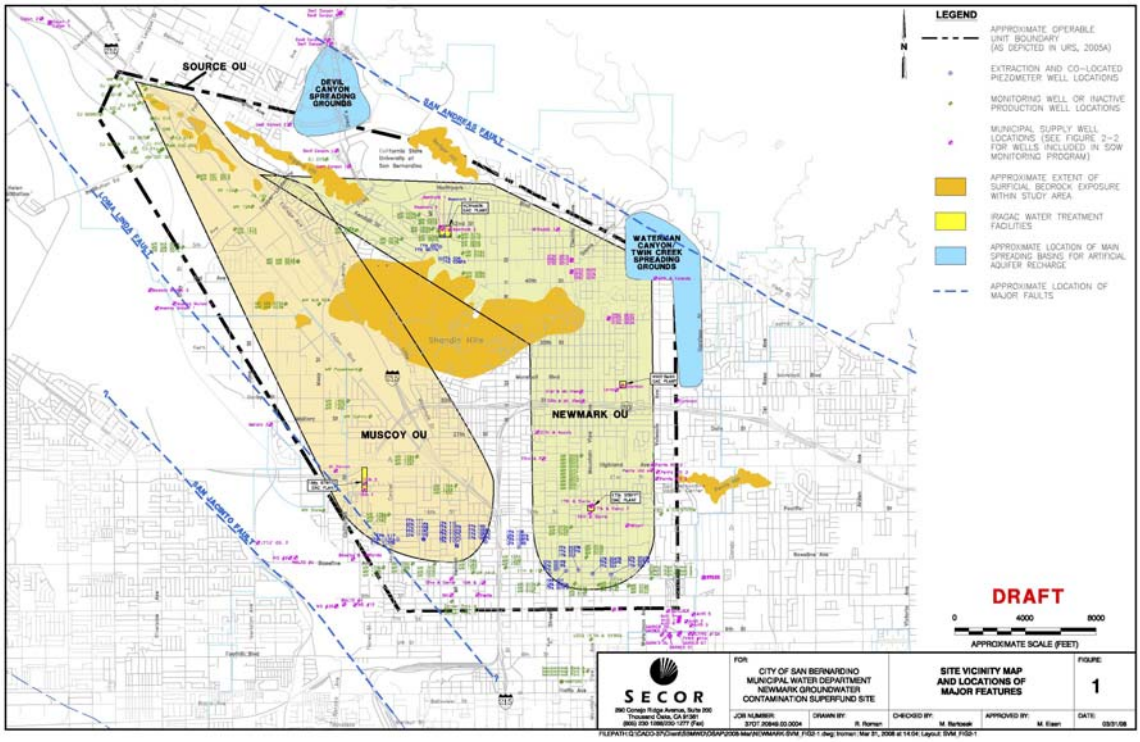
> *If a remedial action is selected that results in hazardous substances, pollutants, or contaminants remaining at the site above levels that allow for unlimited use and unrestricted exposure, the lead agency shall review such action no less often than every five years after initiation of the selected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

The purpose and focus of five-year reviews are further defined in EPA Office of Solid Waste and Emergency Response (OSWER) Directive 9355.7-03B-P (EPA, 2001).

The EPA Region 9 has conducted a review of the remedial actions implemented at the Newmark Site, San Bernardino, CA. This review was conducted between February and September 2008. This report documents the results of the review. The U.S. Army Corps of Engineers (USACE) provided analyses in support of the FYR at the request of EPA Region 9.

This is the first FYR for the Newmark Site. The trigger date for the FYR was the start of the on-site construction for the Newmark OU remedy in September 1996. This FYR for the Newmark Site is a statutory review as required under CERCLA Section 121, 42 U.S.C. Section 9621, for remedies where hazardous substances will remain on-site above levels that allow for unlimited use and unrestricted exposure. Reviews are to be conducted every five years after commencement of the remedial action.

Figure 1: Site Map



2.0 SITE CHRONOLOGY

The site chronology is summarized in Table 1.

Table 1
Chronology of Site Events

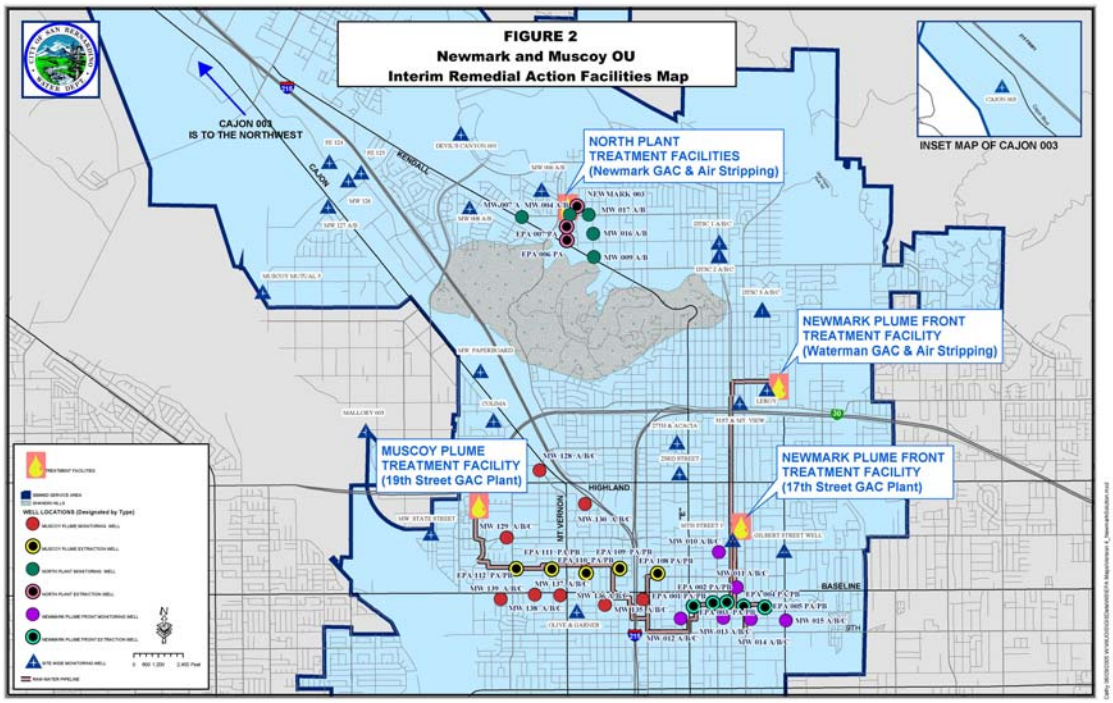
EVENT	DATE
Initial Discovery	1980
State funds interim treatment facilities for contaminated City production wells	1986
Newmark Site placed on the NPL	1989
RI/FS Report for Newmark OU completed	1993
Newmark OU ROD signed	1993
RI/FS Report for Muscoy OU completed	1994
Muscoy OU ROD signed	1995
Newmark OU Construction Start (Wells)	1996
Remedial design completed for Newmark OU and construction started (plants and piping)	1997
Newmark treatment systems on-site construction complete	1998
Newmark OU Start-up	1998
Newmark OU Operational & Functional	2000
Settlement negotiation started among US, DTSC and San Bernardino	2000
Remedial design completed for Muscoy OU and construction started (treatment plant)	2003
Explanation of Significant Differences	2004
Consent Decree signed with City	2005
Muscoy treatment system on-site construction complete	2005
Muscoy OU Start-up	2005
Construction of 2 more wells, EPA 108S and MW141A, in the Muscoy OU as a result of one-year performance data	2006
Passage of City Ordinance restricting construction of new water supply wells	2006
Muscoy OU Operational & Functional	2007

3.0 BACKGROUND

3.1 Site Location, Physical Characteristics, and Land Use

The Newmark Site includes groundwater contamination covering approximately eight square miles and is located in the northwestern and west-central portions of the City. It consists of three OUs, including the Newmark, Muscoy, and Source OUs. The Newmark OU is located in the north-central portion of the City and the Muscoy OU is located in the west central part of the City and part of the unincorporated area known as Muscoy. The Source OU was designated to find the sources site-wide. Interim remedial systems have been constructed for the Newmark and Muscoy OUs, including several extraction wells and treatment facilities. One of the systems is located in the northern part of the City, while the other two are largely located in the west-central part of the city. The locations of these systems are shown in Figure 2.

Figure 2: Newmark and Muscoy OU Interim Action Facilities



The Newmark Site includes a broad plain that slopes toward the southeast and south at the base of the San Bernardino Mountains. This plain is punctuated by bedrock-cored hills, the largest being the Shandin Hills. The Shandin Hills are grass-covered and largely undeveloped and act, in part, to separate the Newmark and Muscoy OUs, geographically and hydraulically.

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

3.2 History of Contamination

In the 1980's, the state of California (State) sampled water produced from certain City wells and detected contamination from VOCs, including PCE, TCE, and Freon, decomposition byproducts from those compounds, and other contaminants. The State investigations were published in 1986 and 1989, and identified the Newmark and Muscoy contamination plumes. The source(s) for the contamination have not been definitively identified, but previous source investigation activities were centered at the former Camp Ono (a World War II Army installation) a steel rolling mill, and at the San Bernardino County's closed Cajon Landfill.

3.3 Initial Responses

The California Department of Toxic Substances Control (DTSC) and the Santa Ana Regional Water Quality Control Board (RWQCB) found that the Newmark and Muscoy plumes threatened public health. In l986, DTSC contracted with the SBMWD to construct, operate, and maintain four treatment systems consisting of air stripping and liquid granular activated carbon units at existing SBMWD facilities. These systems were intended to treat water pumped for public supply and were not intended to treat or contain the contaminant plumes.

EPA placed the Newmark Site on the National Priorities List (NPL) in March 1989. In 1990, EPA began the Remedial Investigation (RI) and the Feasibility Study (FS) of the Newmark OU. The RI/FS report for the Newmark OU was finalized in March 1993.

Additional investigation in the summer of 1992 traced the direction of the groundwater contamination flow into the western side of the Shandin Hills. Based on this information, the Newmark Site was officially expanded in September 1992 to include the Muscoy groundwater plume, located west of the Shandin Hills, which was designated as the Muscoy OU. EPA completed the RI/FS for the Muscoy groundwater contamination in December 1994.

The Source OU RI/FS is still being conducted. In the 1990s and early 2000s, various investigations were conducted of possible sources in the northern portions of the Site, including the former San Bernardino Airport, the former (WWII-era) Camp Ono (with the participation of the USACE), a former steel rolling mill, and the San Bernardino County Cajon landfill. A ROD for the Source OU will be issued after completion of the RI/FS (currently estimated to occur in 2011).

3.4 Basis for Taking Action

The contamination present in the groundwater at the Newmark Site represents a potential risk to the population who depend on groundwater for municipal supply. Groundwater from the Bunker Hill Basin represents the primary water source for the City of San Bernardino and surrounding area. The contaminated plumes potentially can affect drinking water sources for an estimated population of 600,000 people. Under current exposure conditions, all routes of exposure are currently controlled through treatment of municipal water prior to distribution.

Assessment of potential risks posed by contamination in both the Newmark and Muscoy OUs has been conducted by EPA. Chemicals of potential concern considered in the risk assessment included: PCE, TCE, cis-1,2-Dichloroethene (DCE), and other VOCs detected in at least one well in both OUs.

For residential scenarios, EPA included two potential exposure routes in the risk assessment:

• drinking the groundwater during residential use; and
• inhaling the chemicals in groundwater as vapors during showering.

Skin contact with contaminated water was also considered but EPA found that it did not pose a significant risk. 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 ecological receptors.

3.4.1 Newmark OU

The risk assessment estimated the possibility that additional occurrences of cancer would result from exposure to contamination. The background probability of developing cancer from all causes in California is approximately one in four (or 250,000 in a million). An excess cancer risk of 1 in a million means that a person exposed to a certain level of contamination would increase the risk of developing cancer from 250,000 in a million to 250,001 in a million as a result of the exposure. If the contaminated groundwater in the Newmark OU were used as a drinking water source without treatment, the chance of developing cancer during a lifetime would increase by as much as 20 in a million (i.e., the excess cancer risk would be 2×10^{-5}). While this is still within EPA's acceptable risk range, EPA is taking an action at the Newmark OU because the contaminant levels in groundwater exceed drinking water standards (also referred to as Maximum Contaminant Levels, or MCLs).

The potential for adverse non-carcinogenic health effects was estimated by calculating a hazard index for the sum of all the compounds of potential concern in the Newmark plume. If the total hazard index is 1.0 or above, there may be a concern for potential health effects. The hazard index for the Newmark OU under the reasonable maximum exposure scenario was less than 0.7, which indicated that non-carcinogenic health effects are negligible.

3.4.2 Muscoy OU

The risk assessment also estimated the possibility that additional occurrences of cancer will result from exposure to contamination. If the Muscoy OU groundwater was used as a drinking water source without treatment, the chance of developing cancer during a lifetime would increase by as much as 50 in a million (i.e., the excess cancer risk would be 5×10^{-5}). While this is within EPA's acceptable risk range, EPA is taking take action at the Muscoy Plume OU because contaminant levels in groundwater exceed drinking water standards (MCLs).

The potential for non-carcinogenic health effects was estimated by calculating a hazard index for the sum of all the compounds of potential concern in the Muscoy plume. As stated above, if the total hazard index is 1.0 or above, there may be a concern for potential adverse health effects. The hazard index for the Muscoy Plume OU was less than 0.5, which indicated that non-carcinogenic health effects are negligible.

4.0 REMEDIAL ACTIONS

4.1 Newmark OU

4.1.1 Remedy Selection

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

Both the Newmark and Muscoy RODs were supplemented by an Explanation of Significant Differences (ESD) issued by EPA in 2004. The ESD added an institutional controls program "to assure that the Newmark and Muscoy extraction and treatment systems remain effective in meeting the objectives of capturing contaminated groundwater and inhibiting the migration of groundwater contamination into clean portions of the aquifer" (Institutional Controls Program). As discussed above, the Institutional Controls Program requires an ordinance to be adopted by the City of San Bernardino to prohibit extraction within the zone of influence of the Newmark and Muscoy systems that would interfere with their integrity. As discussed below, the Institutional Controls Program has not been fully implemented, but the current control mechanisms are effective to protect the integrity of the systems in the short term.

4.1.2 Remedy Implementation

Construction of the Newmark OU extraction and treatment system began with well installation in 1996. Construction of the piping and treatment facilities at the Waterman and

Newmark Water Treatment plants was begun 1997 and all construction was completed in October, 1998. The Newmark OU system was determined to be operational and functional in October 2000.

The extraction systems include three extraction wells (EPA 006, 007 and Newmark 003) in the north area (Newmark North) and five extraction wells in the south area (Newmark South) (EPA 001 through 005). Two of the Newmark North wells were installed as part of the remedy construction and one is an existing City of SBMWD production well (Newmark 003). These wells form a roughly north-south line across the Newmark plume north of the Shandin Hills along Western Drive north of Kendall Drive. The wells are from 340 to 495 feet deep with 70-190 feet of screen. All three wells have vertical line-shaft turbine pumps, driven by fixed-rate electric motors. The design flow rates range from 1000-1600 gpm for a total of 3600 gpm.

The five Newmark South area wells 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. All wells have electric submersible pumps with variable-frequency motor controllers. The design flow rates range from 2000 to 2200 gallons/minute (gpm) for a total of 10,200 gpm.

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

The treatment facilities all include carbon adsorption with chlorination prior to distribution through the public water supply system. The Waterman and Newmark North plants also have air stripping plants used to meet peak demands co-located with the LPGAC systems, although the air stripping systems are not part of the EPA remedy. The main components of the EPA treatment systems include:

- Liquid Phase Granular Activated Carbon (LPGAC)
- Piping System
- Metering
- Chlorination System
- Discharge to:
    - Ground Storage Reservoir or
    - Distribution System or
    - Boosted to a Higher Area of the Distribution System

Each treatment plant includes a pressure sustaining valve to keep dissolved gases in solution, a SCADA system, a backwash holding tank, and discharge lines to surface water drainage as part of the SBMWD NPDES Permit.

Monitoring of the performance of the Newmark South extraction system is supported by a network of multi-level monitoring wells located near the extraction wells, both up- and downgradient of the extraction well line. 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 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.

4.1.3 System Operations/Operation and Maintenance (O&M)

The Newmark OU was declared Operational and Functional (O&F) in October 2000, after two years (1998-2000) of data evaluation and system repair due to construction problems. Capture analysis of the water level data during the O&F period showed that the extraction wells achieve 100% capture at the design extraction rates. O&M on the Newmark OU started in October 2000.

The SBMWD delivers the treated water to its potable water system under a CDPH permit. The permit addresses the end-use of the treated water for municipal water supply and specifies treatment goals, maintenance procedures, and sampling and reporting requirements. Pursuant to the 2005 Consent Decree between the City of San Bernardino, the state of California on behalf of DTSC and the United States of America, on behalf of the Department of the Army and EPA (Consent Decree or CD), SBMWD performs specified O&M requirements and evaluates hydraulic performance of the extraction system for maintaining capture of the leading edge of the Newmark plume and the chemical concentration in the monitoring wells south of the extraction system in accordance with a Statement of Work to the Consent Decree (CD/SOW). The results have been reported by SBMWD to EPA and DTSC in their quarterly reports since 2005.

When the Muscoy OU treatment system started O&M in October 2007, extraction well EPA 005 was approved by CDPH to be taken off treatment since all sampling results have shown no detected level of contaminant since 2000. The remaining four extraction wells were rerouted to be treated as follows: EPA 001 is treated at the Muscoy OU 19th Street treatment plant, and EPA 002, 003 and 004 are treated at Waterman Plant. The 17th Street Plant was returned to SBMWD to treat the City's production wells.

4.2 Muscoy OU

4.2.1 Remedy Selection

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

As noted above, both the Newmark and Muscoy Interim RODs were supplemented by an Explanation of Significant Differences (ESD) issued in 2004 to add an institutional controls program to the interim remedies.

The treatment system at the 19th Street Water Treatment Plant is very similar to the system described above for the Newmark OU. The primary difference between the OUs is the absence of air stripping units used for peak flows at the Muscoy 19th Street Plant.

4.2.2 Remedy Implementation

Construction of the Muscoy OU extraction and treatment system began with installation of two extraction wells in 2001 to help in finalizing the design of the treatment system. Construction of the remaining three extraction wells and the treatment system started in 2003, when Remedial Design (RD) was completed. Construction of the piping and a treatment facility referred to as the 19th Street Water Treatment Plant, located near the intersection of North Pennsylvania Avenue and 19th Street, was completed in August 2005.

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. EPA 108S was installed in January 2007 and was intended to address capture of the easternmost shallow portion of the Muscoy plume. The wells are approximately 490 to 1260 feet deep and screened over a total of 225 to 1250 feet. The wells are generally installed in an east - west line oriented perpendicular to groundwater flow near Baseline Street. All wells have electric submersible pumps with variable-frequency motor controllers and motors ranging in size from 120 – 500 horsepower (HP). The design flow rates range from 600 to 2500 gallons/minute (gpm) for a total design capacity of 11,500 gpm. The extraction wells are connected to the treatment facilities through appropriately sized buried piping that generally follows surface streets. A booster station with three booster pumps connecting SBMWD water distribution system with the San Bernardino Valley Municipal Water District (SBVMWD) was also constructed as part of the Muscoy OU treatment system.

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.

4.2.3 System Operations/Operation and Maintenance (O&M)

The O&M for the Muscoy OU systems is the same as described for the Newmark OU in Section 4.1.3 above. Refer to Table 4 for overall operational costs for both the Muscoy and Newmark systems.

The Muscoy OU was declared O&F on September 30, 2007, after eighteen months of monitoring and data evaluation (July 2005-February 2007). O&M started in October 2007.

The current volumes extracted and treated by the Muscoy OU are in compliance with the consent decree among EPA, the United States of America, and the City of San Bernardino. At the present time the quantity treated results in approximately 5000 gpm of water in excess of the SBMWD demand. This excess is sold to the San Bernardino Valley Municipal Water District (SBVMWD) at production cost, which SBVMWD resells to neighboring water agencies. Proceeds from this water sale are deposited in the escrow account for O&M of the treatment systems that was established pursuant to the Consent Decree.

As required by the Statement of Work appended to the Consent Decree (CD/SOW), SBMWD is developing a set of operating plans for both the Newmark and Muscoy OUs. Routine O&M and monitoring are described in the O&M Plan, the Quality Assurance/Quality Control ("QA/QC") plan and the Operation and Sampling Analysis Plan ("OSAP", SBMWD, 2008). The OSAP also describes in details the performance criteria laid out in the CD/SOW (described in the next Section), which were modified at the end of the Muscoy OU O&F period, and the monitoring and analysis required to meet these performance criteria. The Baseline Mitigation Plan (SBMWD 2008) outlined the phased activities to be taken when one or more of the performance criteria, as described in Section 4.4 below, are not met. In accordance with the Consent Decree, DTSC will assume the lead oversight role once all the above-referenced site plans for both OUs have been approved by EPA. EPA will continue in a support oversight role and retains primary responsibility for some oversight functions, including five-year reviews.

4.3 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. In addition to these CD/SOW-specified Site-wide monitoring wells, SBMWD will monitor other wells that are considered useful for assessing contaminant conditions, either as required by the Drinking Water Permit, or necessary for the database for the groundwater model development. The 23 Site-wide monitoring well locations are shown on Figure 2, and listed in Table B-2 of Appendix B (Data Review Memorandum).

4.4 Performance Monitoring and Evaluation

SBMWD is required to perform regular analysis of monitoring/sampling data to assess whether the performance criteria established in the CD/SOW are being achieved. As required by the CD/SOW, the OSAP specifies the scope and procedures for monitoring and sampling tasks, and outlines the methodology and procedures for evaluating compliance with performance criteria established in the SOW.

The Newmark and Muscoy plumes were well characterized during the O&F periods. The Newmark plume is in the deep aquifer, while the Muscoy plumes include one in the shallow zone of the aquifer, and one in the top layer of the deep aquifer, referred to as the intermediate zone. The performance criteria were negotiated as part of the Consent Decree Statement of Work (CD/SOW, 2005), and modified at the end of the Operational & Functional period of the Muscoy OU (2007), to be applied to both the Newmark and Muscoy plumes. They include flow performance (i.e., capture) and chemical performance criteria, as summarized in the following Tables 2 and 3. Flow performance is determined from capture analysis of the individual plumes, and chemical performance is determined using the concentration of the contaminants in the monitoring wells downgradient of the Newmark South and Muscoy extraction wells. The OSAP describes in detail and provides examples as to how these performance evaluations should be conducted. SBMWD provides this evaluation for both the Newmark and Muscoy OU data in quarterly progress reports submitted pursuant to the Consent Decree.

Table 2 (OSAP Table 8-4)
Summary of Flow Performance Criteria

Operating Condition(1)	Extraction Well Network	Particle Capture Criteria(2)
Operations Within the Maximum TER	Newmark Plume Front Extraction Well Network	90% particle capture or greater based on a three-month rolling average
	Muscoy Plume Extraction Well Network - Shallow Plume	80% particle capture or greater based on a three-month rolling average
	Muscoy Plume Extraction Well Network - Intermediate/Deep Plume	85% particle capture or greater based on a three-month rolling average

Operating Condition[1]	Extraction Well Network	Particle Capture Criteria[2]
Transition Phase and/or Non-Routine Phase Operations (described in the BMP)	Newmark Plume Front Extraction Well Network	85% particle capture or greater based on a three-month rolling average
	Muscoy Plume Extraction Well Network - Shallow Plume	75% particle capture or greater based on a three-month rolling average
	Muscoy Plume Extraction Well Network - Intermediate/Deep Plume	80% particle capture or greater based on a three-month rolling average

Notes:

(1) Combined flow rate at which the Newmark Plume Front or Muscoy Plume extraction well network is operating

(2) Minimum percentage of particles placed across the subject contaminant plume (as defined by the 2.5 g/L PCE concentration contour) that are required to be captured per monthly flow performance analysis.

MRER Maximum Routine Extraction Rate

TER Target Extraction Rate

Maximum TER The annual TER plus 10%

Table 3 (OSAP Table 8-9)
Summary of Contaminant Performance Criteria

Wells Designated For Contaminant Performance[1]			Suspended Wells
Newmark Plume Front Extraction Well Network	MW 012A/B/C, MW 013A/B/C, MW 014A/B/C, MW 015A/B/C		None
Muscoy Plume Extraction Well Network	MW 135A/B/C, MW 136A/B/C, MW 137A/B/C, MW 138A/B/C, MW 139A/B/C, MW 141A		MW 135A, MW 137A, MW 138A, MW 141A
Criteria	**PCE Drinking Water MCL [2] (µg/L)**	**TCE MCL[2] (µg/L)**	**Immediate Action**
Increasing Trend	Based on Analysis	Based on Analysis	Increase Monitoring to Quarterly
>½ MCL	2.5	2.5	Increase Monitoring to Quarterly
>MCL	5	5	Evaluate Mitigation Measures

For the Muscoy OU, due to preexisting low-level contamination south of the extraction wells, the CD/SOW provides that any monitoring well of the MW 135 – 139 A-C group which has tetrachloroethylene ("PCE") or trichloroethylene ("TCE") concentrations above 1 part per billion ("ppb") at the end of the one-year performance period will be suspended from compliance with the routine chemical performance criteria described above (See CD/SOW Section III.F.1.) At the end of the O&F period, the following monitoring wells were identified to have concentrations higher than 1 ppb: MW 135A, 137A, 138A, and 141A (built at the location of MW 136 as a shallow monitoring well). These wells are suspended from the contaminant performance criterion requirement for enforcement, but are currently being monitored quarterly instead of semi-annually to ensure protectiveness. When the contamination level in these wells is under 1 ppb for 8 consecutive quarters, they will be re-included in required compliance with the routine chemical performance criteria. As noted, notwithstanding that these wells are not included in compliance evaluation, they are monitored for protectiveness purposes.

4.5 Annual O&M Cost

The annual operating costs for the two Newmark and Muscoy OU treatment systems are summarized below in Table 4.

Table 4
Annual Combined Newmark and Muscoy OU System Operations/O&M Costs

Dates		Total Cost rounded to nearest $100,000
From	To	
April 2005	December 2005*	$1,200,000
January 2006	December 2006	$2,200,000
January 2007	October 2007	$2,000,000

*Note: 2005 data do not include operating costs for the Muscoy system

Costs in Table 4 include labor, utilities, materials, sampling and analysis, maintenance, and administrative fees for approved activities as specified in the Consent Decree.

5.0 PROGRESS SINCE THE LAST REVIEW

This is the first FYR for the Newmark Site.

6.0 FIVE-YEAR REVIEW PROCESS

6.1 Administrative Components, Community Notification, Document Review

This FYR consisted of the following activities: public notification by EPA Region 9 that a FYR was underway in the following San Bernardino area newspapers: *Precinct Reporter*, *The Black Voice News*, *El Chicano Newspaper*, and the *San Bernardino County Sun* ; a review of relevant documents (Appendix A); a site inspection (Appendix E) ; and discussions with SBMWD employees, EPA RPMs, consultants to EPA and the City, and California State

agency representatives (Appendix F). The remedial action objectives (RAOs), applicable or relevant and appropriate requirements (ARARs), and cleanup levels were obtained from the ROD for each OU. A copy of this completed report and an updated fact sheet are available through the EPA Region 9 Superfund Records Center located in San Francisco, from the information repository at the San Bernardino County Library, San Bernardino, CA, or the City of San Bernardino Water Department, 300 E Street, San Bernardino. Notice of the completion of this report will be announced in the above local newspapers.

6.2 Data Review

A review of all relevant data for the Newmark and Muscoy OU treatment systems is provided in the Data Review memorandum in Appendix B. Annual extraction rates, and mass removal of TCE and PCE are summarized for the period from 2000-2008. Monitoring data included both water levels and contaminant concentrations, collected at sampling intervals specified in the CD/SOW and described in detail in the OSAP (SECOR, 2008) at the treatment plants, extraction wells and monitoring wells. Data from the specific group of wells associated with each of the three plumes are analyzed and evaluated against the performance criteria described above. Capture analysis is currently performed quarterly for the Newmark and Muscoy OU plumes, and chemical data are collected and analyzed either quarterly, semiannually or annually. Analysis for these data and evaluation of their compliance to the performance criteria are reported in the SBMWD quarterly progress reports. A review of all the above results show that the performance criteria as described in Section 4.4 were met during the entire operation of the treatment systems.

For the FYR, key contaminant concentration trend and long term monitoring frequency optimization for each well are also performed for the Newmark and Muscoy extraction and monitoring wells. This analysis includes both Mann-Kendall and linear regression analyses, conducted using the Monitoring and Remediation Optimization System (MAROS) software. This analysis is presented in the Remedial System Evaluation ("RSE", USACE, 2008) for the Newmark Site, including monitoring data from 1999 to 2007. The RSE study is an update to the Long Term Monitoring Optimization ("LTMO", GSI, 2007) study conducted in 2007 by GSI for the Newmark Site, which was a comprehensive optimization of the long term monitoring program based on an evaluation of data from 1999 through 2006 for over 160 wells in the Bunker Hill basin.

6.2.1 Capture Performance Analysis

Water level data collection has been automated for both the Newmark and Muscoy OU through a SCADA (Supervisory Control and Data Acquisition) system. SBMWD reports the SCADA analyses to EPA and DTSC in its quarterly reports.

Capture performance was evaluated for the Newmark and Muscoy OUs during the O&F phases, and reported in the EPA Performance Reports on both OUs. For the Newmark OU, capture zone analysis was performed for the South Newmark extraction system (EPA 001-005) monthly during the O&F period (1998-2000) and reported in the two Newmark Performance reports (URS 2000), annually during O&M (2000-2007) and reported in the

Capture Zone Evaluation (CH2MHill, 2008), and quarterly during O&M by SMBWD, and reported in the quarterly progress reports. 100% capture of this plume was achieved during this entire period. The Data Review Memorandum presents an example of a capture analysis of the Newmark plume using water level data from June 2008. Plume maps of the Newmark deep plume are also shown in the Data Review Memorandum for the years 2000 and 2007 to show progression of the plume, which appears to reduce in size during this O&M period.

For the Muscoy OU, capture zone analysis was performed for the two aquifer zones where contamination is found in the Muscoy OU. During the O&F period (Aug 2005-Mar 2007), capture zone analyses were performed monthly by EPA, with capture of the shallow plume in May 2007 analyzed from the pump test results of the new extraction well EPA 108S. During this period, capture of the shallow plume was between 80%-93%, and capture of the intermediate plume was 100%, meeting the performance criteria described in Table 2 of the Data Memorandum. SBMWD started evaluating the capture zone for the Muscoy extraction system in April 2008, using the methodology presented in the OSAP (2008). The 100% capture achieved in April-June 2008 for the Muscoy shallow plume shows the effective contribution to capture from EPA 108S, which went on line in May 2007. Capture of the intermediate plume during this period remained at 100%. The Data Review Memorandum presents an example of a capture analysis for the two Muscoy plumes using water level data from June 2008. Since Muscoy O&M just started in 2007, a comparison of plume maps will be provided in the next FYR.

A groundwater model that simulates flow throughout the Bunker Hill Basin is currently being developed by SBMWD and SBVMWD, with participation of other water purveyors in the Bunker Hill Basin, under EPA oversight. Once approved by EPA, the model will be used as a tool to implement the Institutional Controls Program, to assess the impacts of proposed pumping in the basin on the performance of the OUs, and may also be used to evaluate remedial performance and water management issues.

6.2.2 Contaminant-Level Performance Analysis

Contaminant concentration data are collected at monitoring wells downgradient of the extraction wells barrier. Contaminant concentrations are monitored semiannually at the extraction systems (both extraction wells and monitoring wells used to monitor the performance of the extraction wells), and annually Site-wide. The Data Review Memorandum summarizes the range of TCE and PCE concentrations observed in the monitoring wells used for monitoring the performance of the barrier extraction wells. For the Newmark deep plume, all the monitoring data from 2000 - 2007 met the chemical performance criteria. For the Muscoy shallow and intermediate plume, monitoring data from 2005-2008, except for data from the monitoring wells not included in the performance monitoring program due to preexisting contamination, show that all the other wells met the performance criteria.

While the Newmark North extraction system is not included in the performance evaluation, the range of PCE concentrations found in nearby monitoring wells with the highest historical levels is 11μg/L (Nov 1999) to 7.1 μg/L (Nov 2007) in MW09B and 13 μg/L (Nov 1999) to

5.6 μg/L (Nov 2007) in MW 016B, which are both downgradient of the Newmark North extraction wells. Contaminant concentrations in monitoring wells downgradient to the south extraction barrier systems show either no trend or a decreasing trend.

At the treatment plants, combined influent concentrations are monitored quarterly, and combined effluent concentrations are monitored weekly as part of the carbon change out requirement. Combined influent PCE concentrations into each of the Newmark and Muscoy treatment plants through June 2008 ranges from 8.5 (Feb 1999) - 2.1 (Jun 2008) μg/L for the Newmark plant, 5.5 (Jan 2000) - <0.5 (Jun 2008) μg/L for the 17th Street plant, 2.3 (Jan 2000) - 2.6 (Jun 2008) μg/L for the Waterman plant, and 5.7 (Aug 2005) - 1.6 (Jun 2008) for the 19th Street plant. Combined effluent concentrations from all the treatment plants have been non-detect (< 0.5 μg/L) since treatment started.

6.2.3 Treatment Performance Summary

As discussed above, the treatment systems have been consistently meeting all performance criteria and permit requirements since 2005, when the performance criteria went into effect. Based on review of influent and effluent concentrations, flow rates, and water levels, both the Newmark South and Muscoy extraction systems appear to be performing well. In particular, the recent addition of shallow extraction well EPA 108S has improved the performance and certainty of capture of the Muscoy extraction system. Continued monitoring of concentrations near the eastern end of the Muscoy line of wells and the western end of the Newmark line of wells would be appropriate, as discussed in the RSE. This would include close attention to results from monitoring clusters MW-12 and MW-135.

6.2.4 MAROS Analysis

For the FYR, the Data Review Memorandum summarizes the trend analysis results of monitoring data for the EPA monitoring well network (shown in Table B-2 of the Data Review Memorandum) for the Newmark data from 1999-2007, and for Muscoy data from 1999-2007 and 2005-2007, the latter being the actual O&M period of the Muscoy OU. Table 5 summarizes the trend analysis of monitoring data from 2000-2007, which show either a Probably Increasing (PI) or an Increasing (I) trend. Overall, those data showed that there is an increasing trend either north or at the extraction wells barrier, showing that the extraction system is working properly, and drawing the contamination towards the extraction barrier.

For the monitoring frequency analysis, the recommended frequencies included in the GSI LTMO study (GSI, 2007), and the RSE study (USACE, 2008) are compared to the current sampling frequency. The RSE study endorsed the GSI recommendations for the wells monitored under the Consent Decree. Based on this study, Table 6 summarizes EPA recommendations for monitoring frequency changes.

Table 5
MAROS Analysis: PCE Increasing Trend

Downgradient Monitoring Well	Range of PCE Concentration (µg/L)	Trend
EXTRACTION WELL MONITORING		
Newmark OU North Network		
MW 009A	0.4 (Feb 1999) - < 10 (Nov 2005)	PI
Newmark OU South		
Extraction Wells and Associated Piezometers		
EPA 001	0.8 (Feb 1999) to 7.5 (Feb 2004)	I
EPA 001PA	ND (various dates) to 1.34 (Nov 2007)	I
EPA 001PB	ND (through Nov 2000) to 4.6 (Nov 2004)	I
EPA 002	0.5 (Sep 2001) to 8.2 (Feb 2004)	I
EPA 002PA	ND (various dates) to 3 (May 2007)	I
EPA 002PB	ND (through May 2000) to 3.7 (Nov 2004)	I
Monitoring Wells		
MW 011C	ND (through May 2000) to 4.2 (May 2007)	I
MW 012A	ND (various dates) to 0.6 (Aug 2007)	I
MW 014A	ND (various dates) to 0.68 (Feb 2004)	I
Muscoy OU		
Extraction Wells and Associated Piezometers		
EPA 108PB	ND (various dates) to 0.7 (Nov 2007)	PI
EPA 111PB	0.7 (Dec 2005) to 13 (Nov 2007)	I
EPA 111PC	0.77 (Sep 2005) to 17.4 (Nov 2007)	I
Monitoring Wells		
MW 128A	3.6 (Apr 2005) to 18.4 (Nov 2007)	PI
MW 135A	1.3 (Apr 2005) to 6 (Jan 2006)	PI
SITE-WIDE MONITORING		
27th & Acacia (MUNI 18)	0.5 (11/04) to 3.9 (10/06)	PI
DTSC 002C (MUNI 09C)	ND (through 4/02) to 4.4 (2/04)	I

Note: PI: Probably Increasing
I: Increasing

Table 6
EPA Recommendation for Monitoring Program Changes and Rationale

Well Name	Current monitoring frequency requirement	GSI/RSE recommendation	EPA Recommendation / Rationale
EXTRACTION WELL MONITORING			
Newmark OU North			
Extraction Wells and Associated Piezometers			
EPA 006	Quarterly(1)	Semi-annually	Quarterly / CDPH Permit on extraction well
EPA 006PA	Semi-annually(2)	Annually	Semi-annually / Extraction well effectiveness monitoring
EPA 007	Quarterly(1)	Semi-annually	Quarterly / CDPH Permit on extraction well
EPA 00 7PA	Semi-annually	Annually	Semi-annually / Extraction well effectiveness monitoring
Monitoring Wells			
MW 004A	Semi-annually(2)	Bi-annually	Annually – SBMWD can submit request to EPA for change if appropriate
MW 004B	Semi-annually(2)	Annually	
MW 007B	Semi-annually(2)	Annually	
Newmark OU South			
Extraction Wells			
EPA 001	Quarterly(1)	Semi-annually	Quarterly / CDPH Permit on extraction well
EPA 002	Quarterly(1)	Semi-annually	
EPA 003	Quarterly(1)	Semi-annually	
EPA 004	Quarterly(1)	Semi-annually	
EPA 005	Quarterly(1)	Semi-annually	
Monitoring Wells			
MW 010A	Semi-annually(2)	Annually	Semi-annually / Part of performance evaluation program
MW 010B	Semi-annually(2)	Annually	
MW 010C(2)	Semi-annually(2)	Annually	
MW 011A	Semi-annually(2)	Annually	
MW 011B	Semi-annually(2)	Annually	
MW 011C	Semi-annually(2)	Annually	
Muscoy OU			
Extraction Wells			
EPA 108	Quarterly(1)	Semi-annually	Quarterly / CDPH Permit on

Well Name		Current monitoring frequency requirement	GSI/RSE recommendation	EPA Recommendation / Rationale
	EPA 109	Quarterly[1]	Semi-annually	extraction well
	EPA 110	Quarterly[1]	Semi-annually	
	EPA 111	Quarterly[1]	Semi-annually	
	EPA 112	Quarterly[1]	Semi-annually	
Monitoring Wells				
	MW 129A	Semi-annually[2]	Bi-annually	Semi-annually / Part of performance evaluation program
	MW 129B	Semi-annually[2]	Annually	
	MW 130A	Semi-annually[2]	Annually	
	MW 130B	Semi-annually[2]	Annually	
	MW 130C	Semi-annually[2]	Annually	
SIDE-WIDE MONITORING				
Active Production Wells				
	31st & Mt. View	Annually[2]	Semi-annually	Semi-annually / as recommended by GSI/RSE
	Leroy	Annually[2]	Semi-annually	
Inactive Production Wells				
	MW Paperboard	Annually[2]	Bi-annually	Annually / to maintain continuity of database / SMBWD can request change if appropriate
Monitoring Wells				
	DTSC 002C	Annually[2]	Semi-annually	Semi-annually / as recommended by GSI/RSE
	DTSC 003C	Annually[2]	Semi-annually	
	MW 006A	Annually[2]	Bi-annually	Annually / maintain continuity of database / SMBWD can request change if appropriate
	MW 006B	Annually[2]	Bi-annually	
	MW 126	Annually[2]	Bi-annually	
	MW 140B	Annually[2]	Semi-annually	Semi-annually / as recommended by GSI/RSE
	MW 140C	Annually[2]	Semi-annually	
	PZ 124	Annually[2]	Bi-annually	Annually / maintain continuity of database / SMBWD can request change if appropriate
	PZ 125	Annually[2]	Bi-annually	

Notes:
[1] Required by CDPH Drinking Water Permit
[2] Required by CD/SOW

EPA will be discussing implementation of the above recommendations with the City

6.3 Site Inspection

The USACE team conducted the site inspection on February 12 -13, 2008. The site inspection consisted of an inspection of the four treatment plants and associated extraction wells, booster stations, potable water reservoir, and the monitoring well network for both OUs. The EPA RPM, the SBMWD, and SBMWD consultants participated in the site inspection on February 12 and 13. The inspection included a question-and-answer session concerning site conditions, treatment plant and extraction system operations and maintenance procedures, and monitoring. The list of site visit attendees and complete details of the inspection findings are provided in Appendix E.

The wells and treatment plant sites are all fenced with either decorative steel or chain link fencing topped with barbed wire. The fencing was found to be intact in all cases with the exception of one segment of the Newmark North Water Treatment Plant where the barbed wire was loose. Facilities were otherwise secure. Intermittent vandalism has been experienced at the water treatment plants. In one case the sample taps were left on, and in a second incident vandals attempted to steal aluminum pipe caps and spilled thousands of pounds of LPGAC on the housekeeping pad adjacent to the units. Since that occurrence, the SBMWD has been implementing a new security system including cameras and motion sensors at all treatment facilities to deter future incidents. Access to the wells and treatment plants is accomplished using remote-controlled gates which open when activated by a device similar to a garage door opener. This allows plant operators to open the entry to the secure plant area without leaving their vehicle.

The well systems have been operating well with scheduled maintenance. Some items noted:

- EPA 112 had been producing ~5 lb of sand per day, so it was fitted with a sand separator.
- EPA 109 has declining water levels; videos of the well show water seeping into the well about 10 ft above the dynamic water level. These observations have led to adjustments in the reported water levels in EPA109 for contouring.
- EPA 006 was down at the time of the site visit for pump testing to determine the sustainable rate.
- Water levels at the Newmark North system have declined, limiting yield. EPA 006 was rated at 1000 gpm, but could only sustain 600 gpm. SBMWD will select and install a new pump sized for the sustainable flow since the two EPA extraction wells at Newmark North do not have VFDs.
- A “shallow” (<500 feet deep) extraction well (EPA 108S) with a capacity of approximately 600 gpm was added adjacent to EPA 108 to address shallow contamination at the EPA 108 location not captured by the deeper well.

DTSC installed air stripping towers at the Waterman and Newmark (North) plants in the early 1990s. These strippers are used when City production wells are needed to meet peak demand

and can be used as a backup water treatment process to treat water from the EPA extraction wells if the carbon systems are off-line.

Treated water is disinfected using chlorine gas at each of the plants. A limited number of 150-lb cylinders are stored at each of the sites. Eye wash stations and emergency showers were in place at all of the treatment plants. All appropriate operation and maintenance manuals, safety manuals and sampling and analysis plans are kept at the SBMWD main offices for reference as needed.

In general, the extraction and treatment systems are extremely well maintained and operating in accordance with requirements.

6.4 Interviews

6.4.1 Technical Interviews

The EPA and USACE contacted potential interested State and local agencies to discuss remedial activities at the site. Interview records are included in Appendix F. Some observations based on discussions with SBMWD personnel, and their contractor SECOR, are documented in the Site Inspection Checklist (Appendix E). Those contacted included:

- Alice Campbell and Greg Holmes, California Department of Toxic Substances Control
- Kamron Saremi, Santa Ana Regional Water Quality Control Board
- Sean McCarthy, California Department of Public Health
- Tom Perina, Project Manager, CH2M-Hill, contractor to EPA
- Chris Lichens, Remedial Project Manager, Source OU, Newmark Site
- Kim Hoang, Remedial Project Manager, Muscoy and Newmark OUs
- Mike Garland, Terry Tonn, and Con Arrieta, SBMWD (during the site inspection)
- Mark Eisen, SECOR, contractor to the City of San Bernardino (during the site inspection)

Overall, the interviewees were pleased with the operation, maintenance, and overall performance of the remediation systems. No adverse comments were received, though the DTSC hydrogeologist expressed some concerns on the effectiveness of the Muscoy remedy to capture the pre-existing contamination downgradient of the Muscoy extraction barrier, and the role of the Loma Linda Fault and the possible existence of preferred paths such as buried channels which might affect the effectiveness of the Muscoy remedy. Communication among the various stakeholders appears to be quite good at the present time.

6.4.2 Community Interviews

EPA placed notices on page A-2 of the *Precinct Reporter*, page A-3 of *The Black Voice News*, and in the *El Chicano Newspaper* on Thursday, March 27, 2008, and on page A4 of the *San*

Bernardino County Sun on Tuesday, March 25, 2008. The notices informed readers of the five-year review and provided contact information.

EPA conducted four community interviews (for interview summaries, see Appendix G). Interviewees were asked to participate based on their role in the community or location relative to the Newmark site. Interviewees included the local pastor and three residents living near the Newmark site. No interviewees voiced complaints with the cleanup processes, activities, or administration. Overall feedback was very positive.

7.0 TECHNICAL ASSESSMENT

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

Yes, the extraction and treatment systems are functioning as intended by the decision documents, as described below. As also discussed below, while the Institutional Controls element has not been fully implemented, the current mechanisms are functioning to control pumping that could interfere with the integrity of the remedies as intended by the Institutional Controls selected in the ESD.

7.1.1 Remedial Action Performance and Operations

Based on the sampling of monitoring and extraction wells since system start-up, it appears that the Muscoy and Newmark South containment systems have been successful in meeting the goal of preventing migration of contaminants. Concentrations downgradient of the extraction wells are generally well below the drinking water standards, where detectible, and the concentrations do not exhibit increasing trends where there are verified detections.

Most monitoring wells in the interiors of the Newmark and Muscoy plumes have decreasing or stable concentration trends. This suggests the slow removal of mass from the plume, either due to extraction (in the case of the Newmark North system) or possibly abiotic degradation processes. Given the extremely long plumes, the time necessary to significantly reduce concentrations in the upgradient portions of the plume due to pumping at the leading edge may be very large. As a result, it is likely the plumes will remain a fixture in the Bunker Hill Basin for quite some time. A LTMO study may be repeated at the next Five-Year Review, to see the effect of both the Newmark and Muscoy OU extraction system on these plumes.

7.1.2 Implementation of Institutional Controls

An ESD was issued in 2004 to require an Institutional Controls Program as part of the Newmark Site remedies to prohibit any water production activities that might impair the effectiveness of the plume containment system in the Newmark and Muscoy OUs. The ESD required the SBMWD to adopt an ordinance containing specific permit requirements for any well drilled within the Newmark and Muscoy plumes' zone of influence, also called the management zone. The City Ordinance was passed in 2006. However, SBMWD is not enforcing the City Ordinance against several water purveyors with water rights within the management zone, with

which SBMWD has entered into the Groundwater Management Agreement. A basin-wide groundwater model also is currently being developed by SBMWD as required by the CD to help with long-term water management program. The anticipated program is currently in a draft form until the groundwater model is finalized (expected to occur in 2009) and can be used for groundwater management decision-making. As such, the Institutional Controls Program has not yet been fully implemented. Any long-term deviation from the requirements of the ESD or Consent Decree is subject to EPA review and approval.

7.1.3 Early Indicators of Potential Issues

There are no indications of remedy failure. As noted in Section 7.1.1, close attention will need to be paid to concentrations in the vicinity of the southwest end of the Newmark South extraction system (near MW-12) and the east end of the Muscoy extraction system. From the long term monitoring trend analysis, while there are a number of wells that show a probably increasing trend or increasing trend, overall, those data showed that the increasing trend is mainly either north of or at the extraction wells barrier, showing that the extraction system is working properly, and drawing the contamination towards the extraction barrier.

7.1.4 Optimization

The MAROS analysis shows that there are a number of wells in the Site-Wide monitoring program where monitoring should be done more often than the current schedule requires. As shown in Table 6, based on the MAROS analysis results, EPA has developed a recommended schedule for monitoring frequency at those monitoring wells. Several other wells were also identified for a reduction in monitoring frequency, depending on whether or not their monitoring data would be useful for the development and maintenance of the groundwater model. EPA will discuss these recommendations with SBMWD.

7.2 Question B: Are the exposure assumptions, toxicity data, cleanup levels and remedial action objectives (RAOs) used at the time of remedy selection still valid?

The most notable changes in the toxicity values that affect this site are for TCE and PCE, which is discussed in detail below. This change does not affect the current remedy, since there is no exposure to contaminated water. All other assumptions made at the time of the remedy selection remain valid, as discussed below.

7.2.1 Changes in Standards and To Be Considered Criteria (TBCs)

There have been no changes in the ARARs that would affect the protectiveness of the remedy. Refer to Appendix C for a more comprehensive ARARs discussion.

7.2.2 Changes in Exposure Pathways, Toxicity, and Other Contaminant Characteristics

The toxicities of TCE and PCE are being reassessed by EPA since completion of the Baseline Risk Assessment in 1994. EPA released the draft “TCE Health Risk Assessment” in 2001. The

findings indicate that toxicity values for PCE and TCE may be more stringent than in 1994. According to the draft TCE Health Risk Assessment, for those who have increased susceptibility and/or higher background exposures, TCE could pose a higher risk than considered in the Baseline Risk Assessment. The draft TCE Health Risk Assessment has been peered reviewed by the Science Advisory Board, a team of outside experts convened by U.S. EPA, in 2002 and the National Academy of Sciences in 2006. Since both TCE and PCE are still being reassessed by EPA, the current Cal EPA derived toxicity value was used for these two chemicals in the derivation of the risk-based screening levels.

In 2008, EPA consolidated all EPA Regional risk-based screening levels into one table, the Regional Screening Level (RSL) table. The RSL table was developed using the latest toxicity values, default exposure assumptions and physical and chemical properties and is consistent with the OSWER chemical toxicity hierarchy. For TCE and PCE, the RSL table uses the current Cal EPA derived toxicity values as shown in Appendix D. The Cal EPA toxicity values are being used because EPA has not finalized its evaluation of TCE and PCE toxicity.

Although the toxicity values have changed for PCE and TCE, these changes do not affect the protectiveness because there is no exposure to untreated groundwater at the Site. Contaminated water is treated by the Newmark and Muscoy treatment systems to non-detect before being served as potable water, and therefore the changes in toxicity values do not affect treated water.

All other assumptions used at the time of the remedy selection remain the same.

7.2.3 Changes in Risk Assessment Methods

There has been no change to the standardized risk assessment methodology that could affect the protectiveness of the remedy. Refer to Appendix D for a more comprehensive risk assessment discussion.

7.2.4 Expected Progress towards Meeting RAOs

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

7.3 Question C: Has any other information come to light that could call into questions the protectiveness of the remedy?

No, there is no new information that might affect the protectiveness of the remedy.

8.0 ISSUES, RECOMMENDATIONS, AND FOLLOW–UP ACTIONS

Issue	Affects Current Protectiveness (Y/N)?	Affects Future Protectiveness (Y/N)?	Responsible Entity[2] and Milestone[3]
The Institutional Controls program is only partially implemented. The City of San Bernardino has adopted the necessary ordinance placing requirements on any new well drilled within the Newmark Site management zone, although most of the water purveyors are exempted from that ordinance. For most of those water purveyors, however, a draft agreement was signed to keep all water production stable until the groundwater model is fully implemented. This agreement needs to be finalized when the groundwater model is finalized. Any long-term changes to the requirements of the ESD or the Consent Decree will be subject to EPA review and approval.	**N**	**Y**	**SBMWD** To be completed in 2009

9.0 PROTECTIVENESS STATEMENT

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

10.0 NEXT REVIEW

The next FYR for the Newmark Site is required by September 2013, five years from the date of this review.

US Environmental Protection Agency

Appendix A
List of Documents Reviewed
for
Newmark Superfund Site
San Bernardino, California

Prepared by: US Environmental Protection Agency, Region 9,
San Francisco, California

September 2008

Baseline Mitigation Plan - Revised Draft, SECOR (for SBMWD), April 2008

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

Consent Decree, Appendix C, Newmark and Muscoy Operable Units Statement of Work (CD/SOW), Document Number: 532407, State of California Department of Toxic Substances Control (DTSC), May 2004

Cost and Performance Report, Muscoy Plume Operable Unit Remedial Action, Newmark Groundwater Contamination Superfund Site, URS Group, Inc., January 2007

Cost and Performance Report, Newmark Operable Unit, URS Consultants, Inc., October 2004

Data Evaluation and Capture Zone Analysis for the Newmark Groundwater Contamination Superfund Site, CH2MHill, September 2008

Explanation of Significant Differences to 1993 and 1995 Interim Records of Decision: Newmark and Muscoy Operable Units, EPA/ESD/R09-04/579, August 2004

Interim Remedial Action Report, Muscoy Plume Operable Unit Remedial Action, Newmark Groundwater Contamination Superfund Site, URS Group, Inc., March 2007

Long-Term Groundwater Monitoring Optimization Newmark, Muscoy, and Source Operable Units, Newmark Superfund Sites, San Bernardino, CA, M. Vanderford, GSI Environmental, August 2007

Monthly and Quarterly Progress Reports, Newmark and Muscoy Groundwater Contamination Superfund Site Interim Remedial Actions, City of San Bernardino Municipal Water Department, Monthly from June 2005 – March 2005, Quarterly from April 2005 through June 2008

Muscoy Operable Unit Record of Decision, Newmark Groundwater Contamination Superfund Site, USEPA Region 9, March 1995

Newmark Operable Unit Final Interim Remedial Action Report (Volume 1), URS Consultants, Inc., September 2004

Newmark Operable Unit Record of Decision, Newmark Groundwater Contamination Superfund Site, USEPA Region 9, August 1993

Operation and Maintenance and Performance Manual - Final, Newmark Treatment System, Newmark Groundwater Contamination Superfund Site Newmark Operable Unit Remedial Action, URS Greiner Woodward-Clyde Federal Services, Inc., September 2004

Operation and Maintenance and Performance Manual – Final, Muscoy Treatment System, Newmark Groundwater Contamination Superfund Site Muscoy Operable Unit Remedial Action, URS Greiner Woodward-Clyde Federal Services, Inc., June 2006

Operation and Maintenance Plan - Draft, SECOR (for SBMWD), April 2008

Operational and Analysis Plan - Draft, SECOR (for San Bernardino Municipal Water Department [SBMWD]), April 28, 2008

Operational & Functional Determination Letter – Final, Muscoy Operable Unit, Newmark Groundwater Contamination Superfund Site, USEPA Region 9, September 2007

Operational & Functional Data Summary Letter – Final, Muscoy Operable Unit, Newmark Groundwater Contamination Superfund Site, USEPA Region 9, September 2007

Ordinance MC-1221, San Bernardino Municipal Code, Title 13.25, March 2006 (http://www.ci.san-bernardino.ca.us/civica/filebank/blobdload.asp?BlobID=2552)

Project Performance Report, Newmark Plume Operable Unit Remedial Action, Newmark Groundwater Contamination Superfund Site, URS Group, Inc., January 2004

Quality Assurance/Quality Control Plan - Revised Draft, SECOR (for SBMWD), February 2008

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

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

Revised Six-Month Operation Report, Newmark Plume Operable Unit Remedial Action, Newmark Groundwater Contamination Superfund Site, URS Greiner Woodward-Clyde Federal Services, Inc., June 2000

Semi-Annual Data Evaluation Summary Report July 2005 through January 2006 - Final, Muscoy Plume Operable Unit, Newmark Groundwater Contamination Superfund Site, URS Greiner Woodward-Clyde Federal Services, Inc., February 2007

Semi-Annual Data Evaluation Report, Muscoy Plume Operable Unit Remedial Action, Newmark Groundwater Contamination Superfund Site, August 2005 through January 2006, URS Group, Inc., February 2007

Semi-Annual Data Evaluation Report, Muscoy Plume Operable Unit Remedial Action, Newmark Groundwater Contamination Superfund Site, February 2006 through July 2006, URS Group, Inc., April 2007

South Coast Air Quality Management District (SCAQMD) Permit to Operate Air Stripper at the Waterman Plant, ACAQMD, 1987

Water Supply Permit, City of San Bernardino, CA, California Department of Health Services, December, 1999

US Environmental Protection Agency

Appendix B
Data Review Memorandum
for
Newmark Superfund Site
San Bernardino, California

Prepared by: US Environmental Protection Agency, Region 9, San Francisco, California

September 2008

TECHNICAL MEMORANDUM

Groundwater Data Review Memorandum for Newmark Groundwater Superfund Site

First Five-Year Review

This technical memorandum summarizes findings from a review of documents and data related to groundwater monitoring activities at the Newmark Superfund Site during the operation and maintenance (O&M) period for both the Newmark and Muscoy OUs. For the Newmark OU, this period runs from 2000 to the present; for the Muscoy OU, O&M started in 2007.

The purpose of this data review is to identify trends in the information collected from groundwater monitoring to support an evaluation of whether the implemented groundwater remedies at the site remain protective of human health and the environment. This data review memorandum will be incorporated into the first FiveYear Review (FYR) Report prepared for the site.

Background

In the 1980's, the state of California (State) sampled water produced from certain City wells and detected contamination from volatile organic compounds (VOCs), including tetrachloroethylene (PCE), trichloroethylene (TCE), and Freon, decomposition byproducts from those compounds, and other contaminants. In l986, the Department of Toxic Substances Control (DTSC) contracted with the San Bernardino Municipal Water Department (SBMWD) to construct, operate, and maintain four treatment systems consisting of air stripping and liquid granular activated carbon units at existing SBMWD facilities. These systems were intended to treat water pumped for public supply and were not intended to treat or contain the contaminant plumes.

EPA placed the Newmark Groundwater Contamination Superfund Site on the National Priorities List (NPL) in March 1989. The Interim Record of Decision (ROD) for the Newmark Operable Unit (OU) was finalized in March 1993, and the ROD for the Muscoy OU was finalized in 1995. Pump and treat remedial systems were built to address the contamination in the Newmark and Muscoy plumes. The Newmark treatment system started Operation and Maintenance (O&M) in October 2000, the Muscoy treatment system started O&M in October 2007. A Source OU was started to investigate the potential sources, and is still in the Remedial Investigation/Feasibility Study (RI/FS) stage. The source(s) for the contamination have never been definitively identified, but activities at the former Camp Ono, a World-War-II Army installation, a steel rolling mill, and San Bernardino County’s closed Cajon Landfill have been identified as possible contributors to the contamination. A Consent Decree was negotiated between the U.S EPA, the United States Army, DTSC and the City of San Bernardino in 2005, providing performance criteria to evaluate the effectiveness of the two treatment systems, as well as O&M funding for up to fifty years of operation.

Remedial Actions

EPA completed the construction of the Newmark OU treatment system in 1998, and started the Operational and Functional (O&F) determination period in October 1998, which lasted two years. The Newmark system was declared O&F in October 2000, after which O&M started. Construction of the Muscoy OU treatment system was completed in 2005, and the O&F period was from July 2005 through March 2007. The Muscoy system was declared O&F in September 2007. The treatment systems include extraction wells, treatment of the extracted water at four treatment plants via LPGAC, and delivery of treated water to the existing SBMWD distribution system or to a booster station linked to the San Bernardino Valley Municipal Water District (SBVMWD). Table B-1 summarizes the designed and built specifications of the two treatment systems.

The Newmark OU includes two sets of extraction wells, one set in the North of the plume (EPA 006, EPA 007 and Newmark 3), and one set further South (EPA 001-005) serving as a barrier to the plume, which is connected to the Muscoy extraction system (EPA 108-112). Together, these ten extraction wells form a barrier to capture both the Newmark and Muscoy plumes. Contaminant concentrations monitored in a set of nine monitoring wells (listed in Table B-4) south of the barrier are used to evaluate the performance of the extraction barrier. Extracted water from the Newmark North extraction wells is treated at the Newmark plant. Extracted water from the Newmark south extraction barrier is treated both at the Waterman Plant (EPA 002-004), and at the Muscoy 19th Street Plant (for EPA 001 only), where water from all five Muscoy extraction wells is also treated. Both of the south extraction systems are interconnected, with raw water from any of the south extraction barrier well treatable at either the Waterman or the 19th Street Plant. Treated water goes into the SBMWD distribution system, or to a booster station connected to SBVMWD for sale to other water purveyors.

Further construction details are provided in the Remedial Action (RA) reports for the Newmark and Muscoy OUs (URS, 2000), and in the Operational Sampling and Analysis Plan (OSAP) (Secor, 2008). In 2007, when the Muscoy OU treatment system went on line, extraction well EPA 001 was routed to the Muscoy treatment plant on 19th Street, EPA 005 was taken off treatment and extracted water is now directly discharged into the potable water supply, and water extracted from EPA 002-004 is now treated at the Waterman Plant. The Newmark 17th Street Plant, which was originally a SBMWD treatment plant before it was combined into the EPA Newmark treatment system, was returned to SBMWD for the treatment of their own water.

Operation and Maintenance

As noted above, O&M started in 2000 for the Newmark OU and in 2007 for the Muscoy OU, when each was declared O&F. Detailed O&M procedures and monitoring requirements are provided in the following three SBMWD plans: Newmark and Muscoy Operation and Maintenance Plan (O&M plan), OSAP, and Quality Assurance/Quality Control Plan (QA/QC plan). A fourth plan, the Baseline Mitigation Plan (BMP)

describes the provisions for O&M under non-routine conditions, which arise when performance criteria cannot be met under maximum normal operating conditions.

Monitoring data from the treatment systems include all operating conditions of the extraction wells and treatment plants, maintenance logs of all the components in the treatment systems, water level data at the extraction wells and monitoring wells, and chemical concentration data at the treatment plants, extraction wells, and monitoring wells. O&M logs, monitoring results and evaluations are currently reported by SBMWD for both the Newmark and Muscoy OU treatment systems in the quarterly Progress Reports required by the Consent Decree.

Performance Criteria and Evaluation

The EPA monitoring requirements are laid out in the Consent Decree and Statement of Work (CD/SOW), and described in details in the OSAP Section 4. A summary of the monitoring network is provided in Table B-2.

The Newmark and Muscoy plumes were well characterized during the O&F periods. The Newmark plume is in the deep aquifer, while the Muscoy plumes include one in the shallow zone of the aquifer, and one in the top layer of the deep aquifer, referred to as the intermediate zone. The performance criteria were negotiated as part of the Consent Decree Statement of Work (CD/SOW, 2005), and modified at the end of the Operational & Functional period of the Muscoy OU (2007), to be applied to both the Newmark and Muscoy plumes. They include flow capture performance and chemical performance criteria, as summarized in Tables B-3 and B-4.

For the Muscoy OU, due to preexisting contamination south of the extraction wells, a special accommodation was established in the CD/SOW: any monitoring well of the MW 135 – 139 A-C group which has tetrachloroethylene ("PCE") or trichloroethylene ("TCE") concentrations above 1 μg/L at the end of the one year performance period will be suspended from compliance with the routine chemical performance criteria described above (See CD/SOW Section III.F.1.)

At the end of the O&F period in September 2007, the following monitoring wells were identified to have concentrations higher than 1 μg/L: MW 135A, 137A, 138A, and 141A. (MW 141A replaced MW 136A as the shallow zone monitoring well for the Muscoy shallow plume. MW 136A is actually monitoring below the Muscoy shallow plume, and its contaminant concentration has been below 1 μg/L.) The above four wells are suspended from the contaminant performance criterion requirement for enforcement, and are currently being monitored quarterly instead of semiannually. When the contamination level in these wells is less than 1 μg/L for 8 consecutive quarters, they will be incorporated back into the contaminant performance requirement. These wells are monitored quarterly instead of semi-annually for protectiveness purposes during this period.

The evaluation methodology for the monitoring data is described in detail in the OSAP Section 8 for the analysis included in the quarterly Progress Reports. For capture analysis, wells are selected for each of the contaminated zones, as presented in Table B-5, and PCE concentration data from these wells are used to estimate the 2.5 μg/L contour for each of the three plumes. Capture of the plumes is simulated through tracking of hypothetical particles released across the width of the plumes as they follow the hydraulic gradients and determining the percentage of particles captured by the extraction wells. Percent capture of particles across these surfaces is compared to the performance criteria for performance evaluation presented in Table B-3. For contaminant concentrations, monitoring data from monitoring wells south of the extraction barrier as listed in Table B-4 are used to estimate if there is a trend, and compared against the contaminant performance criteria.

In 2007, a Long Term Monitoring Optimization (LTMO) study was conducted by GSI on behalf of EPA for the Newmark Groundwater Contamination Superfund Site (GSI, 2007) using chemical monitoring data from 2000-2007 from 160 monitoring wells. The study divided the Newmark and Muscoy aquifers into three zones, shallow, intermediate, and deep. Statistical analyses were performed for each group of wells in these zones using Monitoring and Remediation Optimization System (MAROS) software. For the FYR, these statistical analyses were updated with chemical monitoring data in 2007 for the monitoring wells listed in Table B-2 for the Newmark and Muscoy plumes. In addition, the statistical trends over the two-year period 2005-2007 observed in wells in the Muscoy OU were also determined using the MAROS software. These trends were used to assess the impact of the start-up of the Muscoy extraction system.

Data Review

During the O&F periods for the Newmark and Muscoy OU, performance monitoring and data analyses were conducted by EPA. Once O&M started, SBMWD conducted all O&M activities. For the Newmark OU, from 2000-2005, SBMWD submitted quarterly summary reports including operational results and O&M costs. After the Consent Decree was entered in 2005, performance criteria were established to evaluate the capture analyses and chemical concentrations for compliance. For the Newmark OU, from April 2005 through March 2007, SBMWD submitted monthly Progress Reports, which included all operational and monitoring results, as well as the additional analyses required by the CD/SOW for the Newmark OU plume. Since April 2007, the Progress Reports are submitted quarterly. Starting April 2008, the quarterly Progress Reports also included capture analyses for the Muscoy OU plumes, after the evaluation procedures were developed in the OSAP (SECOR, 2008).

The following data are included in this review: (1) operational results, (2) capture analyses, and (3) chemical concentration data from the monitoring wells through 2007. Operational results and capture analyses are included for data through June 2008, since these data are collected either daily, weekly or monthly; chemical concentration and trend analyses are included for data through December 2007 since these data are collected

semi-annually. Results from the capture analyses and chemical concentrations are compared against the performance criteria in Table B-3 and 4.

For the FYR, detailed statistical analysis was also performed for the chemical concentration data to provide trends and recommendations for monitoring frequency. This new analysis is an update to the LTMO study performed by GSI in 2007 using the MAROS software. GSI used monitoring data from 160 wells from 2000-2007 to analyze trends of PCE and TCE concentration from the Newmark and Muscoy OUs shallow, intermediate and deep zones. The updated analysis includes monitoring data obtained in 2007, for the wells associated with the specific Newmark and Muscoy plumes as shown in Table B-11.

Operational Results

SBMWD quarterly Progress Reports include summaries of all O&M activities and results. Descriptions of maintenance activities can be found in these quarterly Progress Reports. Summaries of total extraction volume from the extraction wells and mass removal of TCE and PCE from the treatment plants are provided in Table B-6 and Table B-7.

Flow Performance Evaluation

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

Newmark OU

Capture zone analysis was performed for the South Newmark extraction system (EPA 001-005) monthly during O&F (1998-2000) and reported in the two Newmark Performance reports (URS 2000), annually during O&M (2000-2007) and reported in the Capture Zone Evaluation (CH2MHill, 2008), and quarterly during O&M by SMBWD in their quarterly Progress Reports. 100% capture of this plume was achieved during this entire period. While EPA 005 was taken off treatment in 2007, water from that extraction well is still being pumped and fed directly to the water distribution system, and therefore extraction from that well is still contributing to the overall capture of the plume. Figure B-1 shows the Newmark plumes in 2000 and 2007, which indicate that there might be some reduction in the size of the plume during this O&M period. Capture zone analysis for June 2008 for the Newmark plume is shown in Figures B-2, with the plume map drawn from the May 2007 sampling event.

Muscoy OU

Capture zone analysis was performed for the two aquifer zones where contamination is found in the Muscoy OU. During the O&F period (Aug 2005-Mar 2007), capture zone

analyses were performed monthly by EPA, with capture of the shallow plume in May 2007 analyzed from the pump test results of the new extraction well EPA 108S. During this period, capture of the shallow plume was between 80%-93%, and capture of the intermediate plume was 100%, meeting the performance criteria described in Table B-3. SBMWD submitted the draft OSAP in April 2008 (Secor, 2008), which proposed a methodology for capture zone analysis for the two Muscoy plumes, and started evaluating the capture zone for the Muscoy extraction system in April 2008 . The 100% capture achieved in April-June 2008 for the Muscoy shallow plume shows the effective contribution to capture from EPA 108S, which went on line in May 2007. Capture of the intermediate plume during this period remained at 100%. Capture of the Muscoy shallow and intermediate plumes (from the May 2007 sampling event) are shown in Figures B-3 and B-4. Capture analyses showed that the performance criterion for each zone was met for all months during this period for both zones.

Chemical Performance Evaluation

Contaminant concentration data are collected at the treatment plants, extraction wells and monitoring wells. At the treatment plants, combined influent concentration is monitored quarterly, and combined effluent concentration is monitored weekly as part of the carbon change out requirement. Table B-8 summarizes the combined influent concentrations into each of the Newmark and Muscoy treatment plants through June 2008. Combined effluent concentrations from all the treatment plants have been non-detect (< 0.5 μg/L) since treatment started.

Contaminant concentrations are monitored semiannually at the extraction systems (both extraction wells and monitoring wells used to monitor the performance of the extraction wells), and annually side-wide. Table B-9 summarizes the range of concentrations for TCE and PCE observed in all the extraction wells since operation started. Table B-10 summarizes the range of TCE and PCE observed in the monitoring wells used for monitoring the performance of the barrier extraction wells, as compared to the performance criteria for the results from the October/November 2007 sampling event for the Newmark deep, and the Muscoy shallow and intermediate plumes.

While the Newmark North extraction system is not included in the performance evaluation, the range of PCE concentrations found in nearby monitoring wells with the highest historical level is 11μg/L (Nov 1999) – 7.1μg/L (Nov 2007) in MW09B and 13 μg/L (Nov 1999) to 5.6 μg/L (Nov 2007) in MW 016B, which are both downgradient of the Newmark North extraction wells.

Based on all of the monitoring data, contaminant concentrations in monitoring wells immediately downgradient of the Newmark and Muscoy extraction systems either show no trend or a decreasing trend.

MAROS Analysis

Trend analysis of the contaminant concentrations was performed as part of the LTMO study (GSI, 2007). The LTMO study done by GSI included an in-depth analysis of concentration trends for the primary contaminants of concern, including PCE, TCE, dichlorodifluoromethane, and trichlorofluoromethane. The study included both Mann-Kendall and linear regression analyses, conducted using the MAROS software. The trend analysis used data collected from 1999 to 2007, and therefore, includes data prior to the FYR period and data collected prior to the startup of the Muscoy extraction system. A series of tables extracted from the GSI (2007) report summarizing the trend analysis is provided below. The total mass of each contaminant, the center of contaminant mass for each OU, and the spread of each plume were also assessed over the same time period as an indication of plume stability. The trend in each parameter was also determined through Mann-Kendall analysis using MAROS.

In general, GSI (2007) found the plumes at the site to be adequately defined with no significant data gaps, with one possible exception (discussed further below). GSI also concluded that the plumes are stable, though many individual wells had no statistically significant trends. Just under 60% of the monitoring points had stable or decreasing PCE trends, and another 29% had no statistically valid trend. Only 12% of the monitoring wells had increasing trends in PCE concentrations. Most of these were at or adjacent to the extraction wells themselves, or at wells in the interior of the plume far upgradient of the extraction wells (and that display concentrations below the MCLs). Increasing concentrations in the extraction wells and adjacent monitoring points are expected given that the wells are pulling higher concentration portions of the plume toward them.

The GSI study (2007) also identified high spatial density and frequency of sampling locations near Camp Ono and the municipal landfill, resulting from multiple investigation studies. This suggests that there are redundant wells in this area. This study was expanded with the 2007 data and included in detail in the Remedial System Evaluation ("RSE", USACE, 2008) for the Newmark site.

For the FYR, the MAROS analysis was updated to include monitoring results obtained in 2007 for the wells in the EPA monitoring well network (shown in Table B-2). Tables B-11 and B-12 show the trend analysis for the monitoring wells in the Newmark and Muscoy OUs, as well as the recommendation for sampling frequency for each well. In these two tables, the monitoring wells in the Side-wide sampling program are grouped into the Newmark or Muscoy OUs, depending on their locations.

For the Newmark OU, data for the monitoring wells in that OU were included from 1999-2007. For the Muscoy OU, since the side-wide monitoring wells in that OU have been sampled since 1999, while the Muscoy extraction wells and down gradient performance monitoring wells were constructed in 2005, data are analyzed in two sets: one set with all the data available from 1999-2007 (with the Muscoy extraction and monitoring wells data from 2005), and one set with the data from all wells analyzed only from 2005-2007,

which is the actual O&M period of the Muscoy OU. Results from the two sets of analyses for the Muscoy OU wells are very similar.

Tables B-11 and B-12 summarize the trend analysis results of monitoring data for the wells in the EPA monitoring well network for the Newmark data from 1999-2007, and for the Muscoy data from 1999-2007 and 2005-2007. Trend analysis of monitoring data from 2000-2007 shows wells with either Probably Increasing (PI) or Increasing (I) trends. These wells are identified in Tables B-11 and B-12 as shaded rows, and summarized in Table B-13. Overall, data from those wells showed that there is mainly an increasing trend either north or at the extraction wells barrier, which indicates that the extraction system is working properly, and drawing the contamination towards the extraction barrier.

For the monitoring frequency analysis, the recommended frequencies included in the GSI LTMO study (GSI, 2007), and the RSE study (USACE, 2008) are compared to the current sampling frequency. The RSE study endorsed the GSI recommendations for the wells monitored under the Consent Decree. For most of the monitoring wells, the recommended GSI/RSE frequency agrees with the current EPA sampling frequency. The GSI/RSE analysis identified the following wells in the Site-Wide monitoring program where the recommended frequency is more often than the current sampling frequency: 31st & Mt. View (MUNI 14), Leroy (MUNI 16), DTSC 002C (MUNI-09C), DTSC 003C (MUNI-11C), and MW 140B/C. These wells are currently monitored annually, and the recommendation is to monitor them semi-annually. Several wells in the Newmark and Muscoy monitoring programs are identified for reduction of sampling frequency. Table B-13 summarizes the GSI/RSE recommendations for monitoring frequency changes, together with EPA recommendations based on the GSI/RSE studies. EPA will discuss these recommendations with SBMWD.

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

Extraction Well Design Flow Rate Specifications [1]				
Extraction Wells/Extraction Terminology	Newmark OU Extraction Rates (gpm)			Muscoy Plume Extraction Rates (gpm)
	North Plant Extraction Wells	Newmark Plume Front Extraction Wells		
	North Plant Treatment Facilities	Waterman Treatment Plant[2]	17th Street Treatment Plant	19th Street Treatment Plant
EPA 001		1,700		
EPA 002		1,700		
EPA 00003			2,000	
EPA 004		1,700		
EPA 005		1,700		
EPA 00006	1,000			
EPA 007	1,300			
Newmark 003	1,600			
EPA 108				1,300
EPA 109				1,300
EPA 110				2,500
EPA 111				2,500
EPA 112				1,300
Total Extraction Rates (gpm)	3,900	6,800	2,000	8,900
		8,800		
		17,700		
	21,600			
Total Extraction Rates With Maintenance Allowance (gpy/acre-ft per year) assuming 330 days of operation	1.853E+09/ 5,686	3.231E+09/ 9,914	9.504E+08/ 2,916	4.229E+09/ 12,976
		4.182E+09/12,832		
		8.411E+09/25,809		
	1.026E+10/31,482			

Extraction Rate Requirements			
Design Extraction Rate (gpm)	3,900	8,800	8,900
Design Extraction Rates With Maintenance Allowance (gpy/acre-ft per year assuming 330 days of operation)	1.853E+09/ 5,686	4.182E+09/12,832	4.229E+09/12,976
Target Extraction Rate	variable	variable	variable
Maximum Routine Extraction Rate (gpm)	NA	10,008	10,008
Maximum Routine Extraction Rates With Maintenance Allowance (gpy/acre-ft per year assuming 330 days of operation)	NA	4.756E+09/14,593	4.756E+09/14,593
Non-Routine Extraction Rates (gpm)	NA	>10,008	>10,008
Non-Routine Extraction Rates With Maintenance Allowance (gpy assuming 330 days of	NA	>4.756E+09/14,593	>4.756E+09/14,593

Treatment Plant Design Specifications				
	Newmark OU Treatment Facilities (gpm)			**Muscoy OU Treatment Facilities (gpm)**
		Newmark Plume Front Treatment Facilities		
Component	**North Plant 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

<table>
<tr><td>LPGAC Design Flow Rate Per Pair(3) (gpm)</td><td>696</td><td>637</td><td>650</td><td>972</td></tr>
<tr><td>Total Design Plant Flow Rate (gpm)</td><td>4,872</td><td>5,096</td><td>1,950</td><td>11,664</td></tr>
<tr><td>Maximum Flow Per Vessel</td><td>750</td><td>750</td><td>750</td><td>1,050</td></tr>
<tr><td>Maximum Flow Per Plant</td><td>5,250</td><td>6,000</td><td>2,250</td><td>12,600</td></tr>
<tr><td>Effective Capacity Per Vessel (96% of maximum in gpm)</td><td>720</td><td>720</td><td>720</td><td>1,008</td></tr>
<tr><td rowspan="3">Effective Capacity (96% of maximum in gpm)</td><td rowspan="2">5,040</td><td>5,760</td><td>2,160</td><td rowspan="2">12,096</td></tr>
<tr><td colspan="2">7,920</td></tr>
<tr><td colspan="4">25,056</td></tr>
<tr><td rowspan="3">Effective Capacity (96% of maximum in gpy/acre-ft per year)</td><td rowspan="2">2.395E+09/ 7,349</td><td>2.737E+09/ 8,398</td><td>1.026E+09/ 3,148</td><td rowspan="2">5.748E+09/ 17,637</td></tr>
<tr><td colspan="2">3.764E+09/11,550</td></tr>
<tr><td colspan="4">1.191E+10/36,545</td></tr>
<tr><td rowspan="2">Percent Additional Effective Capacity Over Design Extraction Rate</td><td>29%</td><td colspan="3">13%</td></tr>
<tr><td colspan="4">16%</td></tr>
</table>

Notes:
LPGAC = 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 EPA 001, EPA 002, EPA 004 and EPA 005 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	Name Cross Reference to EPA Designation (4)	Location	Rationale for Monitoring (1)
EXTRACTION WELL MONITORING			
Newmark OU North			
Extraction Wells and Associated Piezometers			
EPA 006 EPA 006PA	EW-6 EW-6PA	Kendall and Western	To monitor treatment plant influent and plume concentrations.
EPA 007 EPA 00 7PA	EW-7 EW-7PA	West 48th Street	To monitor treatment plant influent and plume concentrations.
Newmark 3	MUNI-06	48th Street near Magnolia	Monitoring treatment plant influent and plume concentrations.
Monitoring Wells			
MW 004A MW 004B	MW04A MW04B	Newmark Well Field, West Side	Monitoring points within northern portion of Newmark Plume
MW 007A MW 007B	MW07A MW07B	48th and Kendall	Monitoring points within northern portion of Newmark plume; provides extraction system "early warning" points for contaminant migration.
MW 009A MW 009B	MW09A MW09B	4th and Kendall	Monitoring points within northern portion of Newmark plume used to monitor groundwater extraction system effectiveness.
MW 016A MW 016B	MW16A MW16B	4th Avenue	Monitoring points downgradient from the Newmark plume front extraction well network.
MW 017A MW 017B	MW17A MW17B	48th Street	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	EW-1 EW-1PA EW-1PB	North E Street	To monitor treatment plant influent and plume concentrations.

Well Name	Name Cross Reference to EPA Designation (4)	Location	Rationale for Monitoring (1)
EPA 002 EPA 002PA EPA 002PB	EW-2 EW-2PA EW-2PB	North Arrowhead Avenue	To monitor treatment plant influent and plume concentrations.
EPA 003 EPA 003PA EPA 003PB	EW-3 EW-3PA EW-3PB	West 11th Street	To monitor treatment plant influent and plume concentrations.
EPA 004 EPA 004PA EPA 004PB	EW-4 EW-4PA EW-4PB	West 11th Street	To monitor treatment plant influent and plume concentrations.
EPA 005 EPA 005PA EPA 005PB	EW-5 EW-5PA EW-5PB	East 11th Street	To monitor treatment plant influent and plume concentrations.
Monitoring Wells			
MW 010A MW 010B MW 010C(2)	MW10A MW10B MW10C	Magnolia and Arrowhead	Monitoring points downgradient from the Newmark plume front extraction well network.
MW 011A MW 011B MW 011C	MW11A MW11B MW11C	Genevieve	Monitoring points downgradient from the Newmark plume front extraction well network.
MW 012A MW 012B MW 012C(2)	MW12A MW12B MW12C	10th Street	Monitoring points beyond extraction wells used to monitor groundwater extraction system effectiveness.
MW 013A MW 013B MW 013C	MW13A MW13B MW13C	10th Street	Monitoring points beyond extraction wells used to monitor groundwater extraction system effectiveness.
MW 014A MW 014B MW 014C(2)	MW14A MW14B MW14C	10th Street	Monitoring points beyond extraction wells used to monitor groundwater extraction system effectiveness.
MW 015A MW 015B MW 015C(2)	MW15A MW15B MW15C	Waterman Avenue	Monitoring points beyond extraction wells used to monitor groundwater extraction system effectiveness.

Well Name	Name Cross Reference to EPA Designation [4]	Location	Rationale for Monitoring [1]
Muscoy OU			
Extraction Wells			
EPA 108	EW-108	G Street	To monitor treatment plant influent and plume concentrations.
EPA 108S EPA 108PA EPA 108PB	EW-108S EW-108PA EW-108PB		
EPA 109 EPA 109PA EPA 109PB EPA 109PC	EW-109 EW-109PA EW-109PB EW-109PC	Home Street	To monitor treatment plant influent and plume concentrations.
EPA 110 EPA 110PA EPA 110PB EPA 110PC EPA 110PD EPA 110PE	EW-110 EW-110PA EW-110PB EW-110PC EW-110PD EW-110PE	Garner Street	To monitor treatment plant influent and plume concentrations.
EPA 111 EPA 111PA EPA 111PB EPA 111PC EPA 111PD	EW-111 EW-111PA EW-111PB EW-111PC EW-111PD	Pico Street	To monitor treatment plant influent and plume concentrations.
EPA 112 EPA 112PA EPA 112PB	EW-112 EW-112PA EW-112PB	Virginia Street	To monitor treatment plant influent and plume concentrations.
Monitoring Wells			
MW 128A MW 128B MW 128C	MW-128A MW-128B MW-128C	Western Avenue	Monitoring points upgradient from the Muscoy Plume extraction well network
MW 129A MW 129B MW 129C	MW-129A MW-129B MW-129C	16th Street	Monitoring points upgradient from the Muscoy Plume extraction well network

Well Name	Name Cross Reference to EPA Designation (4)	Location	Rationale for Monitoring (1)
MW 130A MW 130B MW 130C	MW-130A MW-130B MW-130C	Garner Avenue	Monitoring points upgradient from the Muscoy Plume extraction well network
MW 135A MW 135B MW 135C	MW-135A MW-135B MW-135C	Orange Street	Monitoring points downgradient from extraction wells, used to monitor groundwater extraction system effectiveness.
MW 136A MW 136B MW 136C MW 141A	MW-136A MW-136B MW-136C MW-141A	11th Street	Monitoring points downgradient from extraction wells, used to monitor groundwater extraction system effectiveness.
MW 137A MW 137B MW 137C	MW-137A MW-137B MW-137C	Harrington Avenue	Monitoring points downgradient from extraction wells, used to monitor groundwater extraction system effectiveness.
MW 138A MW 138B MW 138C	MW-138A MW-138B MW-138C	Western Avenue	Monitoring points downgradient from extraction wells, used to monitor groundwater extraction system effectiveness.
MW 139A MW 139B MW 139C	MW-139A MW-139B MW-139C	Wilson Street	Monitoring points downgradient from extraction wells, used to monitor groundwater extraction system effectiveness.
SITE-WIDE MONITORING			
Active Production Wells			
16th & Sierra	MUNI 22	16th Street	Production well used as monitoring point within mid-portion of Newmark plume.
23rd & E	MUNI 20	23rd Street	Production well used to define current western Newmark plume boundary.
27th & Acacia	MUNI 18	27th and Acacia	Production well used to define current western Newmark plume boundary.
31st & Mt. View	MUNI 14	31st Street and Mountain View Street	Production well monitoring mid-point of Newmark plume.

Well Name	Name Cross Reference to EPA Designation (4)	Location	Rationale for Monitoring (1)
Cajon 3	MUNI 112	West of Cajon Blvd. and Yucca Street	Production well upgradient from Newmark and Muscoy plumes; serves as background well for the source area.
Devil Canyon 1	MUNI 01	Devil Canyon Road	Monitoring point upgradient from Newmark Plume.
Gilbert	MUNI 24	Gilbert Street	Production well used to monitor downgradient/cross-gradient southeastern edge of Newmark plume.
Leroy	MUNI 16	Leroy Street	Production well monitoring current boundary of eastern portion of Newmark plume.
Mallory 3	MUNI 108	Mallory Street	Production well used to define current southwestern/mid-portion of Muscoy plume.
Muscoy Mutual 5	MUNI 116	Muscoy Mutual	Production well cross-gradient from the Muscoy plume.
Olive & Garner	MUNI 101	Olive Street and Garner Street	Production well located downgradient between Newmark and Muscoy extraction wells.
Inactive Production Wells			
MW Paperboard	MUNI 109	South end of Colligan property	Monitoring point used to monitor mid-portion of the Muscoy plume and groundwater effects of the Shandin Hills.
MW State	MUNI 103	State Street	Monitoring point used to define current southwestern Muscoy plume boundary.
Monitoring Wells			
DTSC 001B DTSC 001C	MUNI-07B MUNI-07C	Electric Avenue North	Monitoring point within the northern mid-portion of the Newmark plume.
DTSC 002B DTSC 002C	MUNI-09B MUNI-09C	Electric Avenue South	Monitoring point within the northern mid-portion of the Newmark plume.
DTSC 003A DTSC 003C	MUNI-11A MUNI-11C	Parkdale Avenue	Monitoring point within the northern mid-portion of the Newmark plume.

Well Name	Name Cross Reference to EPA Designation [4]	Location	Rationale for Monitoring [1]
MW 006A MW 006B	MW06A MW06B	Sun Valley Drive	Monitoring points upgradient from Newmark Plume; used to define Newmark plume northern boundary.
MW 008A MW 008B	MW08A MW08B	Windsor	Monitoring points within northern portion of the Newmark plume; provides extraction system "early warning" points for contaminant migration.
MW 126	MW-126	Along flood control canal off of Industrial Parkway	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	MW-127A MW-127B	Cajon Blvd.	Monitor points in the southern mid-portion of the suspected source area.
MW 140A MW 140B MW 140C	MW-140A MW-140B MW-140C	Darby Avenue	Monitoring point used to monitor mid-portion of Muscoy plume.
PZ 124	PZ-124	Industrial Parkway	The EPA/URS rationale was not provided in the Site-Wide FSP as this well was not included in that program.
PZ 125	PZ-125	Along flood control canal off Industrial Parkway	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	Encanto Park A Encanto Park B Encanto Park C	Garner Avenue	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	Meadowbrook Park A Meadowbrook Park B Meadowbrook Park C	2nd Street	Monitoring points downgradient from extraction wells, used to monitor groundwater levels.

Well Name		Name Cross Reference to EPA Designation (4)	Location	Rationale for Monitoring (1)
	Sierra High School A Sierra High School B Sierra High School C	Sierra High School A Sierra High School B Sierra High School C	9th Street and Waterman Ave	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

Table B-3 (OSAP Table 8-4)
Summary of Flow Performance Criteria

Operating Condition[1]	Extraction Well Network	Particle Capture Criteria[2]
Operations Within the Maximum TER	Newmark Plume Front Extraction Well Network	90% particle capture or greater based on a three-month rolling average
	Muscoy Plume Extraction Well Network - Shallow Plume	80% particle capture or greater based on a three-month rolling average
	Muscoy Plume Extraction Well Network - Intermediate/Deep Plume	85% particle capture or greater based on a three-month rolling average
Transition Phase and/or Non-Routine Phase Operations	Newmark Plume Front Extraction Well Network	85% particle capture or greater based on a three-month rolling average
	Muscoy Plume Extraction Well Network - Shallow Plume	75% particle capture or greater based on a three-month rolling average
	Muscoy Plume Extraction Well Network - Intermediate/Deep Plume	80% particle capture or greater based on a three-month rolling average

Notes:

(1)	Combined flow rate at which the Newmark Plume Front or Muscoy Plume extraction well network is operating
(2)	Minimum percentage of particles placed across the subject contaminant plume (as defined by the 2.5 µg/L PCE concentration contour) that are required to be captured per monthly flow performance analysis.
MRER	Maximum Routine Extraction Rate
TER	Target Extraction Rate
Maximum TER	The annual TER plus 10%

Table B-4 (OSAP Table 8-9)
Summary of Contaminant Performance Criteria

Wells Designated For Contaminant Performance[1]			**Suspended Wells**
Newmark Plume Front Extraction Well Network	MW 012A/B/C, MW 013A/B/C, MW 014A/B/C, MW 015A/B/C		None
Muscoy Plume Extraction Well Network	MW 135A/B/C, MW 136A/B/C, MW 137A/B/C, MW 138A/B/C, MW 139A/B/C, MW 141A		MW 135A, MW 137A, MW 138A, MW 141A
Criteria	**PCE Drinking Water MCL[2] (µg/L)**	**TCE MCL[2] (µg/L)**	**Immediate Action**
Increasing Trend	Based on Analysis	Based on Analysis	Increase Monitoring to Quarterly
>½ MCL	2.5	2.5	Increase Monitoring to Quarterly
>MCL	5	5	Evaluate Mitigation Measures

Table B-5 (OSAP Tables 8-5 to 8-7)
Potential Wells Selected For Estimating the Potentiometric Surface
For the Newmark and Muscoy Plumes

Newmark Plume Well (1)	Muscoy Shallow Plume Well (1)	Muscoy Intermediate Plume Well (1)
EPA 001PB	EPA 001PA	EPA 109PB (2)
EPA 002PB	EPA 002PA	EPA 110PD
EPA 003PB	EPA 108S	EPA 111PC
EPA 004 Casing (2)	EPA 109PA (2)	EPA 112PB (2)
EPA 005PB	EPA 110PB	MW 128B
EPA 108PB	EPA 111PB	MW 129B
MW 010B	EPA 112PA (2)	MW 130B
MW 011B	MW 012A	MW 136B
MW 012B	MW 014A	MW 137B
MW 013B	MW 128A	MW 138B
MW 014B	MW 129A	MW 139B
MW 015B	MW 130A	MW 140B
MW 129C	MW 135A	16th Street
MW130C	MW 137A	27th and Acacia
MW 135C	MW 138A	
MW 136C	MW 139A	
MW 138C	MW 140A	
MW 140C	MW 141A	
Antil 6	Mt Vernon	
7th	MW Paperboard	
23rd and E	Encanto Park B	
27th and Acacia	Sierra High School A	
30th and Mountain View		
31st and Mountain View		
Encanto Park B		
Leroy		
Perris Hill 5		
Sierra High School C		
Waterman		

Notes:
(1) This is a typical example of the wells used in capture analysis of each plume. The actual list of wells used for each monthly evaluation may vary due to availability of measurements and applicability for the individual monthly

evaluations.
(2) Water Levels will be approximated for this location in an attempt to account for well efficiency and the effect of the extraction well screening multiple aquifers
bgs below ground surface
ft feet
msl mean sea level

Table B-6: Pumpage Summary
Newmark OU and Muscoy OU

Extraction Well	Start	End	Pumpage (acre-ft)
EPA 001	10/1/2000	2/28/2005	8267.469
	3/1/2005	12/31/2005	1942.841
	1/1/2006	12/31/2006	2332.668
	1/1/2007	12/31/2007	2179.321
	1/1/2008	06/30/2008	1012.106
		Total	**15734.405**
EPA 002	10/1/2000	2/28/2005	9485.917
	3/1/2005	12/31/2005	1813.805
	1/1/2006	12/31/2006	2540.659
	1/1/2007	12/31/2007	2263.908
	1/1/2008	06/30/2008	1052.473
		Total	**17156.762**
EPA 003	10/1/2000	2/28/2005	10905.463
	3/1/2005	12/31/2005	1983.173
	1/1/2006	12/31/2006	2126.197
	1/1/2007	12/31/2007	3013.060
	1/1/2008	06/30/2008	1715.238
		Total	**19743.131**
EPA 004	10/1/2000	2/28/2005	10095.939
	3/1/2005	12/31/2005	2039.219
	1/1/2006	12/31/2006	2485.515
	1/1/2007	12/31/2007	2185.245
	1/1/2008	06/30/2008	1045.986
		Total	**17851.904**
EPA 005	10/1/2000	2/28/2005	8897.257
	3/1/2005	12/31/2005	2090.242
	1/1/2006	12/31/2006	2663.924
	1/1/2007	12/31/2007	2561.492
	1/1/2008	06/30/2008	1151.904
		Total	**17345.206**
Total Newmark Plume Front Extraction Well Network			**87831.408**
EPA 006	10/1/2000	2/28/2005	2993.680
	3/1/2005	12/31/2005	552.242
	1/1/2006	12/31/2006	1200.602
	1/1/2007	12/31/2007	944.446
	1/1/2008	06/30/2008	197.096
		Total	**5888.066**

Extraction Well	Start	End	Pumpage (acre-ft)
EPA 007	10/1/2000	2/28/2005	5976.409
	3/1/2005	12/31/2005	1803.598
	1/1/2006	12/31/2006	2213.925
	1/1/2007	12/31/2007	2156.525
	1/1/2008	06/30/2008	1031.938
		Total	**13182.395**
Newmark 3	10/1/2000	2/28/2005	4420.420
	3/1/2005	12/31/2005	985.633
	1/1/2006	12/31/2006	1507.132
	1/1/2007	12/31/2007	3049.195
	1/1/2008	06/30/2008	817.633
		Total	**9272.881**
Total Newmark North Extraction Well Network			**28343.342**
EPA 108	3/1/2005	12/31/2005	1621.360
	1/1/2006	12/31/2006	2250.033
	11/1/2007	12/31/2007	1776.399
	1/1/2008	06/30/2008	1166.457
		Total	**6814.249**
EPA 108S	5/1/2007	12/31/2007	610.211
	1/1/2008	06/30/2008	470.912
		Total	**1081.123**
EPA 109	3/1/2005	12/31/2005	1590.856
	1/1/2006	12/31/2006	2244.229
	1/1/2007	12/31/2007	2160.220
	1/1/2008	06/30/2008	1004.910
		Total	**7000.215**
EPA 110	3/1/2005	12/31/2005	2468.695
	1/1/2006	12/31/2006	2829.061
	1/1/2007	12/31/2007	1863.391
	1/1/2008	06/30/2008	1142.302
		Total	**8303.449**
EPA 111	3/1/2005	12/31/2005	2520.090
	1/1/2006	12/31/2006	2829.061
	1/1/2007	12/31/2007	3077.867
	1/1/2008	06/30/2008	1327.768
		Total	**9754.786**
EPA 112	3/1/2005	12/31/2005	1388.440
	1/1/2006	12/31/2006	1995.706
	1/1/2007	12/31/2007	2482.158
	1/1/2008	06/30/2008	1249.448
		Total	**7115.752**
Total Muscoy Plume Extraction Well Network			**40069.574**

Table B-7: Summary of Historical Mass Removal
Newmark OU and Muscoy OU

Treatment Plant	Start	End	Total PCE-TCE Removed From Remedy Extraction Wells (lbs)
Newmark	10/3/2000	12/31/2004	204.13
	1/1/2004	12/31/2004	34.26
	1/1/2005	12/31/2005	45.76
	1/1/2006	12/31/2006	44.81
	1/1/2007	12/31/2007	33.67
	1/1/2008	06/30/2008	11.33
		Total	**373.96**
17th Street [(1)]	10/3/2000	12/31/2004	137.07
	1/1/2004	12/31/2004	29.95
	1/1/2005	12/31/2005	29.50
	1/1/2006	1/31/2006	19.32
		Total	**215.84**
Waterman	10/3/2000	12/31/2004	318.25
	1/1/2004	12/31/2004	109.73
	1/1/2005	12/31/2005	50.60
	1/1/2006	1/31/2006	57.36
	1/1/2007	12/31/2007	73.90
	1/1/2008	06/30/2008	31.41
		Total	**641.25**
		Total Newmark	**1231.05**
19th Street	3/1/2005	12/31/2005	182.92
	1/1/2006	1/31/2006	183.37
	1/1/2007	12/31/2007	468.10
	1/1/2008	06/30/2008	84.08
		Total Muscoy	**595.06**
		Total Newmark and Muscoy	**1826.11**

Note:

[(1)] Not part of EPA system in 2007

Table B-8: Combined Influent Concentration
Newmark OU and Muscoy OU Treatment Plants

Treatment Plant	Range of PCE Concentration (µg/L)	Range of TCE Concentration (µg/L)
Newmark Treatment Plants		
Newmark	8.5 (Feb 1999) - 2.1 (Jun 2008)	1.1 (Oct 1998) - <0.5 (Jun 2008)
17th Street [(1)]	5.5 (Jan 2000) - <0.5 (Jun 2008)	1.4 (Aug 1999) - <0.5 (Jun 2008)
Waterman	2.3 (Jan 2000) - 2.6 (Jun 2008)	0.8 (Nov 1999) - 0.8 (Jun 2008)
Muscoy Treatment Plant		
19th Street	5.7 (Aug 2005) - 1.6 (Jun 2008)	1.0 (Aug 2005) - <0.5 (Jun 2008)

Note:

[(1)] Not part of EPA system in 2007

Table B-9: Extraction Well Monitoring Results - PCE and TCE

Extraction Well	Range of PCE Concentration (µg/L)	Range of TCE Concentration (µg/L)
Newmark North Extraction Well Network		
EPA 006	5.0 (Nov 1999) - 4.0 (Apr 2008)	0.9 (Nov 1999)- 0.7 (Apr 2008)
EPA 007	6.0 (Nov 1999) - 1.9 (Apr 2008)	1.0 (Nov 1999) < 0.5 (Apr 2008)
Newmark 3 (MUNI-06)	7.0 (Nov 1999) - 2.0 (Apr 2008)	0.9 (Nov 1999) < 0.5 (Apr 2008)
Newmark Plume Front Extraction Well Network		
EPA 001	1.0 (Nov 1999) - 4.9 (Apr 2008)	0.7 (Nov 1999) - 1.5 (Apr 2008)
EPA 002	3.0 (Nov 1999) - 5.3 (Apr 2008)	1.0 (Nov 1999) - 1.6 (Apr 2008)
EPA 003	4.0 (Nov 1999) - 2.7 (Apr 2008)	1.0 (Nov 1999) - 0.7 (Apr 2008)
EPA 004	2 (Nov 1999) - 0.6 (Apr 2008)	1.0 (Nov 1999) - <0.5 (Apr 2008)
EPA 005	<0.5 (1999-2008)	<0.5 (1999-2008)
Muscoy Plume Front Extraction Well Network		
EPA 108	4.0 (May 2003)- 2.5 (Apr 2008)	0.5 (Aug 2005) - 0.7 (Apr 2008)
EPA 108S	13 (Jul 2007) - 8.5 (Apr 2008)	3.5 (Jul 2007) - 2.6 (Apr 2008)
EPA 109	8.3 (May 2005) - 2.6 (Apr 2008)	1.2 (Aug 2005) - 0.6 (Apr 2008)
EPA 110	9.2 (May 2005) - 3.5 (Apr 2008)	1.4 (Aug 2005) - 0.9 (Apr 2008)
EPA 111	7 (Aug 2005) - 2.6 (Apr 2008)	1.2 (Aug 2005) - <0.5 (Apr 2008)
EPA 112	4.1 (Aug 2005) - 2.5 (Apr 2008)	<0.5 (Aug 2005 - Apr 2008)

Table B-10: Downgradient Plume Front Well Monitoring Results Of PCE and TCE for Performance Evaluation

Downgradient Monitoring Well	Range of PCE Concentration (μg/L)	Performance evaluation for Oct/Nov 2007 Monitoring data[1] (Y/N)
Newmark Plume Front Monitoring Well Network		
Deep Plume		
MW 012B/C	0(C) (Sep 1999) - < 0.3(B)-0.33(C) (Oct 2007)	Y
MW 013B/C	0(C) (Sep 1999) - < 0.3(B/C) (Oct 2007)	Y
MW 014B/C	1(C) (Sep 1999) - < 0.3(B/C) (Oct 2007)	Y
MW 015B/C	0(C) (Sep 1999) - < 0.3(B/C) (Oct 2007)	Y
Muscoy Plume Monitoring Well Network		
Shallow Plume		
MW 135A (2)	3.7 (Aug 2005) – 3.13 (Nov 2007)	N
MW 137A (2)	0.94 (Aug 2005) – 0.39 (Nov 2007)	Y
MW 138A (2)	3.6 (Aug 2005) – 1.39 (Nov 2007)	N
MW 139A	0.27 (Aug 2005) – 0.33 (Nov 2007)	Y
MW 141A (2)	1.8 (Mar 2007) – 0.95 (Nov 2007)	Y
Intermediate Plume		
MW 135B	<0.5 (Aug 2005) - <0.3 (Nov 2007)	Y
MW 136B	<0.5 (Aug 2005) - <0.3 (Nov 2007)	Y
MW 137B	<0.5 (Aug 2005) - <0.3 (Nov 2007)	Y
MW 138B	<0.5 (Aug 2005) - <0.3 (Nov 2007)	Y
MW 139B	<0.5 (Aug 2005) - <0.3 (Nov 2007)	Y

Notes:

(1) See Table B-4 for Chemical Performance criteria

(2) Wells not included in normal performance evaluation program due to preexisting contamination (Table B-4). Values are compared to 1.0 μg/L

Table B-11: MAROS Analysis - Newmark OU

Well Name	COC	Mann Kendall Trend '99-'07*	Max PCE Concentration '99-'07 (Where Incr Trend) ug/L****	Number of Samples	Number of Detects	MAROS Recommend Freq ('99-'07)	Current Sampling Frequency and Basis	GSI/RSE Recomm Freq**
EPA 1	PCE	I	7.5	16	16	Annual	Quarterly (Permit)	Semi-Ann
EPA 1PA	PCE	I	1.34	15	6	Biennial	Semi-Ann (SOW)	Semi-Ann
EPA 1PB	PCE	I	4.6	15	10	Biennial	Semi-Ann (SOW)	Semi-Ann
EPA 2	PCE	I (Recent Qual S)***	8.2	16	16	Annual	Quarterly (Permit)	Semi-Ann
EPA 2PA	PCE	I	3	15	9	Annual	Semi-Ann (SOW)	Semi-Ann
EPA 2PB	PCE	I (Recent Qual S)***	3.7	15	11	Annual	Semi-Ann (SOW)	Semi-Ann
EPA 3	PCE	D		16	16	Annual	Quarterly (Permit)	Semi-Ann
EPA 3PA	PCE	NT		15	5	Biennial	Semi-Ann (SOW)	Semi-Ann
EPA 3PB	PCE	NT		15	11	Annual	Semi-Ann (SOW)	Semi-Ann
EPA 4	PCE	D		16	15	Biennial	Quarterly (Permit)	Semi-Ann
EPA 4PA	PCE	NT		15	5	Biennial	Semi-Ann (SOW)	Semi-Ann
EPA 4PB	PCE	NT		15	5	Biennial	Semi-Ann (SOW)	Semi-Ann
EPA 5	PCE	D		16	8	Biennial	Quarterly (Permit)	Semi-Ann
EPA 5PA	PCE	NT		15	4	Biennial	Semi-Ann (SOW)	Semi-Ann
EPA 5PB	PCE	S		15	7	Biennial	Semi-Ann (SOW)	Semi-Ann
EPA 6	PCE	D		16	16	Annual	Quarterly (permit)	Semi-Ann
EPA 6PA	PCE	D		15	15	Biennial	Semi-Ann (SOW)	Annual
EPA 7	PCE	D		14	14	Annual	Quarterly (permit)	Semi-Ann
EPA 7PA	PCE	NT		11	7	Annual	Semi-Ann (SOW)	Annual
MUNI 01	PCE	NT		13	3	Annual	Annual (SOW)	Annual
MUNI 07B	PCE	NT		13	1	Annual	Annual (SOW)	Annual
MUNI 07C	PCE	NT		13	2	Annual	Annual (SOW)	Annual

Well Name	COC	Mann Kendall Trend '99-'07*	Max PCE Concentration '99-'07 (Where Incr Trend) ug/L****	Number of Samples	Number of Detects	MAROS Recommend Freq ('99-'07)	Current Sampling Frequency and Basis	GSI/RSE Recomm Freq**
MUNI 09B	PCE	NT		13	1	Annual	Annual (SOW)	Annual
MUNI 09C	PCE	I	4.4	10	7	Semi-Annual	Annual (SOW)	Semi-Ann
MUNI 11A	PCE	S		6	6	Annual	Annual (SOW)	Annual
MUNI 11C	PCE	D		11	11	Quarterly	Annual (SOW)	Semi-Ann
MUNI 14	PCE	D		13	12	Quarterly	Annual (SOW)	Semi-Ann
MUNI 16	PCE	D		12	12	Semi-Annual	Annual (SOW)	Semi-Ann
MUNI 18	PCE	PI	3.9	13	13	Semi-Annual	Annual (SOW)	Annual
MUNI 20 (23rd &E)	PCE	Not Used		??	??	Not Used	Annual (SOW)	Annual[1]
MUNI 22	PCE	NT		13	10	Annual	Annual (SOW)	Annual
MUNI 24	PCE	NT		11	5	Annual	Annual (SOW)	Annual
MW 04A	PCE	NT		14	1	Biennial	Semi-Ann (SOW)	Biennial
MW 04B	PCE	D		15	12	Annual	Semi-Ann (SOW)	Annual
MW 06A	PCE	--		12	0	Biennial	Annual (SOW)	Biennial
MW 06B	PCE	--		12	0	Biennial	Annual (SOW)	Biennial
MW 07A	PCE	D		15	15	Annual	Semi-Ann (SOW)	Semi-Ann
MW 07B	PCE	D		13	12	Biennial	Semi-Ann (SOW)	Annual
MW 08A	PCE	S		13	3	Biennial	Annual (SOW)	Annual
MW 08B	PCE	NT		13	12	Biennial	Annual (SOW)	Annual
MW 09A	PCE	PI (Recent Qual S)***	10	15	15	Annual	Semi-Ann (SOW)	Semi-Ann
MW 09B	PCE	PD		15	14	Annual	Semi-Ann (SOW)	Semi-Ann
MW 10A	PCE	NT		14	1	Biennial	Semi-Ann (SOW)	Annual
MW 10B	PCE	S		14	9	Biennial	Semi-Ann (SOW)	Annual
MW 10C	PCE	D		14	14	Annual	Semi-Ann (City Proposed)	Semi-Ann

Well Name	COC	Mann Kendall Trend '99-'07*	Max PCE Concentration '99-'07 (Where Incr Trend) ug/L****	Number of Samples	Number of Detects	MAROS Recommend Freq ('99-'07)	Current Sampling Frequency and Basis	GSI/RSE Recomm Freq**
MW 11A	PCE	NT		15	1	Biennial	Semi-Ann (SOW)	Annual
MW 11B	PCE	D		16	16	Biennial	Semi-Ann (SOW)	Annual
MW 11C	PCE	I	4.2	16	10	Annual	Semi-Ann (SOW)	Annual
MW 12A	PCE	I	0.6	17	9	Biennial	Semi-Ann (SOW)	Semi-Ann
MW 12B	PCE	--		15	0	Biennial	Semi-Ann (SOW)	Semi-Ann
MW 12C	PCE	NT		15	4	Biennial	Semi-Ann (City Proposed)	Semi-Ann
MW 13A	PCE	--		14	0	Biennial	Semi-Ann (SOW)	Semi-Ann
MW 13B	PCE	--		15	0	Biennial	Semi-Ann (SOW)	Semi-Ann
MW 13C	PCE	--		15	0	Biennial	Semi-Ann (SOW)	Semi-Ann
MW 14A	PCE	I	0.68	14	12	Annual	Semi-Ann (SOW)	Semi-Ann
MW 14B	PCE	--		15	0	Biennial	Semi-Ann (SOW)	Semi-Ann
MW 14C	PCE	D		15	7	Biennial	Semi-Ann (City Proposed)	Semi-Ann
MW 15A	PCE	S		14	2	Biennial	Semi-Ann (SOW)	Semi-Ann
MW 15B	PCE	--		15	0	Biennial	Semi-Ann (SOW)	Semi-Ann
MW 15C	PCE	--		15	0	Biennial	Semi-Ann (City Proposed)	Semi-Ann
MW 16A	PCE	NT		12	3	Biennial	Semi-Ann (SOW)	Annual
MW 16B	PCE	D		12	11	Quarterly	Semi-Ann (SOW)	Semi-Ann
MW 17A	PCE	NT		15	1	Biennial	Semi-Ann (SOW)	Biennial
MW 17B	PCE	NT		13	13	Biennial	Semi-Ann (SOW)	Annual
PZ 124	PCE	N/A		1	0	N/A	Annual (SOW)	Biennial[1]
PZ 125	PCE	N/A		1	0	N/A	Annual (SOW)	Biennial[1]

*I=Increasing, PI=Probably Increasing, S=Stable, NT=No Trend, PD=Probably Decreasing, D=Decreasing,
N/A=Not Analyzed (Due to too few samples), -- shows wells with all samples non-detect
**The GSI/RSE recommended frequency is the qualitatively adjusted recommendation from GSI (2007) and adopted for the RSE
***These trends were qualitatively assessed using the concentrations from the last few years and found to be roughly stable
****For wells with increasing trends, the maximum concentration of PCE over the 1999-2007 period is shown

Table B-12: MAROS Analysis – Muscoy OU

Well Name	COC	Mann Kendall Trend '99-'07*	Number of Samples '99-'07	Number of Detects '99-'07	Mann Kendall Trend '05-'07*	Number of Samples '05-'07	Number of Detects '05-'07	Max PCE Conc, Wells with Incr Trends '05-'07 ug/L****	MAROS Recomm Freq ('99-'07)	MAROS Recomm Freq ('05-'07)	Current Sampling Frequency and Basis	GSI/RSE Recomm Freq**
EPA 108	PCE	I	12	11	NT	9	9		Annual	Annual	Quarterly (Permit)	Semi-Ann
EPA 108PA	PCE	NT	13	11	NT	13	11		Annual	Annual	Semi-Ann (SOW)	Semi-Ann
EPA 108PB	PCE	PI	13	5	PI	8	4	0.7	Annual	Biennial	Semi-Ann (SOW)	Semi-Ann
EPA 108S	PCE	N/A	5	5	N/A (Qual=S)***				N/A	N/A	Quarterly (Permit)	Quarterly[1]
EPA 109	PCE	D	11	11	D	9	9		Annual	Annual	Quarterly (Permit)	Semi-Ann
EPA 109PZA	PCE	S	10	10	S	10	10		Annual	Annual	Semi-Ann (SOW)	Semi-Ann
EPA 109PZB	PCE	PI	10	10	NT	8	8		Annual	Annual	Semi-Ann (SOW)	Semi-Ann
EPA 109PZC	PCE	NT	6	4	NT	5	3		Biennial	Biennial	Semi-Ann (SOW)	Semi-Ann
EPA 110	PCE	D	11	11	S	9	9		Annual	Annual	Quarterly (Permit)	Semi-Ann
EPA 110PZA	PCE	S	10	9	S	10	9		Annual	Annual	Semi-Ann (SOW)	Semi-Ann
EPA 110PZB	PCE	S	11	11	S	11	11		Annual	Annual	Semi-Ann (SOW)	Semi-Ann
EPA 110PZC	PCE	S	10	10	PD	8	8		Annual	Annual	Semi-Ann (SOW)	Semi-Ann

Well Name	COC	Mann Kendall Trend '99-'07*	Number of Samples '99-'07	Number of Detects '99-'07	Mann Kendall Trend '05-'07*	Number of Samples '05-'07	Number of Detects '05-'07	Max PCE Conc, Wells with Incr Trends '05-'07 ug/L****	MAROS Recomm Freq ('99-'07)	MAROS Recomm Freq ('05-'07)	Current Sampling Frequency and Basis	GSI/RSE Recomm Freq**
EPA 110PZD	PCE	NT	11	11	S	8	8		Annual	Annual	Semi-Ann (SOW)	Semi-Ann
EPA 110PZE	PCE	NT	8	4	NT	6	3		Biennial	Biennial	Semi-Ann (SOW)	Semi-Ann
EPA 111	PCE	D	11	11	D	9	9		Annual	Annual	Quarterly (Permit)	Semi-Ann
EPA 111PZA	PCE	D	10	5	D	10	5		Annual	Annual	Semi-Ann (SOW)	Semi-Ann
EPA 111PZB	PCE	I	11	11	I	8	8	13	Semi-Annual	Quarterly	Semi-Ann (SOW)	Semi-Ann
EPA 111PZC	PCE	I	11	11	I	8	8	17.4	Quarterly	Quarterly	Semi-Ann (SOW)	Semi-Ann
EPA 111PZD	PCE	D	8	7	PD	6	5		Annual	Annual	Semi-Ann (SOW)	Semi-Ann
EPA 112	PCE	S	12	12	NT	9	9		Annual	Annual	Quarterly (Permit)	Semi-Ann
EPA 112PA	PCE	D	12	11	D	12	11		Annual	Annual	Semi-Ann (SOW)	Semi-Ann
EPA 112PB	PCE	D	13	8	D	8	4		Annual	Biennial	Semi-Ann (SOW)	Semi-Ann
MUNI 101	PCE	S	12	9	N/A	2	1		Annual	Annual	Annual (SOW)	Annual
MUNI 102	N/A				S	12	6		N/A	Annual		
MUNI 103	PCE	NT	11	1	NT	11	1		Annual	Annual	Annual (SOW)	Annual
MUNI 104A	N/A				N/A	2	2		N/A	SemiAnnual		

Well Name	COC	Mann Kendall Trend '99-'07*	Number of Samples '99-'07	Number of Detects '99-'07	Mann Kendall Trend '05-'07*	Number of Samples '05-'07	Number of Detects '05-'07	Max PCE Conc, Wells with Incr Trends '05-'07 ug/L****	MAROS Recomm Freq ('99-'07)	MAROS Recomm Freq ('05-'07)	Current Sampling Frequency and Basis	GSI/RSE Recomm Freq**
MUNI 104B	N/A				N/A	2	2		N/A	Quarterly		
MUNI 108	PCE	NT	13	1	N/A	2	0		Annual	Annual	Annual (SOW)	Annual
MUNI 109	PCE	N/A (Qual=D)***	8 ('99-'04)	8	N/A				N/A	N/A	Annual (SOW)	Biennial[1]
MUNI 116	PCE	NT	12	5	N/A	2	1		Annual	Annual	Annual (SOW)	Annual
MW 126	PCE	N/A	1	0	N/A				N/A	N/A	Annual (SOW)	Biennial[1]
MW 127A	PCE	PD	12	12	PD	12	12		Biennial	Biennial	Annual (SOW)	Annual
MW 127B	PCE	NT	12	9	NT	12	9		Biennial	Biennial	Annual (SOW)	Annual
MW 128A	PCE	PI	20	20	PI	13	13	18.4	Quarterly	Quarterly	Semi-Ann (SOW)	Semi-Ann
MW 128B	PCE	--	18	0	--	8	0		Biennial	Annual	Semi-Ann (SOW)	Annual
MW 128C	PCE	S	16	2	--	8	0		Biennial	Annual	Semi-Ann (SOW)	Annual
MW 129A	PCE	D	19	5	D	19	5		Biennial	Biennial	Semi-Ann (SOW)	Biennial
MW 129B	PCE	NT	19	15	D	8	7		Annual	Annual	Semi-Ann (SOW)	Annual
MW-129C	PCE	S	20	1	--	8	0		Biennial	Annual	Semi-Ann (SOW)	Semi-Ann
MW 130A	PCE	D	20	20	D	20	20		Annual	Annual	Semi-Ann (SOW)	Annual

Well Name	COC	Mann Kendall Trend '99-'07*	Number of Samples '99-'07	Number of Detects '99-'07	Mann Kendall Trend '05-'07*	Number of Samples '05-'07	Number of Detects '05-'07	Max PCE Conc, Wells with Incr Trends '05-'07 ug/L****	MAROS Recomm Freq ('99-'07)	MAROS Recomm Freq ('05-'07)	Current Sampling Frequency and Basis	GSI/RSE Recomm Freq**
MW 130B	PCE	D	20	20	PD	8	8		Annual	Annual	Semi-Ann (SOW)	Annual
MW 130C	PCE	S	20	1	--	8	0		Biennial	Annual	Semi-Ann (SOW)	Annual
MW 135A	PCE	PI	15	15	PI	15	15	6	Annual	Annual	Semi-Ann (SOW)	Semi-Ann
MW 135B	PCE	NT	14	1	N/A	3	0		Biennial	Annual	Semi-Ann (SOW)	Semi-Ann
MW 135C	PCE	NT	14	1	N/A	3	0		Biennial	Annual	Semi-Ann (SOW)	Semi-Ann
MW 136A	PCE	NT	15	2	D	9	1		Biennial	Biennial	Semi-Ann (SOW)	Semi-Ann
MW 136B	PCE	NT	14	2	--	8	0		Biennial	Annual	Semi-Ann (SOW)	Semi-Ann
MW-136C	PCE	S	14	0	--	8	0		Biennial	Annual	Semi-Ann (SOW)	Semi-Ann
MW 137A	PCE	D	15	13	D	15	13		Annual	Annual	Semi-Ann (SOW)	Semi-Ann
MW 137B	PCE	S	14	1	D	8	1		Biennial	Biennial	Semi-Ann (SOW)	Semi-Ann
MW-137C	PCE	S	14	1	D	8	1		Biennial	Biennial	Semi-Ann (SOW)	Semi-Ann
MW 138A	PCE	NT	15	15	NT	15	15		Annual	Annual	Semi-Ann (SOW)	Semi-Ann
MW 138B	PCE	--	14	0	--	8	0		Biennial	Annual	Semi-Ann (SOW)	Semi-Ann
MW-138C	PCE	S	14	0	--	8	0		Biennial	Annual	Semi-Ann (SOW)	Semi-Ann

Well Name	COC	Mann Kendall Trend '99-'07*	Number of Samples '99-'07	Number of Detects '99-'07	Mann Kendall Trend '05-'07*	Number of Samples '05-'07	Number of Detects '05-'07	Max PCE Conc, Wells with Incr Trends '05-'07 ug/L****	MAROS Recomm Freq ('99-'07)	MAROS Recomm Freq ('05-'07)	Current Sampling Frequency and Basis	GSI/RSE Recomm Freq**
MW 139A	PCE	NT	15	12	NT	15	12		Biennial	Biennial	Semi-Ann (SOW)	Semi-Ann
MW 139B	PCE	--	14	0	--	8	0		Biennial	Annual	Semi-Ann (SOW)	Semi-Ann
MW-139C	PCE	S	14	0	--	8	0		Biennial	Annual	Semi-Ann (SOW)	Semi-Ann
MW 140A	PCE	N/A	1	1	N/A				N/A	N/A	Annual (SOW)	Annual[1]
MW 140B	PCE	D	5	5	D	5	5		Annual	Annual	Annual (SOW)	Semi-Ann
MW 140C	PCE	S	5	5	S	5	5		Annual	Annual	Annual (SOW)	Semi-Ann
MW 141A	PCE	N/A (Qual=D)***	6	6	N/A				N/A	N/A	Semi-Ann (SOW)	Semi-Ann

*I=Increasing, PI=Probably Increasing, S=Stable, NT=No Trend, PD=Probably Decreasing, D=Decreasing,
N/A=Not Analyzed (Due to too few samples), -- shows wells with all samples non-detect

**The GSI/RSE recommended frequency is the qualitatively adjusted recommendation from GSI (2007) and adopted for the RSE

***These trends were qualitatively assessed using the concentrations from the last few years and found to be roughly stable (S) or decreasing (D)

****For wells with increasing trends, the maximum concentration of PCE over the 1999-2007 period is shown

Table B-13: MAROS Analysis
PCE Increasing Trend

Downgradient Monitoring Well	Range of PCE Concentration (µg/L)	Trend
EXTRACTION WELL MONITORING		
Newmark OU North Network		
MW 009A	0.4 (Feb 1999) - < 10 (Nov 2005)	PI
Newmark OU South		
Extraction Wells and Associated Piezometers		
EPA 001	0.8 (Feb 1999) to 7.5 (Feb 2004)	I
EPA 001PA	ND (various dates) to 1.34 (Nov 2007)	I
EPA 001PB	ND (through Nov 2000) to 4.6 (Nov 2004)	I
EPA 002	0.5 (Sep 2001) to 8.2 (Feb 2004)	I
EPA 002PA	ND (various dates) to 3 (May 2007)	I
EPA 002PB	ND (through May 2000) to 3.7 (Nov 2004)	I
Monitoring Wells		
MW 011C	ND (through May 2000) to 4.2 (May 2007)	I
MW 012A	ND (various dates) to 0.6 (Aug 2007)	I
MW 014A	ND (various dates) to 0.68 (Feb 2004)	I
Muscoy OU		
Extraction Wells and Associated Piezometers		
EPA 108PB	ND (various dates) to 0.7 (Nov 2007)	PI
EPA 111PB	0.7 (Dec 2005) to 13 (Nov 2007)	I
EPA 111PC	0.77 (Sep 2005) to 17.4 (Nov 2007)	I
Monitoring Wells		
MW 128A	3.6 (Apr 2005) to 18.4 (Nov 2007)	PI
MW 135A	1.3 (Apr 2005) to 6 (Jan 2006)	PI
SITE-WIDE MONITORING		
27th & Acacia (MUNI 18)	0.5 (11/04) to 3.9 (10/06)	PI
DTSC 002C (MUNI 09C)	ND (through 4/02) to 4.4 (2/04)	I

Notes: PI: Probably Increasing
I: Increasing

Table B-14: MAROS Analysis
EPA Recommendation for Monitoring Program Changes and Rationale

Well Name	Current monitoring frequency requirement	GSI/RSE recommendation	EPA Recommendation / Rationale
EXTRACTION WELL MONITORING			
Newmark OU North			
Extraction Wells and Associated Piezometers			
EPA 006	Quarterly(1)	Semi-annually	Quarterly / CDPH Permit on extraction well
EPA 006PA	Semi-annually(2)	Annually	Semi-annually / Extraction well effectiveness monitoring
EPA 007	Quarterly(1)	Semi-annually	Quarterly / CDPH Permit on extraction well
EPA 00 7PA	Semi-annually	Annually	Semi-annually / Extraction well effectiveness monitoring
Monitoring Wells			
MW 004A	Semi-annually(2)	Bi-annually	Annually – SBMWD can submit request to EPA for change if appropriate
MW 004B	Semi-annually(2)	Annually	
MW 007B	Semi-annually(2)	Annually	
Newmark OU South			
Extraction Wells			
EPA 001	Quarterly(1)	Semi-annually	Quarterly / CDPH Permit on extraction well
EPA 002	Quarterly(1)	Semi-annually	
EPA 003	Quarterly(1)	Semi-annually	
EPA 004	Quarterly(1)	Semi-annually	
EPA 005	Quarterly(1)	Semi-annually	
Monitoring Wells			
MW 010A	Semi-annually(2)	Annually	Semi-annually / Part of performance evaluation program
MW 010B	Semi-annually(2)	Annually	
MW 010C(2)	Semi-annually(2)	Annually	
MW 011A	Semi-annually(2)	Annually	
MW 011B	Semi-annually(2)	Annually	
MW 011C	Semi-annually(2)	Annually	

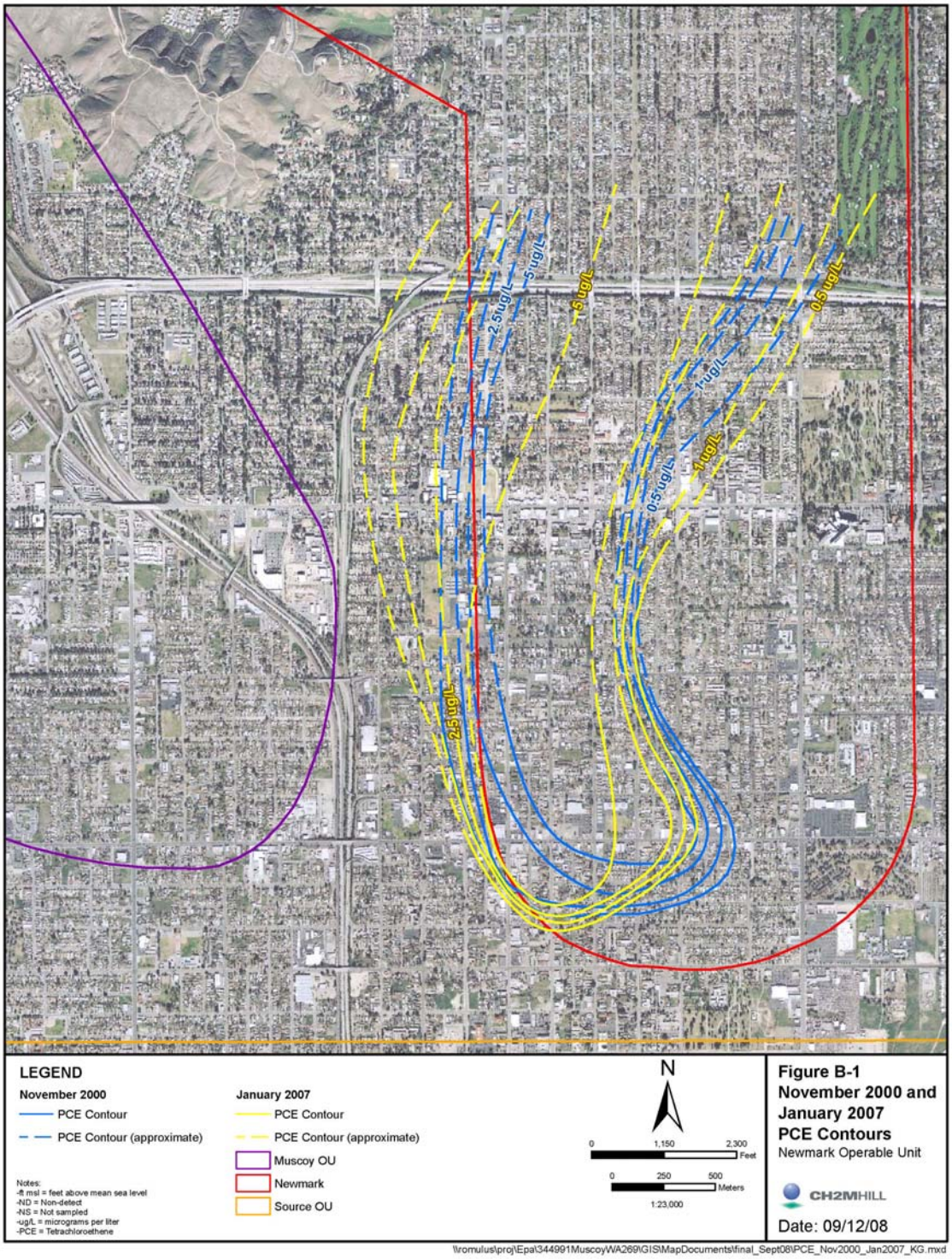
Well Name	Current monitoring frequency requirement	GSI/RSE recommendation	EPA Recommendation / Rationale
Muscoy OU			
Extraction Wells			
EPA 108	Quarterly(1)	Semi-annually	Quarterly / CDPH Permit on extraction well
EPA 109	Quarterly(1)	Semi-annually	
EPA 110	Quarterly(1)	Semi-annually	
EPA 111	Quarterly(1)	Semi-annually	
EPA 112	Quarterly(1)	Semi-annually	
Monitoring Wells			
MW 129A	Semi-annually(2)	Bi-annually	Semi-annually / Part of performance evaluation program
MW 129B	Semi-annually(2)	Annually	
MW 130A	Semi-annually(2)	Annually	
MW 130B	Semi-annually(2)	Annually	
MW 130C	Semi-annually(2)	Annually	
SIDE-WIDE MONITORING			
Active Production Wells			
31st & Mt. View	Annually(2)	Semi-annually	Semi-annually / as recommended by GSI/RSE
Leroy	Annually(2)	Semi-annually	
Inactive Production Wells			
MW Paperboard	Annually(2)	Bi-annually	Annually / to maintain continuity of database / SMBWD can request change if appropriate
Monitoring Wells			
DTSC 002C	Annually(2)	Semi-annually	Semi-annually / as recommended by GSI/RSE
DTSC 003C	Annually(2)	Semi-annually	
MW 006A	Annually(2)	Bi-annually	Annually / maintain continuity of database / SMBWD can request change if appropriate
MW 006B	Annually(2)	Bi-annually	
MW 126	Annually(2)	Bi-annually	
MW 140B	Annually(2)	Semi-annually	Semi-annually / as recommended by GSI/RSE
MW 140C	Annually(2)	Semi-annually	
PZ 124	Annually(2)	Bi-annually	Annually / maintain continuity of database / SMBWD can request change if appropriate
PZ 125	Annually(2)	Bi-annually	

Notes:

(1) Required by CDPH Drinking Water Permit

(2) Required by CD/SOW

Figure B-1: Newmark Plumes in 2000 and 2007



\\romulus\proj\Epa\344991MuscoyWA269\GIS\MapDocuments\final_Sept08\PCE_Nov2000_Jan2007_KG.mxd

Figure B-2 Capture Analysis of Newmark Deep Plume (June 2008)

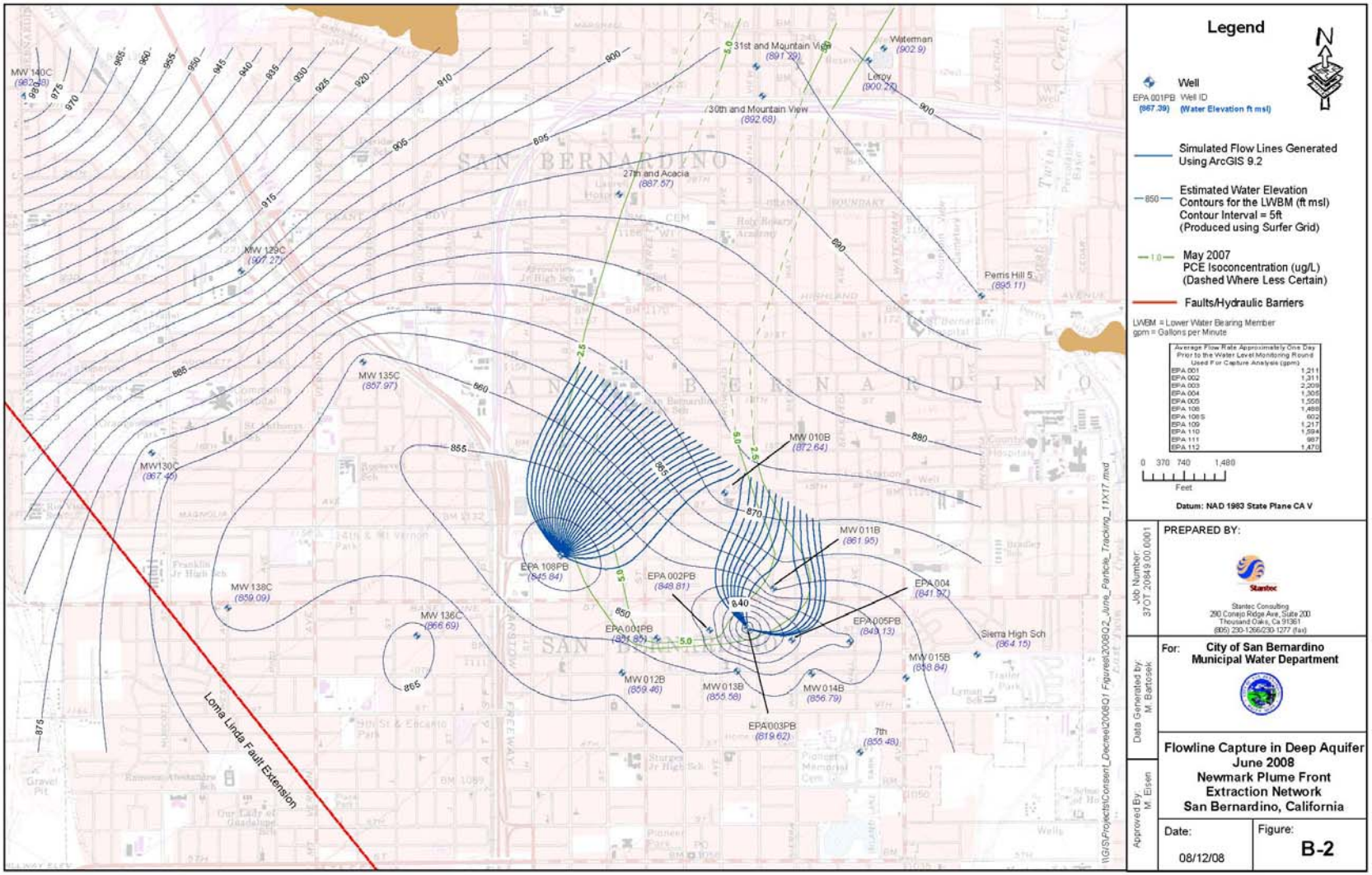
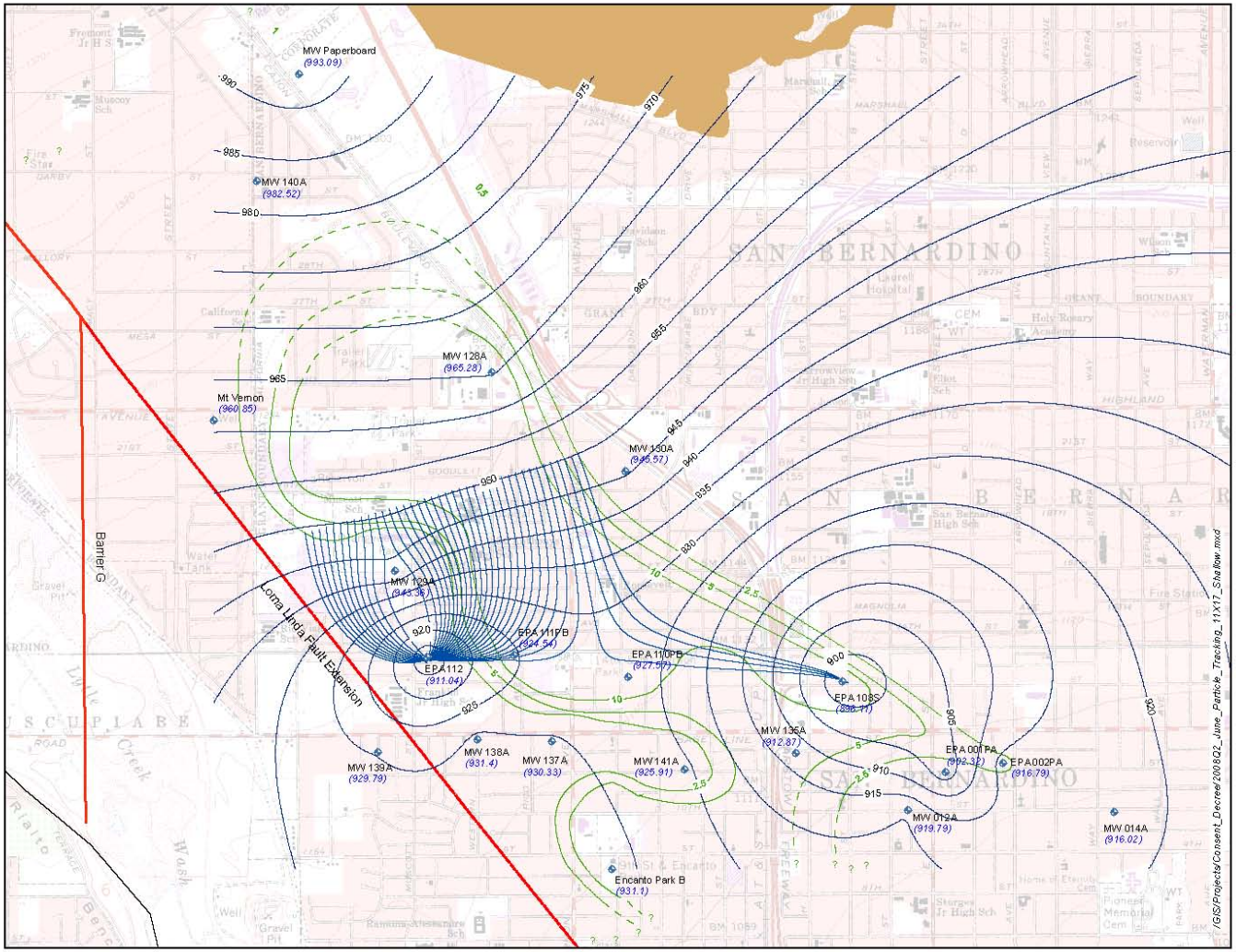


Figure B-3: Capture Analysis of Muscoy Shallow Plume (June 2008)



Legend

Well

EPA 001PB Well ID

(867.39) (Water Elevation ft msl)

Simulated Flow Lines Generated Using ArcGIS 9.2

850 Estimated Water Elevation Contours for the LVBM (ft msl) Contour Interval = 5ft (Produced using Surfer Grid)

1.0 May 2007 PCE Isoconcentration (ug/L) (Dashed Where Less Certain)

Faults/Hydraulic Barriers

Average Flow Rate Approximately One Day Prior to the Water Level Monitoring Round Used For Capture Analysis (gpm)	
EPA 001	1,211
EPA 002	1,319
EPA 003	2,229
EPA 004	1,308
EPA 006	1,666
EPA 108	1,488
EPA 108S	403
EPA 109	1,217
EPA 110	1,994
EPA 111	987
EPA 112	1,478

gpm = Gallons per Minute

0 875 1,750 3,500

Feet

Datum: NAD 1983 State Plane CA V

Job Number: 37 OT 20049.00.0001

PREPARED BY:

Stantec

290 Conejo Ridge Ave., Suite 200
Thousand Oaks, Ca 91361
(805) 230-1266/230-1277 (fax)

Data Generated by: M. Bartosek

For: City of San Bernardino Municipal Water Department

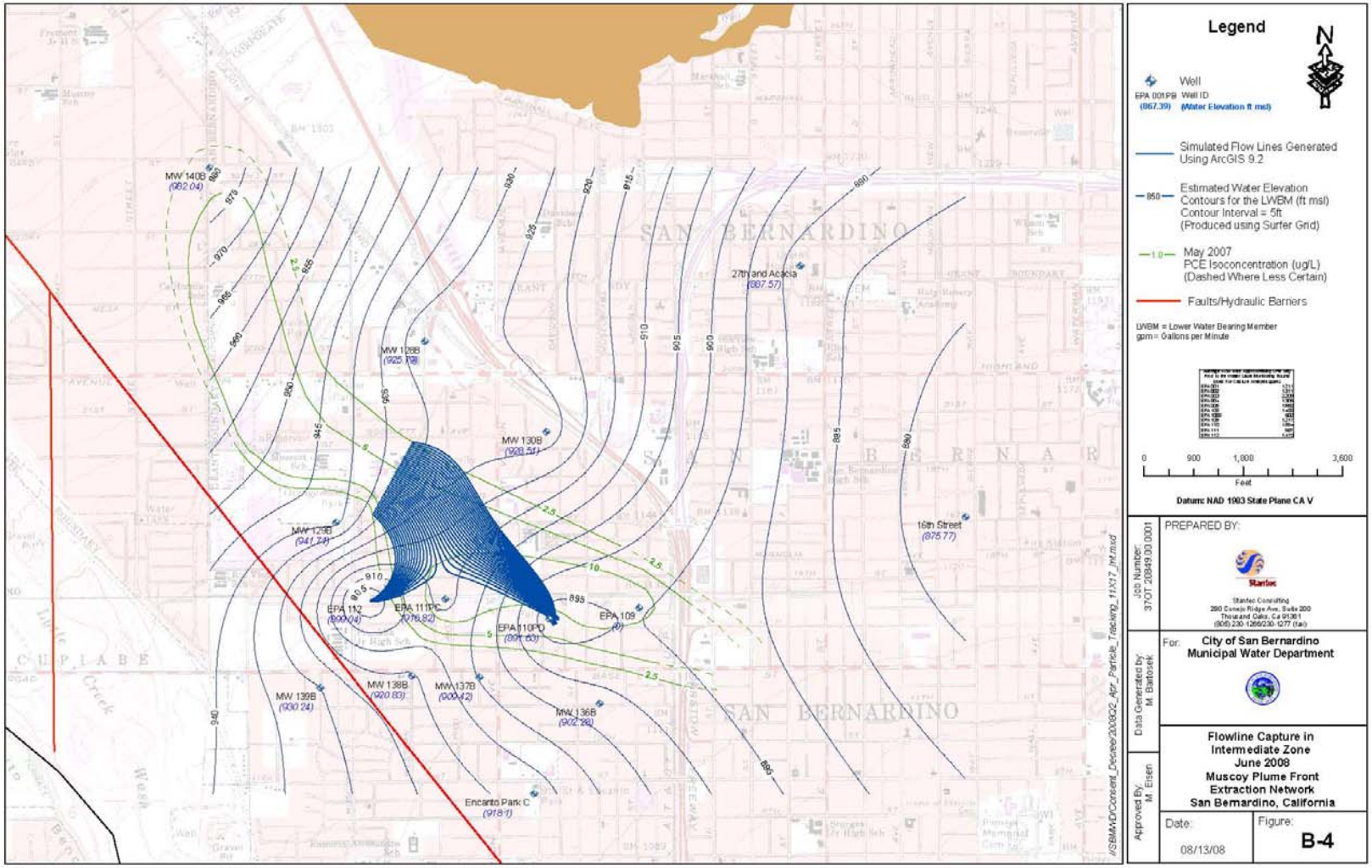
Approved By: M. Eisen

Flow Line Capture in Shallow Aquifer June 2008 Muscoy Plume Extraction Well Network

Date: 08/13/08

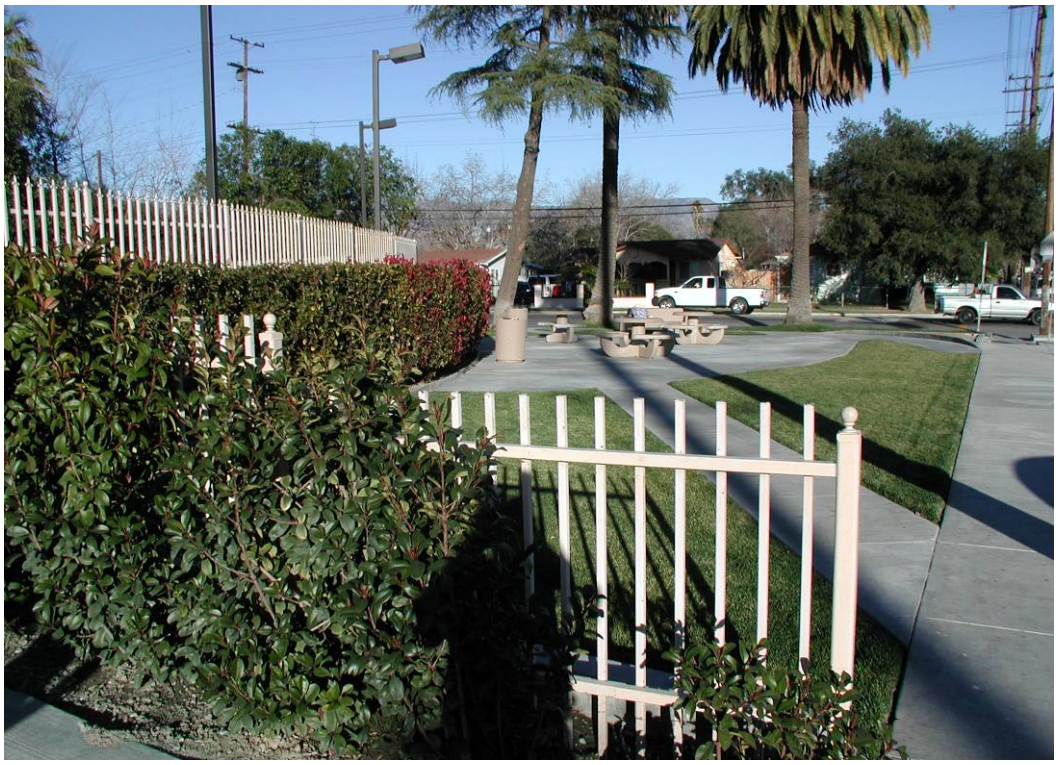
Figure: B-3

Figure B-4: Capture Analysis of Muscoy Intermediate Plume (June 2008)



US Environmental Protection Agency

Appendix C
ARAR Review Memorandum
for
Newmark Superfund Site
San Bernardino, California



Prepared by: US Army Corps of Engineers
Environmental and Munitions Center of Expertise
Omaha, Nebraska

Prepared for: US Environmental Protection Agency, Region 9,
San Francisco, California

September 2008

Changes to Applicable or Relevant and Appropriate Standards (ARARs) Discussion for the Newmark Superfund Site

Introduction: As part of the five-year review process, cleanup levels, standards, to-be-considered criteria (TBCs) and ARARs must be reviewed for changes. Changes (if any) are then evaluated to determine if the changes affect the protectiveness of the remedy. The 1993 Newmark and 1995 Muscoy Operable Unit RODs identified only chemical- and action-specific ARARs for the site. No location-specific ARARs were identified in either ROD. As would be expected, the list of ARARs for each operable unit (OU) was the same. A discussion of each ARAR and any change to the applicable standard or criterion is found in the paragraphs that follow. [Changes to California Code of Regulations (CCR) requirements identified as ARARs for the site were checked using the official CCR website maintained by the California Office of Administrative Law and hosted by Westlaw.]

Safe Drinking Water Act Maximum Contaminant Levels (MCLs). The RODS for both OUs identified Federal and State MCLs as chemical-specific ARARs for the site. Federal MCLs are found at 40 CFR Part 141. California MCLs for organics are found at 22 CCR §64444. Should an MCL for a contaminant differ between the State and Federal regulations, the more stringent value is the ARAR. Changes in MCLs were evaluated for COCs for both operable units. As the 1993 Newmark OU ROD did not clearly identify COCs for the OU, the COCs for the Newmark OU were taken from the 1993 Risk Assessment. COCs for the Muscoy OU were those listed in the 1995 ROD. Changes to MCLs since the date of the RODs are highlighted in Table 1 below. There have been no changes to either State or Federal MCLs that would affect the protectiveness of the remedy

<u>California Secondary Drinking Water Standards [22 CCR §64449]</u>: Both RODS identified State Secondary Drinking Water Standards as ARARs for the site. The original reference to the State regulations in the RODs (22 CCR §64471) has been changed to 22 CCR §64449. This regulation establishes secondary MCLs for the following constituents:

- Aluminum
- Color
- Copper
- Foaming Agents
- Iron
- Manganese
- Methyl-tert-butyl ether (MTBE)
- Odor
- Silver
- Thiobencarb
- Turbidity
- Zinc
- Total Dissolved Solids
- Specific Conductance

- Chloride
- Sulfate

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

TABLE 1 – CHANGES IN CHEMICAL-SPECIFIC ARARS NEWMARK AND MUSCOY OPERABLE UNITS [SINCE SIGNING OF THE RODS]				
COC	**CA MCL[1,2]**	**Federal MCL[1,2]**	**Change?**	**Discussion**
Newmark Operable Unit[3]				
Tetrachloroethene	5	5	None	--------
Trichloroethene	5	5	None	--------
cis-1,2-Dichloroethene	6	70	None	--------
1,1,1-Trichloroethane	200	200	None	--------
1,1-Dichloroethane	5	None	None	--------
1,2-Dichloropropane	5	5	None	--------
Carbon Tetrachloride	0.5	5	None	--------
Chloroform	None	100[4]	Yes	Federal MCL for TTHM was changed from 100 ppb to 80 ppb on 16 Dec 1998 [63 FR 69390]. 22 CCR § 64439 states CA will comply with Federal MCLs for TTHMs.
Methylene Chloride	None	5	Yes	Since the 1993 Newmark OU ROD was signed, CA has promulgated an MCL for methylene chloride (aka, dichloromethane) of 5 ppb.
Muscoy Operable Unit[5]				
1,1-Dichloroethane	5	5	None	--------
cis-1,2-Dichloroethene	6	70	None	--------
Trichloroethene	5	5	None	--------
Tetrachloroethene	5	5	None	--------
Dichlorodifluoromethane	None	100	Yes	It is unclear where the Federal MCL value in the ROD was obtained. Currently there is no MCL for this contaminant

TABLE 1 – CHANGES IN CHEMICAL-SPECIFIC ARARS NEWMARK AND MUSCOY OPERABLE UNITS [SINCE SIGNING OF THE RODS]				
COC	**CA MCL[1,2]**	**Federal MCL[1,2]**	**Change?**	**Discussion**
Trichlorofluoromethane	150	100	Yes	It is unclear where the Federal MCL value in the ROD was obtained. Currently there is no MCL for this contaminant

Table 1 Notes:
1 – The ARAR is established as the more stringent of the State and Federal MCL value as indicated in the RODs for both OUs. Values listed under CA and Federal MCL columns were those provided in site documentation and valid as of the dates of the signing of the RODs.
2 – Units are in parts per billion (ppb).
3 – Newmark OU COCs were taken from the 1993 Risk Assessment. The 1993 ROD discussed only PCE and TCE.
4 – MCL value was for total trihalomethanes (TTHM) per 40 CFR 141.64.
5 – Muscoy OU COCs as identified in the 1995 ROD.

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

SCAQMD Regulation XIV, Rule 1401, was listed as an ARAR for the site. Rule 1401 requires Best Available Control Technology for toxics (T-BACT) be used for new stationary operating equipment emitting toxic air pollutants. In addition, the substantive portions of SCAQMD Regulation XIII, Rules 1301 through 1313 on new source review were also identified as applicable to the site. And finally, SCAQMD Rules 401 (regulating visible emissions), 402 (prohibiting emissions that is odorous or causes injury, nuisance or annoyance) and 403 (regulating downwind particulate emissions) were determined by EPA to be applicable.

Regulation XIV, Rule 1401: This regulation establishes limits for maximum individual cancer risk (MICR) from new, modified or relocated sources emitting toxic air contaminants. Paragraph d(1) of the regulation states that a permit to construct a new source emitting toxic pollutants shall be denied unless the applicant can substantiate the cumulative increase in MICR will not result in:

- an increase in MICR greater than 1×10^{-6} if T-BACT is not used;
- an increase in MICR greater than 1×10^{-5} if T-BACT is used;
- a cancer burden greater than 0.5.

As Rule 1401 is a pre-construction regulation, it is assumed that all applicable requirements were attained before the treatment units went on-line.. Presently, there is no emission control equipment installed on any of the groundwater treatment units.

However, given that emissions from the carbon treatment units should be negligible and that the regulation allows for no T-BACT should the increase in MICR not be greater than 1 X 10^{-6}, the lack of emission control equipment on the carbon treatment units should not present an exceedance of allowable limits. When the carbon units are taken off-line and the air stripping units are utilized for short periods of time for carbon change-out or other maintenance, a worst-case scenario mass balance calculation for the Waterman Treatment Unit shows that a maximum of 1.6 pounds per day of total VOCs would be emitted. [This assumes a conservatively high average total VOC concentration of 20 ppb in groundwater, 100% volatilization and a pumping rate of 7,000 gpm.]. The South Coast AQMD permit issued for site limits air stripper operations to 90,000 gallons per day for 20 days per year at a maximum of PCE and TCE concentrations of 120 ppb and 20 ppb, respectively. As the levels at the site are well below these limits, there is no need to install T-BACT on the air stripping units.

Regulation XIII, Rules 1301-1313: These rules regulate the construction of new, modified or relocated sources to ensure their operation does not interfere with attaining National Ambient Air Quality Standards (NAAQS) in the SCAQMD. It requires the use of Best Available Control Technology (BACT) for new sources. The pollutants covered by this regulation and potentially present in groundwater treatment unit emissions include ozone depleting substances and certain VOCs. The Rules require the use of BACT unless specific conditions are met as described in paragraph b(1) of Rule 1303. As Rules 1301-1313 are pre-construction requirements that must be met prior to commencing construction, it is assumed that applicable requirements therein were attained before the treatment units went on-line.

Rules 401, 402, and 403: These rules regulate visible emissions (via opacity limits), nuisance emissions and fugitive dust emissions, respectively. There have been no changes to substantive requirements in these rules that would affect either the operation or protectiveness of the remedy.

Water Quality Standards for Reinjection and Discharges of Treated Water to Surface Water: The RODS for both the Newmark and Muscoy Operable Units listed several ARARs associated with re-injection of treated groundwater into the aquifer and discharges of treated groundwater to surface water. Each is discussed in detail below.

Underground Injection Control Program regulations, 40 CFR Parts 144-147 and RCRA Section 3020: These regulations were identified as ARARs in both the 1993 Newmark OU and 1995 Muscoy OU RODs. These regulations would apply to any re-injection of treated groundwater to the aquifer should the San Bernardino Water System be unable to accept treated water. 40 CFR 144.13(c) contains a CERCLA exemption to the prohibition on Class IV injection wells (which is how injections wells for the site would most likely be classified). The exemption states that the prohibition does not apply to wells used to inject contaminated groundwater that has been treated and is being re-injected into the same formation from which it was drawn if such injection is approved by EPA, or a State, pursuant to provisions for cleanup of releases conducted under CERCLA. In addition, the RCRA Section 3020(a) ban on the disposal of hazardous

waste into a formation which contains an underground source of drinking water does not apply to the injection of contaminated groundwater into an aquifer if the injection is part of a CERCLA response, if the water is treated to substantially reduce hazardous constituents prior to injection and the response action, upon completion, will be protective of human health and the environment.

After accounting for such exemptions, only the remaining substantive requirements of the regulations would be considered ARARs for the site. In particular, these would be found in 40 CFR 146, which contains standards for construction, operation and maintenance of injection wells. As of this five-year review, no injection wells have been constructed at the site (nor are any planned for the future) and therefore any changes in the regulations would not affect the protectiveness of the remedy.

State Water Resources Control Board, Resolution 68-16 (Anti-degradation Policy): Resolution 68-16 contains no substantive requirements in and of itself. However, it does contain provisions for discharges to Waters of the State such that existing water quality, when higher than established policies and standards, will be maintained. There have been no changes to this resolution since the signing of the 1993 or 1995 RODs.

The Santa Ana Regional Water Quality Control Board (SARWQCB) "Water Quality Control Plan for the Santa Ana River Basin, Bunker Hill Sub-basins" (a.k.a., the Basin Plan): The RODS for both OUs state that the SARWQCB did not identify specific substantive discharge limits or technology standards for temporary discharges to surface water. EPA stated in the 1993 and 1995 RODS for both OUs that to comply with this ARAR, any groundwater to be discharged to surface waters on-site must be treated to meet Federal or State MCLs, whichever is more stringent. Discussion of changes in MCLs is included above.

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

VOC treatment plant requirements – 22 CCR §66264.14 (security requirements), § 66264.18 (location standards) and §66264.25 (precipitation standards): There have been no changes in these regulations since the issuance of the 1993 and 1995 RODs.

VOC treatment plant requirements – Substantive requirements of 22 CCR §66264.600 – .603 for miscellaneous unit requirements and related substantive closure requirements of §66264.111 – .115 for the air stripper or GAC contactor: There have been no changes to substantive requirements of these regulations affecting the protectiveness of the remedy.

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

Hazardous Waste Storage Requirements – 22 CCR §66262.34 and §66264.170 – .178: There have been no changes to these storage requirements except for the addition of two new subsections to §66264.175. In July, 1997, new subsections (d) and (e) were added as follows:

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

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

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

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

ARAR Review Summary: There have been no changes to ARARs identified for the Newmark and Muscovy Operable Units that affect the protectiveness of the remedy.

US Environmental Protection Agency

Appendix D
Risk Assessment and Toxicology Analysis Memorandum
for
Newmark Superfund Site
San Bernardino, California

Prepared by: US Environmental Protection Agency,
Region 9, San Francisco, California

September 2008

TECHNICAL MEMORANDUM

Risk Assessment and Toxicology Analysis Memorandum for Newmark Groundwater Superfund Site

First Five-Year Review

The Newmark Superfund Site is located in San Bernardino, California and consists of three operable units. Interim remedial actions are completed for two of the operable units: the Muscoy and the Newmark Operable Units. A baseline Risk Assessment was completed in March 1993 for the Newmark Operable Unit Remedial Investigation / Feasibility Study and in December 1994 for the Muscoy Operable Unit Remedial Investigation/Feasibility Report.

Exposure Pathways

The exposure assumptions used to develop the Baseline Risk Assessment for both the Muscoy and Newmark Operable Units were for potential future exposure if untreated groundwater were to be used for residential purposes. The baseline Risk Assessment assessed risk for ingestion of contaminated water, and dermal adsorption of contaminated water, primarily during bathing and showering.

The Baseline Risk Assessment discussed the vapor intrusion pathway of exposure. It concluded that vapor intrusion is unlikely to be a significant exposure route at the Newmark Superfund Site because the depth to groundwater throughout the area is greater than 100 feet.

There have been no changes in the exposure pathways since the Baseline Risk Assessment was completed.

Additional Constituents of Potential Concern (COPCs)

SBMWD confirms that no new chemical of potential concern (COPC) has been identified from either the Newmark monitoring program and the California Department of Public Health Drinking Water permit monitoring.

Changes in Toxicity

There have been a number of changes to the toxicity values for specific constituents of concern in groundwater at the Newmark Area since the Baseline Risk Assessment was completed in 1994.

For cancer risks, toxicity values for PCE and TCE are currently more stringent than in 1994. In August 2001, U.S. EPA's Office of Research and Development (ORD) released the draft "Trichloroethylene Health Risk Assessment: Synthesis and Characterization" ("TCE Health Risk Assessment") for external peer review. According to the draft TCE

Health Risk Assessment, for those who have increased susceptibility and/or higher background exposures, TCE could pose a higher risk than considered in the Baseline Risk Assessment. The draft TCE Health Risk Assessment has been peered reviewed by the Science Advisory Board, a team of outside experts convened by U.S. EPA, in 2002 and the National Academy of Sciences in 2006. EPA has not yet finalized this evaluation and therefore only the current Cal EPA derived toxicity value was used. PCE is still under reassessment by EPA, and therefore the Cal EPA value was also currently adopted. Additionally, Cal EPA has a different toxicity value for vinyl chloride that would result in an increased risk for that chemical. None of the other chemicals of concern (COCs) have changed toxicity values.

In 2008, EPA harmonized all risk-based screening tables from different regions to generate a single source, the Region Screening Levels (RSL) table, to allow consistent risk-based screening by all regions. The RSL table was developed using the latest toxicity values, default exposure assumptions and physical and chemical properties and is consistent with the OSWER chemical toxicity hierarchy. The RSL tables are available at the "Regional Screening Levels for Chemical Contaminants at Superfund Sites" website at http://www.epa.gov/region09/waste/sfund/

For TCE and PCE, the RSL table uses the current Cal EPA derived toxicity value. This follows the OSWER toxicity criteria hierarchy. Values for PCE and TCE from the 2008 RSL tables are provided in Table D-1 below.

Table D-1: RSL Toxicity and Screening Levels For TCE and PCE

Contaminant	Screening Levels (SL)												
Analyte (CAS No.)	SFO (mg/kg-day)$^{-1}$	key	IUR ($\mu g/m^3$)$^{-1}$	key	RfD_o (oral) (mg/kg-day)	key	RfC_i (inhalation) (mg/m^3)	key	voc	RAGS Part E GIABS	RAGS Part E ABS	C_{sat} (mg/kg)
Tetrachloro-ethylene (127-18-4)	5.4E-01	C	5.9E-06	C	1.0E-02	I	2.7E-01	A	V	1		1.8E+02
Trichloro-ethylene (79-01-6)	1.3E-02	C	2.06E-06	C					V			7.5E+02

Contaminant	Screening Levels											Protection of Groundwater Soil Screening Levels	
Analyte (CAS No.)	Residential Soil (mg/kg)	key	Industrial Soil (mg/kg)	key	Residential Air ($\mu g/m^3$)	key	Industrial Air ($\mu g/m^3$)	key	Tapwater ($\mu g/L$)	key	MCL ($\mu g/L$)	Risk-based SSL (mg/kg)	MCL-based SSL (mg/kg)
Tetrachloro-ethylene (127-18-4)	5.7E-01	ca	2.7E+00	ca	4.1E-01	ca	2.1E+00	ca	1.1E-01	ca	5.0E+00	5.2E-05	2.4E-03

Trichloro-ethylene (79-01-6)	2.0E-00	ca	1.4E+01	ca	1.2E+00	ca	6.1E+00	ca	1.7E+00	ca	5.0E+00	6.1E-04	1.9E-03

Note: A = ATSDR; C = Cal EPA; ca = cancer; I = IRIS (EPA's Integrated Risk Information System); V = volatile; C_{sat} = soil saturation concentration; ABS = Absorption; GIABS = GI (Gastro-intestinal) Absorption; SSL = soil screening levels

Since 1994, the units and procedures for determining some of the reference doses and slope factors that are used in risk assessment have changed, making a direct comparison between previous factors and current factors difficult. Therefore, in order to assess if there has been changes to the toxicity, a risk number was calculated using the same exposure routes, direct contact residential water use, using the RSL table and is compared to the risk for each chemical presented in the Baseline Risk Assessment.

Table D-2: Comparison of Risk

Chemical of Concern	1994-2008 Average Max Concentration	1994 Non-Cancer Hazard Index	2008 Non-Cancer Hazard Index	1994 RME - Est. Cancer Risk	2008 RME - Est. Cancer Risk
	ug/l				
Tetrachloroethene (PCE)	27	-	-	1.71E-05	2.5E-04
Trichloroethene (TCE)	6	-	-	1.10E-06	1.0E-05
cis-1,2-Dichloroethene	6	1.70E-02	1.6E-02	-	-
trans-1,2-Dichloroethene	0.4	1.00E-04	3.6E-03	-	-
1,1-Dichloroethane	0.8	2.00E-04	1.1E-04	NA	1.1E-10
1,2-Dichloropropane	0.3			2.49E-07	7.7E-07
Dichlorodifluoromethane (Freon 12)	17	2.00E-03	4.4E-02	-	-
Trichlorofluoromethane (Freon 11)	4	4.00E-04	3.1E-03	-	-
Vinyl Chloride	0.1	-	-	2.32E-06	6.3E-06

Currently, for the Newmark site, the concentrations in the groundwater are at lower levels than in 1994 in most of the wells, although still above MCLs for several COCs in some areas. An average maximum concentration is used in Table D-2 to shown the difference in risk level using the new 2008 toxicity factors. Although the current reassessment of the risk from untreated groundwater would resulted in a risk that is slightly outside the risk range, there is no exposure to untreated contaminated groundwater at the Site. The current remedy treats contaminated groundwater to mostly Non Detects for the COCs.

US Environmental Protection Agency

Appendix E
Site Inspection Report
for
Newmark Superfund Site
San Bernardino, California

Prepared by: US Army Corps of Engineers
Environmental and Munitions Center of Expertise
Omaha, Nebraska

Prepared for: US Environmental Protection Agency, Region 9,
San Francisco, California

September 2008

Newmark Superfund Site
First Five-Year Review

Trip Report

Site Inspection Checklist

Site Photographs

Newmark Superfund Site Five-Year Review
Site Inspection Report

TRIP REPORT

1. INTRODUCTION:

a. Date: February 12-14 2008

b. Location: San Bernardino, CA

c. Purpose: The site inspection was conducted to provide information about the site's status and to visually confirm and document the conditions of the remedy, the site, and the surrounding area.

d. Travelers:

Dave J. Becker	USACE EMCX Geologist	(402) 697-2655
Lindsey K. Lien	USACE EMCX Environmental Engineer	(402) 697-2580

e. Contacts:

Newmark Superfund Site Meeting

Name	Organization	Phone Number	e-mail	Attendance	
				2/13/2008	2/14/2008
Dave Becker	USACE	402 697 2655	dave.j.becker@usace.army.mil	x	x
Lindsey K. Lien	USACE	402 697 2580	lindsey.k.lien@usace.army.mil	x	x
Michael Garland	SBMWD	909 379 2618	garland_mi@sbcitywater.org	x	x
Kim Hoang	EPA Region 9	415 972 3147	hoang.kim@epa.gov	x	x
Terry Tonn	SBMWD	909 384 5119	tonn_te@sbcitywater.org	x	
Mark Eisen	SECOR	805 276 0155	meisen@secor.com	x	x
Constantine Arrieta	SBMWD	909 384 5139	arrieta_co@sbcitywater.org	x	
Valerie Housel	SBMWD	909 384 5117	housel_va@ci.sanbernardino.ca.us	x	
Jennifer Bell	SBMWD	909 384 5317	bell_je@ci.sanbernardino.ca.us	x	x
Tom Perina	CH2M Hill	951 276 3003 x-4024	tperina@ch2m.com	x	x
Alice Campbell	DTSC		acampbell@dtsc.ca.gov		x
Greg Holmes	DTSC		gholmes@dtsc.ca.gov		x

2. SUMMARY:

Dave Becker and Lindsey Lien arrived at the San Bernardino 19th Street Water Treatment Plant at approximately 2 PM on February 12, 2008. They met Michael Garland, Terry Tonn, and Jennifer Bell of the San Bernardino Municipal Water District (SBMWD), Kim Hoang EPA Region 9 RPM, and Mark Eisen SECOR Inc. The group spent approximately two hours discussing the facilities present at the Muscoy OU 19th Street Plant, how they compared with the Newmark OU facilities, capacity and operation.

Following the tour of the 19th Street Plant, the team visited some of the "facade homes" associated with Muscoy OU wells. Wells located in low income neighborhoods of the OU required the lots be cleared for installation of the well and discharge piping. At the request of the property owners wells were located near the rear of the lot. Structures were built that look similar to homes in the area to house the controls while maintaining the appearance of well kept neighborhood instead of an industrial area. SBMWD personnel check these wells a minimum of once per shift which has also provided an added level of security in the area.

The following morning, Mr. Lien and Mr. Becker met with the EPA RPM, and SBMWD, to tour the Newmark OU extraction and monitoring wells, and the Waterman and Newmark treatment facilities as well as the 17th Street facility. That afternoon the group identified in paragraph 1.e. above met to discuss the previous two days' activities. Becker briefly explained the RSE process and how it parallels the five year review process, especially in the areas of protectiveness and site closeout, but expands upon the optimization aspects in the areas of effectiveness and cost control. He also identified how the checklists are used and invited the participants to review them on either the USACE or EPA web sites. Lien and Becker then posed questions to the group concerning operations, costs, problem areas, funding, and modeling. Lien and Becker expressed how impressed they were with SBMWDs effort that went into operating the facilities efficiently, and economically while in close partnership with the regulatory community.

On February 14 those identified in the table above met to discuss the status of the modeling for the Newmark Superfund Site and how it interfaced with the modeling effort for the Bunker Hill Basin. Following the presentations and discussions, the travelers interviewed the two representatives from the California DTSC prior to departing for the airport.

3. DISCUSSION:

The information below is presented by subject and is intended to summarize observations made during the site visits accomplished on February 12 and 13, and summarize information gained during meetings on February 13 and 14.

Wells.

The wells are performing as expected with only a few exceptions. EW-110 had performance problems with flow dropping from 2300 gpm to 1000 gpm with little change in drawdown. The well was recently rehabilitated, consisting of the replacement of the pump bowls. The flows have now recovered to ~2300 gpm again. EW-112 had been producing ~5 lb of sand per day, so the SBMWD pulled the pump and added a sand separator (a long shroud that hangs below the intake, preventing sand from being drawn up and the problem was solved. EW-109 has declining water levels; videos of the well show water seeping into the well about 10 ft above the dynamic water level. These observations have led to adjustments in the reported water levels in EW-109 for contouring. EPA-6 was down at the time of the site visit for pump testing to determine the sustainable rate. Water levels at the Newmark North system have declined, limiting yield. EPA-6 was rated at 1000 gpm, but could only sustain 600 gpm. SBWMD will select and install a new pump sized for the sustainable flow since the two EPA extraction wells at Newmark North do not have VFDs. A "shallow" (<500 feet deep) extraction well with a capacity of approximately 600 gpm was added at EW-108 to address shallow contamination at the EW-108 location that the deeper well did not control. The well specific capacities are monitored annually. SBWMD may add sodium hypochlorite where needed to control bacteria. The wells have been pump tested and the information is contained in a 2004 Newmark report we received from Mark Eisen. We also have data on the Muscoy pump tests in the 6-month report.

SBMWD conducts annual pump tests of the wells, and Southern California Edison determines pump efficiency. Most run just below 60%, based on the pump efficiency and the energy imparted to the water. SBWMD was working on one of the Newmark wells when we visited the site. They run video logs of the wells whenever the pump and discharge lines are removed from the casing. They have not seen any evidence of problems in the videos. Water has ~300 mg/L hardness and is scaling rather than corrosive. Older City production wells have some scaling problems (some are over 60 years old).

SBMWD did video one well with unusually low water levels and saw water trickling in about 10 feet above the water level. They suspect the water levels measured underestimate the water level in the aquifer. Most wells have nearby multilevel piezometers, though a couple of the Muscoy extraction wells have the piezometers in the same borehole. The extraction wells at Newmark south and Muscoy have submersible pumps with variable-frequency drive motors (some Newmark wells may have originally had fixed speed motors, but they were changed). The two EPA extraction wells at Newmark North have line-shaft turbine pumps with fixed speed motors (there were questions about the effort to install VFD motor controllers, etc. at the site. SBMWD is concerned with space limitations. Some of the pumps are very large (up to 500 hp) due in part to the large discharge head coupled with high flow rates. For example, Newmark EW-1 runs at 1600 gpm and at 123 psi.

Extraction wells were in good shape at the surface. Sampling taps are unsecured, though this has not been a problem. Sites were all fenced adequately. Some wells for the Muscoy side were hidden behind façade "homes" that blend into the neighborhoods. There were many discussions between the local community and EPA regarding the need for such measures, but EPA ultimately agreed. Wells at the Newmark OU (south and north) are not hidden.

A subset of monitoring wells was inspected for the site visit, including seven monitoring well clusters (135, 10, 11, 13, 12, 137, and 138) near the two downgradient systems, a number of the piezometer clusters near some of the extraction wells, and several monitoring wells in the source area near the Cajon Landfill (COE001, COE002 and COE003 as well as CJ-10 and CJ-17). All wells were secure. The wells near the downgradient extraction systems have transducers with solar power and batteries with radio transmitters. Readings from these monitoring points are taken hourly and handled by the SCADA system.

Water levels are declining in the Muscoy side of the study area and some wells have gone dry. Most monitoring wells are multi-level installations, particularly in the downgradient parts of the plume.

Monitoring Program.

Monitoring wells in the site-wide program (almost all wells, except those that are dry) are sampled annually. Extraction wells are sampled quarterly (monthly for microbiologic analysis). Monitoring points near the downgradient extraction wells are sampled semi-annually. An optimization study was conducted by GSI, Inc., and the preliminary findings indicate that the monitoring network was adequate and the sample frequency could be reduced. This report and its results will be reviewed and summarized in the five-year review report. The results and the report were described to the City Water Department personnel for their information. There will be some hurdles to implement any reductions (through DPH permit, etc).

The City conducts the monitoring for the extraction wells and the monitoring wells near the extraction wells. They will be doing the site-wide monitoring, under a combined Operational Sampling and Analysis Plan (OSAP). This plan is to be submitted to EPA for approval. Once the OSAP is approved, the EPA will turn over lead oversight to California DTSC. There are delays in the submission of the combined OSAP, due to staff changes at the City, and EPA is pressing for the completion of the plan.

The monitoring consists of sampling for VOCs using passive diffusion bag samplers. Only piezometers installed in EW boreholes are sampled with bailers. Once every three years, the extraction wells are sampled for cations/anions, other constituents, and radioactive analytes including gross alpha, Ra228, and Uranium. They have petitioned DPH to stop analyzing for 1,4-dioxane, and butene.

Samples are sent by the City to the Montgomery, Watson, Harza (MWH) lab (a state-approved lab). Results are sent electronically directly to DPH and the City. Analysis is by 524.2 drinking water method. There are no QA samples sent to a different lab, though previously EPA did split samples sent to their contract lab. Results were quite comparable. EPA does 20% data validation checks. Blind duplicates, field blanks, spikes, etc. are all done as part of the program. The State does not perform any split samples for the ground water samples (though they do for backwash discharge).

Data are managed electronically and a master water quality (and hydrologic) database is being constructed by MUNI with cooperation from the City. Reports will be provided quarterly by the City for all monitoring and performance assessment now. The City started monthly reports on the Newmark operable unit in 2005, and once the Muscoy system went operational and functional, has gone to quarterly reporting. URS provided reports on the Muscoy operable unit until after January 2007. The City now does the reporting for Muscoy system.

Treatment Plants.

The City is treating water from the EPA-installed extraction wells at three locations. Discharges from EPA extraction wells EW-2, 3, and 4 are treated at the Waterman plant, discharge from EPA extraction wells EW-6 and 7 are treated at the Newmark North treatment system, and discharges from all six Muscoy extraction wells and Newmark well EW-1 are treated at the 19th Street (Muscoy) plant. The 19th St Plant has a capacity of >12,000 gpm. Water from EW-1 was redirected to the 19th St plant since that plant had the capacity and the Waterman plant did not. The Waterman and Newmark North treatment systems were installed in the 1997-1998 timeframes and have been operational and functional since 2000. Water from EPA extraction well EW-5 is not contaminated and is piped directly into the distribution system following chlorination. The pumping from EW-5 contributes to the capture of the Newmark plume. Water from EPA extraction well EW-3 used to be treated at the 17th Street treatment plant, but is no longer treated there. This plant was installed under the State sponsorship in the early 1990s and is still used to treat the water from the City's two 17th Street production wells (currently running at ~2000 gpm). This plant may be used to treat water from the EPA extraction wells if there are problems at one of the other plants. The State also sponsored the installation of the south bank of vessels (4 pairs of 20,000 pound units) at the 19th Street plant.

All water from the EPA extraction wells is treated by carbon adsorption. The vessels at the Waterman and Newmark North plants contain 20,000 lb of carbon (as does the 17th Street plant). The Waterman and Newmark North vessels were built by Pressure Vessel Technologies (Santa Fe Springs, CA) in 1997 and are rated at 75 psi. The vessels at the 19th Street (Muscoy) plant are 30,000 lb vessels with 624 sq ft of cross-sectional area. The City uses virgin carbon, and changes the carbon in the 20,000 lb vessels annually, and in the 30,000 lb vessels about every 18 months. It takes about 3 weeks to do a complete change out of lead vessels at the 19th Street plant, as an example. The 19th Street plant lead vessels were changed about 3 months before the visit. The City gets

carbon from Carbon Activated (sourced from Sri Lanka) and pays ~$0.53/lb including all costs. The carbon is thermally regenerated but not returned to service at SBMWD. SBMWD had previously done an economic analysis of using virgin vs. regenerated carbon and found it was less expensive to use the virgin as it lasts longer before needing change-out. SBWMD does not backwash the carbon based on headloss across the vessels. They only backwash the beds as part of preparation for bringing a new bed on line following a bed change out. Even then, the backwash water is not too dirty. They do inspect the vessel interiors during carbon change-out and have not had any issues with degradation of the tank linings. At the Newmark North plant, they have had to replace underdrains inside the vessels. They do monitor the differential pressure across the vessels. Most vessels have around a 3-6 psi pressure drop. There were variable pressure drops based on gauges at the Newmark North plant, but the electronic gauges (that read in % of full scale [70 psi]) are more consistent. There are pressure sustaining globe valves on the effluent lines to maintain pressures within the GAC vessels above a certain level to avoid the dissolution of gases from the water. Such gases had caused air bubbles to form in the vessels resulting in channeling in the past. The vessels have air relief valves, but not sure why they would not release the pressure. Some of the air relief valves were not seating adequately and small quantities of water were being released at various locations (e.g., pair 1 at Newmark North). This water was discharged into backwash channel and would be released to either surface drainage (19th Street, Waterman Plant, or Newmark North) or sanitary sewer (17th Street). Backwash effluent discharge to surface drainages was covered under a combined NPDES permit. The City notifies DPH prior to a backwash and samples the discharge. Sometimes the State takes split samples.

Mike Garland indicated the only change he would request is a catwalk along the tops of the carbon vessels to simplify change-out and checks. Currently, they use a lift to raise people to the top of the vessels. Mike also indicated they have not had lost-time accidents or accidental releases (other than the leaking air-relief valves and the carbon release during the attempted theft of aluminum parts at the 19th Street Plant).

The State installed air stripping towers at the Waterman and Newmark (North) plants in the early 1990s. These strippers are used during times when City production wells are needed to meet peak demand and can be used as a backup water treatment process to treat water from the EPA extraction wells if the carbon systems are off-line. EPA will allow costs for running the air strippers if the carbon units have to be off-line. There are no off-gas treatment components for the air strippers. The air strippers are packed towers, generally with about 8 feet of packing (about 2.5 inch diameter spheres). The Waterman plant towers are slightly larger (~14 ft diameter) than the Newmark towers (~12 ft diameters) and have a capacity of 5000 gpm per tower. The air strippers are run at an air-water ratio of 33:1 (e.g., 33,000 scfm at Waterman for 7500 gpm). The blowers at the Waterman plant were driven by fixed speed 200 HP motors. They did change the sheave size long ago to reduce the air/water ratio.

SBMWD adds a proprietary sequestrant (polyphosphate) at 5 mg/L to the tower influent to avoid scaling on the packing. The sequestrant is stored on site in enclosed poly tanks.

Chlorine is added at all plants prior to introduction into the distribution system. Chlorine gas is used. A limited number of 150-lb cylinders are stored at the sites. Chlorine addition is not funded by the EPA.

The treated water is all used for municipal supply. The EPA wells provide more than 25% of the municipal demand during peak usage periods. Some of the treated water is transferred to MUNI (currently about 3000 gpm at the time of the site visit). EPA is credited for the value of the water. Water from the Waterman plant is stored in a 10 million gallon concrete reservoir covered by an earthen berm. The reservoir is in a park, with and the public have access to the soil-covered top of the reservoir. They have had vehicles drive on top of the reservoir. The treatment plant is enclosed by chain-link and decorative wrought-iron fencing. Water from the Newmark North plant is stored in a 23 million gallon concrete reservoir covered by an earthen berm. This reservoir and the treatment plant are all inside a chain-link fence topped with three-strand barbed wire. The fence was in excellent condition, with the exception of one spot where the barbed wire loose. The 19th Street plant has a small reservoir used primarily to supply the wetwell for the booster station, and the 17th Street plant was located adjacent to a 100,000 gal clear well originally built for the two original City production wells on site. The 19th Street and 17th Street sites were also enclosed in a chain-link fence with some wrought iron fencing.

At a couple locations in the northern portion of the City's service area, SBWMD generates electricity at the lower, discharge end of the pipes. This power is used to run pumps as they do not get adequate rebates from Southern Cal Edison.

Eye wash stations and emergency showers were in place at all of the treatment plants.

Performance Requirements.

Currently, the systems have to meet performance requirements for capture and up time (90% uptime). For cost purposes, SBWMD monitors for compliance with target flow rates. The capture targets, based on contouring software (now Surfer with Arc, previously TecPlot) and particle tracking are:

- 80% Muscoy shallow as rolling 3-month average
- 85% Muscoy deep
- 90% Newmark

They have specific criteria to meet for CDPH on effluent. The requirements in the Consent Decree have been changed to reflect these. The contamination in monitoring wells downgradient of the Muscoy system is presently exempted from the capture requirements.

The City has implemented, through ordinance, management zones where water purveyors have to apply for a permit from the City to use water. The groundwater use applications will be considered based the impact on the contaminant plumes as determined by the

ground water model. This constitutes one aspect of the institutional controls defined in the 2004 Explanation of Significant Differences (ESD).

Ground Water Model.

SBWMD, using SECOR, is leading a multi-agency (including MUNI and other municipalities) effort to develop a basin-wide groundwater flow MODFLOW model. The model is based on a USGS model developed by Wes Danskin. They have constructed the model (5 layers, 7 million total cells, 1.2 Million active cells, 102-102 feet cell size) and are currently calibrating the model. They have run the model from 1945 to the 1983 with annual stress periods, then monthly stress periods to 2000. The period 2000 to 2005 is a verification data set. The model run times are 27 hours for calibration and 12 hours for a verification run. The model runs under Groundwater Vistas software(?), except they use Arc for handling pumping rates, etc. The data entry and manipulation process is complex and not well documented.

Mark Eisen showed recent calibration results. They have problems in calibration in the lower basin with a spatial bias (model lower than observed) over much of the model. The matches are better near the site. Mark felt the problems are with surface water recharge and stream bed conductances. The Loma Linda and San Jacinto faults act as barriers. The State DTSC representative, Alice Campbell, was more interested in the fault conductance, but Mark said he was unwilling to adjust the fault conductances as they were set by the USGS. Mark described a recent pump test near the Loma Linda fault using one of the Muscoy wells. Monitoring wells on the other side of the fault did not respond to the pumping at 1300 gpm.

Site Security.

Each site was found to be securely fenced. There was one hole in the fence at the Waterman plant, but the hole opened to a block wall, so was not a point of entry. The Waterman, 17th Street, and 19th Street plants had normal chain-link fencing with privacy slats. The Newmark North plant had chain-link topped with 3-strand barbed wire. Security cameras were in place at the 19th Street and Waterman plants and the 19th Street plant had infrared sensors. Such measures will be implemented at all plants. Vandalism and break-ins have occurred. One person tried to steal aluminum flanges off a carbon transfer pipe, only to have it break and release tens of thousands of pounds of carbon. Another incident involved someone opening all sampling taps. City employees make two checks per day on the wells (once per 10 hour shift). This has improved some of the neighborhoods where the wells are in place. Some of the monitoring well panels have been hit with graffiti, or literally hit by cars.

Costs.

The City obtained a $100M insurance policy from AIG using $50M of the settlement. Bills are submitted to AIG monthly. We are to get copies of these for recent periods as indication of the costs. Any money left over once cleanup is attained is split between the

City and the EPA. A $10M earmark for the settlement was obtained by the City by Congressional appropriation, through EPA, and was in addition to the $60+M settlement.

Electrical costs charged to the EPA account are only for the added differential pressure across the carbon vessels.

4. ACTIONS RECOMMENDED:

The EMCX will incorporate the findings into the Five-Year Review Report.

/s/	/s/
David J. Becker, P.G. Geologist CEHNC-CX-EG	Lindsey K. Lien, P.E. EnvironmentalEngineer CEHNC-CX-EG

Site Inspection Checklist

I. SITE INFORMATION	
Site name: Newmark Superfund Site	**Date of inspection: 12-13 February 2008**
Location and Region: San Bernardino, CA REG 9	**EPA ID: CAD981434517**
Agency, office, or company leading the five-year review: USACE EMCX	**Weather/temperature:** **Sunny, 75 degrees, Light Wind**

Remedy Includes: (Check all that apply)

- □ Landfill cover/containment
- √ Access controls
- √ Institutional controls
- √ Groundwater pump and treatment
- □ Surface water collection and treatment
- □ Other_____
- □ Monitored natural attenuation
- √ Groundwater containment
- □ Vertical barrier walls

Attachments: √ Inspection team roster attached □ Site map attached

II. INTERVIEWS (Check all that apply)

1. **O&M site manager** ___Mike Garland_ _Operations Manager, City of San Bernardino February 12, 2008
   Name Title Date
   Interviewed √at site √ at office □ by phone Phone no. _909 379- 2618_
   Problems, suggestions; □ Report attached __No issues_____

2. **O&M staff** ___Terry Tonn_____ _City of San Bernardino SBMWD__ February 12, 2008
   Name Title Date
   Interviewed □ at site √ at office □ by phone Phone no. _909 384-5119_
   Problems, suggestions; □ Report attached ____No issues_____

2. **O&M staff** ___Con Arrieta_____ _City of San Bernardino SBMWD__ February 12, 2008
   Name Title Date
   Interviewed □ at site √ at office □ by phone Phone no. _909 384-5119_
   Problems, suggestions; □ Report attached ____No issues_____

2. **O&M staff** ___Mark Eisen_____ _SECOR Contractor to SBMWD__ February 12 ,14 , 2008
   Name Title Date
   Interviewed √ at site √ at office □ by phone Phone no. _909 384-5139_
   Problems, suggestions; □ Report attached ____No issues_____

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

Agency _California DTSC_____
Contact __Alice Campbell_____ __Hydrogeologist__ _2/14/2008_ _____
Name Title Date Phone no.
Problems; suggestions; √ Report attached _____
_____

Agency __California DTSC _____
Contact ___Greg Holmes_____ __Hydrogeologist__ __2/14/2008 _____
Name Title Date Phone no.
Problems; suggestions; √ Report attached _____
_____

Agency _____
Contact _____ _____ _____ _____
Name Title Date Phone no.
Problems; suggestions; ▯ Report attached _____
_____

Agency _____
Contact _____ _____ _____ _____
Name Title Date Phone no.
Problems; suggestions; ▯ Report attached _____
_____

4. **Other interviews** (optional) √ Reports attached.

Representative from Regional Water Quality Control Board (Kamron Saremi)

Representatives from California Department of Public Health (Sean McCarthy, Jaydeb Das)

EPA Remedial Project Manager for Source Operable Unit (Chris Lichens)

III. ON-SITE DOCUMENTS & RECORDS VERIFIED (Check all that apply)				
1.	**O&M Documents**			
	√ O&M manual	√ Readily available	☐ Up to date	☐ N/A
	√ As-built drawings	√ Readily available	☐ Up to date	☐ N/A
	√ Maintenance logs	√ Readily available	☐ Up to date	☐ N/A
	Remarks All O&M documents kept at the shops facility			
2.	**Site-Specific Health and Safety Plan**	√ Readily available	☐ Up to date	☐ N/A
	☐ Contingency plan/emergency response plan	√ Readily available	☐ Up to date	☐ N/A
	Remarks All O&M documents kept at the shops facility			
3.	**O&M and OSHA Training Records**	☐ Readily available	☐ Up to date	☐ N/A
	Remarks Not verified			
4.	**Permits and Service Agreements**			
	√ Air discharge permit	☐ Readily available	☐ Up to date	☐ N/A
	√ Effluent discharge	☐ Readily available	☐ Up to date	☐ N/A
	☐ Waste disposal, POTW	☐ Readily available	☐ Up to date	☐ N/A
	√ Other permits NPDES Drinking Water	☐ Readily available	☐ Up to date	☐ N/A
	Remarks			
5.	**Gas Generation Records**	☐ Readily available	☐ Up to date	√ N/A
	Remarks			
6.	**Settlement Monument Records**	☐ Readily available	☐ Up to date	√ N/A
	Remarks			
7.	**Groundwater Monitoring Records**	√ Readily available	√ Up to date	☐ N/A
	Remarks			
8.	**Leachate Extraction Records**	☐ Readily available	☐ Up to date	√ N/A
	Remarks			
9.	**Discharge Compliance Records**			
	☐ Air	☐ Readily available	☐ Up to date	√ N/A
	√ Water (effluent)	√ Readily available	√ Up to date	☐ N/A
	Remarks			
10.	**Daily Access/Security Logs**	√ Readily available	√ Up to date	☐ N/A
	Remarks			

IV. O&M COSTS

1. **O&M Organization**

☐ State in-house ☐ Contractor for State
☐ PRP in-house ☐ Contractor for PRP
☐ Federal Facility in-house ☐ Contractor for Federal Facility
√ Other_San Bernardino Municipal Water Department_____

2. **O&M Cost Records**

√ Readily available √ Up to date
√ Funding mechanism/agreement in place
Original O&M cost estimate_____ ☐ Breakdown attached

Total annual cost by year for review period if available

From_1/1/2007_	To_ 10/31/07__	__$1,980,557__	☐ Breakdown attached
Date	Date	Total cost	
From_1/1/2006_	To_12/31/2006	__$2,178,000___	☐ Breakdown attached
Date	Date	Total cost	
From_4/1/2005	To_12.31.2005_	_ $1,221,600__	☐ Breakdown attached
Date	Date	Total cost	

2005 Data does not include full year of Muscoy OU operations

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

Describe costs and reasons: See Remediation System Evaluation Report_____

V. ACCESS AND INSTITUTIONAL CONTROLS √ Applicable ☐ N/A

A. Fencing

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

Remarks: Fencing in good condition at facilities._____

B. Other Access Restrictions

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

Remarks___Signs identifying water plants/wells as portion of the EPA Newmark System are present

C. Institutional Controls (ICs)

1. **Implementation and enforcement**

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

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

Type of monitoring (*e.g.*, self-reporting, drive by) _SBMWD vehicle visit each well/treatment facility a minimum of one time each shift_____

Frequency _____

Responsible party/agency _____

Contact __Mike Garland_____ _Operations Manager, SBMWD_ _2/12/2008_ _909 379- 2618_

Name Title Date Phone no.

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

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

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

Violations have been reported ☐ Yes ☐ No ☐ N/A

Other problems or suggestions: ☐ Report attached

_____

_____

_____

_____

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

Remarks_____

_____

_____

D. General

1. **Vandalism/trespassing** ☐ Location shown on site map ☐ No vandalism evident

Remarks: Incidents of trespassing have occurred. Security systems are being upgraded. Some facilities have had graffiti problems._____

2. **Land use changes on site** √ N/A

Remarks_____

_____

3. **Land use changes off site** √ N/A

Remarks_____

_____

VI. GENERAL SITE CONDITIONS

A. Roads √ Applicable ☐ N/A

1. **Roads damaged** ☐ Location shown on site map ☐ Roads adequate ☐ N/A

Remarks: Roads and paving in adequate conditions_____

_____

B. Other Site Conditions

Remarks _____

_____

_____

_____

_____

_____

VII. LANDFILL COVERS ☐ Applicable √ N/A

A. Landfill Surface

1. **Settlement** (Low spots) ☐ Location shown on site map ☐ Settlement not evident
Areal extent_____ Depth_____
Remarks_____

_____

2. **Cracks** ☐ Location shown on site map ☐ Cracking not evident
Lengths_____ Widths_____ Depths_____
Remarks_____

_____

3. **Erosion** ☐ Location shown on site map ☐ Erosion not evident
Areal extent_____ Depth_____
Remarks_____

_____

4. **Holes** ☐ Location shown on site map ☐ Holes not evident
Areal extent_____ Depth_____
Remarks_____

_____

5. **Vegetative Cover** ☐ Grass ☐ Cover properly established ☐ No signs of stress
☐ Trees/Shrubs (indicate size and locations on a diagram)
Remarks_____

_____

6. **Alternative Cover (armored rock, concrete, etc.)** ☐ N/A
Remarks_____

_____

7. **Bulges** ☐ Location shown on site map ☐ Bulges not evident
Areal extent_____ Height_____
Remarks_____

_____

8. **Wet Areas/Water Damage** ☐ Wet areas/water damage not evident
☐ Wet areas ☐ Location shown on site map Areal extent_____
☐ Ponding ☐ Location shown on site map Areal extent_____
☐ Seeps ☐ Location shown on site map Areal extent_____
☐ Soft subgrade ☐ Location shown on site map Areal extent_____
Remarks_____
_____

9. **Slope Instability** ☐ Slides ☐ Location shown on site map ☐ No evidence of slope instability
Areal extent_____
Remarks_____
_____

B. Benches ☐ Applicable ☐ N/A
(Horizontally constructed mounds of earth placed across a steep landfill side slope to interrupt the slope in order to slow down the velocity of surface runoff and intercept and convey the runoff to a lined channel.)

1. **Flows Bypass Bench** ☐ Location shown on site map ☐ N/A or okay
Remarks_____
_____

2. **Bench Breached** ☐ Location shown on site map ☐ N/A or okay
Remarks_____
_____

3. **Bench Overtopped** ☐ Location shown on site map ☐ N/A or okay
Remarks_____
_____

C. Letdown Channels ☐ Applicable ☐ N/A
(Channel lined with erosion control mats, riprap, grout bags, or gabions that descend down the steep side slope of the cover and will allow the runoff water collected by the benches to move off of the landfill cover without creating erosion gullies.)

1. **Settlement** ☐ Location shown on site map ☐ No evidence of settlement
Areal extent_____ Depth_____
Remarks_____
_____

2. **Material Degradation** ☐ Location shown on site map ☐ No evidence of degradation
Material type_____ Areal extent_____
Remarks_____
_____

3. **Erosion** ☐ Location shown on site map ☐ No evidence of erosion
Areal extent_____ Depth_____
Remarks_____
_____

4. **Undercutting** ☐ Location shown on site map ☐ No evidence of undercutting
Areal extent_____ Depth_____
Remarks_____
_____

5. **Obstructions** Type_____ ☐ No obstructions
☐ Location shown on site map Areal extent_____
Size_____
Remarks_____
_____

6. **Excessive Vegetative Growth** Type_____
☐ No evidence of excessive growth
☐ Vegetation in channels does not obstruct flow
☐ Location shown on site map Areal extent_____
Remarks_____
_____

D. Cover Penetrations ☐ Applicable ☐ N/A

1. **Gas Vents** ☐ Active ☐ Passive
☐ Properly secured/locked ☐ Functioning ☐ Routinely sampled ☐ Good condition
☐ Evidence of leakage at penetration ☐ Needs Maintenance
☐ N/A
Remarks_____
_____

2. **Gas Monitoring Probes**
☐ Properly secured/locked ☐ Functioning ☐ Routinely sampled ☐ Good condition
☐ Evidence of leakage at penetration ☐ Needs Maintenance ☐ N/A
Remarks_____
_____

3. **Monitoring Wells** (within surface area of landfill)
☐ Properly secured/locked ☐ Functioning ☐ Routinely sampled ☐ Good condition
☐ Evidence of leakage at penetration ☐ Needs Maintenance ☐ N/A
Remarks_____
_____

4. **Leachate Extraction Wells**
☐ Properly secured/locked ☐ Functioning ☐ Routinely sampled ☐ Good condition
☐ Evidence of leakage at penetration ☐ Needs Maintenance ☐ N/A
Remarks_____
_____

5. **Settlement Monuments** ☐ Located ☐ Routinely surveyed ☐ N/A
Remarks_____
_____

E. Gas Collection and Treatment ☐ Applicable ☐ N/A

1. **Gas Treatment Facilities**
☐ Flaring ☐ Thermal destruction ☐ Collection for reuse
☐ Good condition ☐ Needs Maintenance
Remarks_____
_____

2. **Gas Collection Wells, Manifolds and Piping**
☐ Good condition ☐ Needs Maintenance
Remarks_____
_____

3. **Gas Monitoring Facilities** (*e.g.*, gas monitoring of adjacent homes or buildings)
 Good condition Needs Maintenance N/A
Remarks_____
_____

F. Cover Drainage Layer Applicable N/A

1. **Outlet Pipes Inspected** Functioning N/A
Remarks_____
_____

2. **Outlet Rock Inspected** Functioning N/A
Remarks_____
_____

G. Detention/Sedimentation Ponds Applicable N/A

1. **Siltation** Areal extent_____ Depth_____ N/A
 Siltation not evident
Remarks_____
_____

2. **Erosion** Areal extent_____ Depth_____
 Erosion not evident
Remarks_____
_____

3. **Outlet Works** Functioning N/A
Remarks_____
_____

4. **Dam** Functioning N/A
Remarks_____
_____

H. Retaining Walls Applicable N/A

1. **Deformations** Location shown on site map Deformation not evident
Horizontal displacement_____ Vertical displacement_____
Rotational displacement_____
Remarks_____
_____

2. **Degradation** Location shown on site map Degradation not evident
Remarks_____
_____

I. Perimeter Ditches/Off-Site Discharge Applicable N/A

1. **Siltation** Location shown on site map Siltation not evident
Areal extent_____ Depth_____
Remarks_____
_____

2. **Vegetative Growth** Location shown on site map N/A
 Vegetation does not impede flow
Areal extent_____ Type_____
Remarks_____
_____

3. **Erosion** ☐ Location shown on site map ☐ Erosion not evident
Areal extent_____ Depth_____
Remarks_____
_____

4. **Discharge Structure** ☐ Functioning ☐ N/A
Remarks_____
_____

VIII. VERTICAL BARRIER WALLS ☐ Applicable √ N/A

1. **Settlement** ☐ Location shown on site map ☐ Settlement not evident
Areal extent_____ Depth_____
Remarks_____
_____

2. **Performance Monitoring** Type of monitoring_____
☐ Performance not monitored
Frequency_____ ☐ Evidence of breaching
Head differential_____
Remarks_____
_____

IX. GROUNDWATER/SURFACE WATER REMEDIES √ Applicable ☐ N/A

A. Groundwater Extraction Wells, Pumps, and Pipelines √ Applicable ☐ N/A

1. **Pumps, Wellhead Plumbing, and Electrical**
√ Good condition √ All required wells properly operating ☐ Needs Maintenance ☐ N/A
Remarks_Though one well was off at the time of the site inspection, it was not one of the containment wells at the leading edge of the ground water plumes_____.

2. **Extraction System Pipelines, Valves, Valve Boxes, and Other Appurtenances**
√ Good condition ☐ Needs Maintenance
Remarks_Some very isolated rust spots noted on piping at Newmark containment well heads, but very minor_____
__

3. **Spare Parts and Equipment**
√ Readily available √ Good condition ☐ Requires upgrade ☐ Needs to be provided
Remarks__City has reasonable access to parts or parts can be obtained relatively quickly in the local area._____

B. Surface Water Collection Structures, Pumps, and Pipelines ☐ Applicable √ N/A

1. **Collection Structures, Pumps, and Electrical** ☐ Good condition ☐ Needs Maintenance
Remarks_____
_____

2. **Surface Water Collection System Pipelines, Valves, Valve Boxes, and Other Appurtenances**
☐ Good condition ☐ Needs Maintenance
Remarks_____
_____

3. **Spare Parts and Equipment** ☐ Readily available ☐ Good condition ☐ Requires upgrade
☐ Needs to be provided
Remarks_____

C. Treatment System √ Applicable ☐N/A

1. **Treatment Train** (Check components that apply)
☐ Metals removal ☐ Oil/water separation ☐ Bioremediation
√ Air stripping √ Carbon adsorbers
☐ Filters_____
√ Additive (*e.g.*, chelation agent, flocculent)__Chelant for Air Strippers used during peak days to reduce Iron fouling in units, chlorine is added to the discharge of the wells prior to discharging into the distribution system. These systems are operated and maintained by the city, not a part of the RA.
√ Others_____
√ Good condition ☐ Needs Maintenance
√ Sampling ports properly marked and functional
☐ Sampling/maintenance log displayed and up to date
√ Equipment properly identified
√ Quantity of groundwater treated annually __34,843 Acre feet_____
☐ Quantity of surface water treated annually_____
Remarks_The total effective treatment capacity of all treatment facilities is 25,056 gpm, (40,418 Acre feet per year), the target extraction rate is 21,600 gpm (34,843 Acre feet/yr) for all the wells in the Newmark - Muscoy System._____

2. **Electrical Enclosures and Panels** (properly rated and functional)
☐ N/A √ Good condition ☐ Needs Maintenance
Remarks_____

3. **Tanks, Vaults, Storage Vessels**
☐ N/A √ Good condition ☐ Proper secondary containment ☐ Needs Maintenance
Remarks_____

4. **Discharge Structure and Appurtenances**
☐ N/A √ Good condition ☐ Needs Maintenance
Remarks_____

5. **Treatment Building(s)**
☐ N/A √ Good condition (esp. roof and doorways) ☐ Needs repair
√ Chemicals and equipment properly stored
Remarks_____

6. **Monitoring Wells** (pump and treatment remedy)
√ Properly secured/locked √ Functioning ☐ Routinely sampled √ Good condition
☐ All required wells located ☐ Needs Maintenance ☐ N/A
Remarks: Due to the scope of the site and the number of wells, a random subset of monitoring wells in the vicinity of the containment extraction wells were checked. All were found in excellent condition.

D. Monitoring Data	
1.	Monitoring Data √ Is routinely submitted on time √ Is of acceptable quality
2.	Monitoring data suggests: √ Groundwater plume is effectively contained ☐ Contaminant concentrations are declining Remarks Contaminant concentrations are declining in some locations, but not others.
E. Monitored Natural Attenuation	
1.	**Monitoring Wells** (natural attenuation remedy) √ Properly secured/locked √ Functioning √ Routinely sampled √ Good condition ☐ All required wells located ☐ Needs Maintenance ☐ N/A Remarks: _____

X. OTHER REMEDIES Applicable √ N/A

If there are remedies applied at the site which are not covered above, attach an inspection sheet describing the physical nature and condition of any facility associated with the remedy. An example would be soil vapor extraction.

XI. OVERALL OBSERVATIONS

A. Implementation of the Remedy

Describe issues and observations relating to whether the remedy is effective and functioning as designed. Begin with a brief statement of what the remedy is to accomplish (i.e., to contain contaminant plume, minimize infiltration and gas emission, etc.).

See Five-Year Review Report_____

B. Adequacy of O&M

Describe issues and observations related to the implementation and scope of O&M procedures. In particular, discuss their relationship to the current and long-term protectiveness of the remedy.

See Five-Year Review Report. Overall, Operations and Maintenance practices are quite good at the site.

C.	**Early Indicators of Potential Remedy Problems**
	Describe issues and observations such as unexpected changes in the cost or scope of O&M or a high frequency of unscheduled repairs that suggest that the protectiveness of the remedy may be compromised in the future. See Five-Year Review Report

D.	**Opportunities for Optimization**
	Describe possible opportunities for optimization in monitoring tasks or the operation of the remedy. See Five-Year Review Report, and Remediation System Evaluation Report.

Newmark Superfund Site Five-Year Review
Site Inspection Report

Photographs

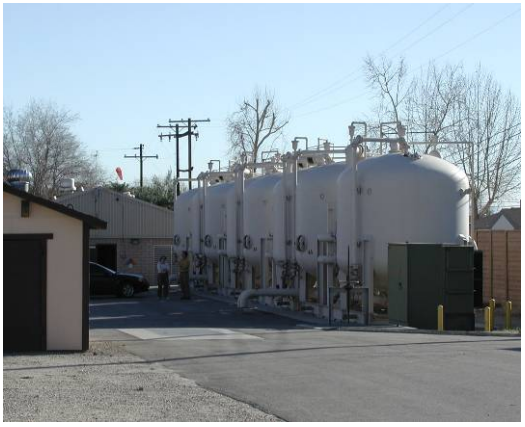
SITE PHOTOGRAPHS

1. 19th Street Booster Station

2. Pressure Sustaining Valve Assembly

3. Typical Pair of 30,000# GAC Vessels 19th Street Water Treatment Plant

4. 30,000# GAC Vessels 19th Street Water Treatment Plant



5. Existing 20K# GAC Vessels at the 19th Street Plant

6. Example of Muscoy OU Facade Home

7. Example of Muscoy OU Facade Home

8. Well present behind Façade home

9. Wells EW 108 and 108S Muscoy OU

10. Waterman GAC Units

11. Waterman GAC Vessels

12. Waterman Typical GAC Unit Sampling Points

13. Newmark Plant from top of Reservoir

14. Newmark Air Strippers

15. GAC Units at Newmark Plant (North)

16. Booster Station Newmark North

17. Repair to EW-EPA-6

18. 17th Street Treatment Plant

19. 17th Street Booster Station and Clearwell

20. Typical Marker

US Environmental Protection Agency

Appendix F
Technical Interviews Report
for
Newmark Superfund Site
San Bernardino, California

Prepared by: US Army Corps of Engineers
Environmental and Munitions Center of Expertise
Omaha, Nebraska

Prepared for: US Environmental Protection Agency, Region 9,
San Francisco, California

September 2008

INTERVIEW DOCUMENTATION FORM			
The following is a list of individuals interviewed for the technical evaluation performed for this five-year review. See the attached contact records for a detailed summary of the interviews. Interviews were conducted by Dave Becker and Lindsey Lien of the US Army Corps of Engineers, Environmental and Munitions Center of Expertise.			
Name	**Title/Position**	**Organization**	**Date**
1. Alice Campbell Greg Holmes	Hydrogeologist Hydrogeologist	California Department of Toxic Substance Control	02/14/08
2. Tom Perina	Hydrogeologist	CH2M-Hill	03/05/08
3. Kamron Saremi	Engineer	Santa Ana Regional Water Quality Control Board	03/06/08
4. Sean McCarthy Jaydeb Das	District Engineer Engineer	California Department of Public Health	03/18/08
5. Chris Lichens	EPA RPM for Source Area Operable Unit	USEPA	03/24/08
6. In addition to the individuals listed above, the following representatives of the City of San Bernardino were interviewed during the course of the Site Inspection (see Appendix E): Michael Garland, Terry Tonn, Constantine Arrieta, Valerie Housel, and Jennifer Bell.			

INTERVIEW RECORD

Site Name: Newmark	**EPA ID No.:** CAD981434517	
Subject: 5-Year Review	**Time:**	**Date:** 02/14/08
Type: ☐ Telephone ☑ Visit ☐ Other **Location of Visit:**	☐ Incoming ☐ Outgoing	

Contact Made By:

Name: Dave Becker and Lindsey Lien	**Title:** Hydrogeologist Environmental Engineer	**Organization:** USACE

Individual Contacted:

Name: Alice Campbell and Greg Holmes	**Title:** Hydrogeologists	**Organization:** California Department of Toxic Substance Control
Telephone No: 818-551-2130 **Fax No:** **E-Mail Address:** acampbel@dtsc.ca.gov gholmes@dtsc.ca.gov	**Street Address:** California DTSC 1011 N. Grandview Ave. **City, State, Zip:** Glendale, CA 91201	

Summary Of Conversation

1. **What has been the nature and duration of your involvement in the project?**
Greg indicated the Department of Toxic Substance Control (DTSC) had a change in personnel in November, 2007. Alice is now the point of contact. She has received many documents, but has not gone through them all. As such, she may be missing some documents. Alice has met with Mark Eisen of SECOR to discuss the project.

The DTSC will assume control of the project when the work plans, including the combined site Operational Sampling and Analysis Plan is approved by EPA.

2. **Have there been performance, maintenance, or monitoring problems in the past five years that caused you concern about the remedy?**
Alice expressed some concern about the role of faults on the remedy, particularly the role of the Loma Linda fault. She also has some questions regarding the particle tracking methods used to assess system performance, particularly the contouring methods that are used.

DTSC is also concerned about the presence of contamination downgradient of the Muscoy extraction system, including the definition of the extent of that contamination. In particular, they are concerned about the possibility of preferred paths such as buried channels. This underlies their concern regarding the systems ability to capture all contamination.

3. **In your opinion, has the communication between various parties at the site been good?**
They both felt that communication on the project has been quite good since the Consent Decree was signed.

Summary Of Conversation (continued)
4. **Any other topics to discuss?** Neither Greg nor Alice had a chance to visit the treatment facilities. They have no plans to gather split samples during monitoring events. The DTSC would like to receive data in a format that is compatible with tools used by DTSC so they can perform their own analysis and interpretation. They would like both the chemical data and the model data files in a form that would not require special software. They will discuss this with the City's contractor, SECOR.

INTERVIEW RECORD

Site Name: Newmark	**EPA ID No.:** CAD981434517	
Subject: 5-Year Review	**Time:**	**Date:** 03/05/08
Type: ☑ Telephone ☐Visit ☐ Other **Location of Visit:**	☐ Incoming ☐ Outgoing	

Contact Made By:

Name: Dave Becker and Lindsey Lien	**Title:** Hydrogeologist Environmental Engineer	**Organization:** USACE

Individual Contacted:

Name: Tom Perina	**Title:** Hydrogeologist	**Organization:** CH2M-Hill
Telephone No: 951-276-3003 **Fax No:** **E-Mail Address:** tperina@ch2m.com	**Street Address:** 2280 Market St, Ste 200 **City, State, Zip:** Riverside, CA 92501	

Summary Of Conversation

1. **What has been the nature and duration of your involvement in the project?**
Tom has been on the project since late 2002. Initially he was the technical reviewer for the work conducted by URS, particularly for hydrogeology and work on two of the extraction wells. He also oversaw the system design and construction. More recently, in 2006, he became more involved in revising the Operational and Functional (O&F) reports. Currently, he is the project manager for CH2M-Hill and provides technical support to EPA and limited work on report preparation (including the O&F Report) and review of the flow model being developed by SECOR.

2. **In your opinion, how is the ground water extraction remedy currently performing?**
He believes the systems are performing well. The Newmark system is capturing the plume completely. He believes the Muscoy system is likely to completely capture the plume, but there is still some uncertainty. He noted that the Muscoy system is not completely downgradient of the plume. He is not sure if the downgradient contamination is in the capture zone. Some contamination may escape, though at very low concentrations. It is successfully limiting plume migration. The extraction wells went in at the same time as the monitoring wells, so the plume extent was not well known. There is more complex hydrogeology on the Muscoy side than on the Newmark side.

3. **Have there been performance, maintenance, or monitoring problems in the past five years that caused you concern about the remedy?**
Yes, he did have questions. When Muscoy extraction well EW-108 was installed, the hydrogeology was similar to that observed on the Newmark side, but when EW-112 was installed, the hydrogeology was much different. They had to change their conceptual site model for the Muscoy plume. They had a question of adequacy of capture on the eastern side of the Muscoy plume, but this concern was addressed by the recent addition of the shallow extraction well at EW-108. He is concerned about the decline in water levels in the basin, and this may be the result of overdraft of ground water in the basin. This may affect capture in future years, as there are not "steady state" conditions. They have had to change pump settings as a result of the decline in water levels.

Summary Of Conversation (continued)

4. **In your opinion, has the communication between various parties at the site been good?**
He felt the communications had been relatively good. They are waiting for some information from the City. They had to wait a while for data from pumping tests conducted by the City. They needed data from Muni 104 well and well 4B.

5. **What improvements do you see as necessary for the remedy?**
He thinks there may be opportunities to optimize system efficiency through modification to the pumping rates.

6. **What other information are you aware of that we should know about regarding the implementation, operation, or performance of the system?**
He referred us to the Operational and Functional letter.

7. **Are there other people knowledgeable about the site we should talk to?**
He suggested we talk to staff at URS. Adam Harvey was a good resource regarding the 19th St. Treatment Plant, though Adam has left URS. Kit Veldaman or Roger Normanson is now the contacts at URS. We can contact Tom if we had any questions about the plants.

8. **Any other topics to discuss?**
We discussed the ground water model for the Bunker Hill Basin. Tom indicated the model was originally intended to be a water resource management tool, but they saw it also as a system performance tool. Tom is concerned that the model treats the aquifer as confined, when in many places the aquifer is actually unconfined, particularly since the problems of concern represent transient responses. We discussed the run times for the model and the degree of discretization used in the model. We also discussed the adequacy of the model calibration, and Tom suggested that Wes Danskin from the USGS perhaps should be involved with the calibration. Finally, we discussed the role of the Loma Linda fault on flow, particularly near the Muscoy system. The results of testing the responses of monitoring wells on both sides of the fault to pumping on the east side of the fault were encouraging, as it suggests the fault is a barrier to flow. This will enhance the plume capture by the Muscoy system.

INTERVIEW RECORD

Site Name: Newmark	**EPA ID No.:** CAD981434517	
Subject: 5-Year Review	**Time:**	**Date:** 03/06/08
Type: ☑ Telephone ☐Visit ☐ Other **Location of Visit:**	☐ Incoming ☐ Outgoing	

Contact Made By:

Name: Dave Becker and Lindsey Lien	**Title:** Hydrogeologist Environmental Engineer	**Organization:** USACE

Individual Contacted:

Name: Kamron Saremi	**Title:** Engineer	**Organization:** Santa Ana Regional Water Quality Control Board
Telephone No: 951-782-4303 **Fax No:** **E-Mail Address:**	**Street Address:** 3737 Main Street, Suite 500 **City, State, Zip:** Riverside, CA 92501-3348	

Summary Of Conversation

1. **What has been the nature and duration of your involvement in the project?**
Kamron has been with the Regional Board since 1981 as an Environmental Engineer. He has been on the project a very long time as the contact for the Regional Board. He currently monitors the project progress by reviewing the project reports and keeps his management informed. He is mostly concerned with compliance aspects, and does not have much interaction with the Department of Public Health.

2. **In your opinion, how is the ground water extraction remedy currently performing?**
He appreciates the work done by EPA and has respect for the EPA staff. He has come to observe some of the ground water monitoring sampling and sampling during backwashing of carbon vessels. He thought the backwashing was to fluff the carbon. He is satisfied with the procedures used in operations.

3. **Have there been performance, maintenance, or monitoring problems in the past five years that caused you concern about the remedy?**
He indicated he would have to look back at some of the past reports, but does not recall past problems. He thought that the operational staff are very good at their jobs and are very professional. He said that split sampling had not presented any surprises.

4. **In your opinion, has the communication between various parties at the site been good?**
Overall, communication has not been an issue.

5. **What improvements do you see as necessary for the remedy?**
None at this time. He would not be hesitant to contact Kim if he thought of something.

Summary Of Conversation (continued)

6. **What other information are you aware of that we should know about regarding the implementation, operation, or performance of the system?**
He thought some treated water may be transferred from the Bunker Hill Basin to the Rialto/Colton area. He thought that they had been more involved with TCE and perchlorate issues in the Rialto/Colton area.

7. **Are there other people knowledgeable about the site we should talk to?**
He thought we were talking to the appropriate people.

8. **Other topics?**
As for future production well installations that could affect the remedy, the Regional Board defers to the municipal governments, though the Board is willing to consult on the issues.

INTERVIEW RECORD

Site Name: Newmark	**EPA ID No.:** CAD981434517	
Subject: 5-Year Review	**Time:**	**Date:** 03/18/08
Type: ☑ Telephone ☐Visit ☐ Other **Location of Visit:**	☐ Incoming ☐ Outgoing	

Contact Made By:

Name: Dave Becker and Lindsey Lien	**Title:** Hydrogeologist Environmental Engineer	**Organization:** USACE

Individual Contacted:

Name: Sean McCarthy and Jaydeb Das	**Title:** District Engineer Engineer	**Organization:** California Department of Public Health
Telephone No: 909-388-2602 **Fax No:** **E-Mail Address:** sean.mccarthy@cdph.ca.gov jaydeb.das@cdph.ca.gov	**Street Address:** **City, State, Zip:**	

Summary Of Conversation

1. **What has been the nature and duration of your involvement in the project?**
Sean has been on the project for approximately 3 years, largely as the district engineer, and has supervised staff involved in project oversight. Jay has just recently been assigned to the project. Sean felt they are well informed on the project.

2. **In your opinion, how is the ground water extraction and treatment remedy currently performing?**
The treatment systems appear to be working very well, as the effluent has essentially non-detectible levels of contaminants. The extraction wells are showing some decline in extracted water concentrations.

3. **Have there been performance, maintenance, or monitoring problems in the past five years that caused you concern about the remedy, particularly related to discharge into the City's water supply?**
They have no real concerns and have much faith in the San Bernardino Municipal Water Department (SBMWD) staff.

4. **In your opinion, has the communication between various parties at the site been good?**
They have a good relationship with the SBMWD and communicate with them. This is obviously important. They communicate with EPA as needed. They have less frequent contact with the California Department of Toxic Substances Control.

5. **What improvements do you see as necessary for the remedy?**
None, the project team should continue to do what they have been doing. The DPH and the City of San Bernardino are looking at new municipal production wells on the east side of the Newmark extraction system. (Kim Hoang clarified this is not related to the EPA extraction system and is more related to basin-wide water management issues. Treatment for the wells would be provided if needed.)

Summary Of Conversation (continued)
6. **What other information are you aware of that we should know about regarding the implementation, operation, or performance of the system?** None. 7. **Are there other people knowledgeable about the site we should talk to?** He thought we should perhaps contact the San Bernardino Water Conservation District, the entity responsible for oversight of recharging ground water. 8. **Other topics?** None.

INTERVIEW RECORD

Site Name: Newmark	**EPA ID No.:** CAD981434517	
Subject: 5-Year Review	**Time:**	**Date:** 03/24/08
Type: ☑ Telephone ☐Visit ☐ Other **Location of Visit:**	☐ Incoming ☐ Outgoing	

Contact Made By:

Name: Dave Becker and Lindsey Lien	**Title:** Hydrogeologist Environmental Engineer	**Organization:** USACE

Individual Contacted:

Name: Chris Lichens	**Title:** EPA RPM for Source Area Operable Unit	**Organization:** USEPA
Telephone No: 415-972-3149 **Fax No:** **E-Mail Address:** Lichens.Christopher@epa.gov	**Street Address:** US EPA Region 9 75 Hawthorne St., SFD-7-4 **City, State, Zip:** San Francisco, CA 94105	

Summary Of Conversation

1. **What has been the nature and duration of your involvement in the project?**
Chris has been the RPM for the Source OU since July 2003. He has not had much involvement in the Newmark or Muscoy OU remedies.

2. **In your opinion, how is the remedy currently performing?**
His general impression is that it is performing adequately.

3. **Do you have any concerns regarding exposures to site contaminants, particularly in the Source Area?**
The only possible concern was the potential for vapor intrusion, but the low concentrations and significant depth to ground water suggests this should not be a problem. He noted there are no residences with wells in the Source OU area.

4. **What are the current plans for the Source Operable Unit at the Newmark Site (e.g., further characterization, remediation)? Are there any recent developments?**
He is struggling with the question of what additional characterization is needed in the Source OU, and they are not sure what the future plans are. There are no plans for remediation.

5. **In your opinion, has the communication between various parties at the site been good?**
He has had good discussions with Kim Hoang and with his contractor URS (a subcontractor to CH2M-Hill).

6. **What improvements do you see as necessary for the remedy?**
He thought perhaps some additional actions will be needed (for the Source Area), but he couldn't say what they might be.

Summary Of Conversation (continued)
7. **What other information are you aware of that we should know about regarding the implementation, operation, or performance of the system?** There is a soil gas report prepared by URS that could be accessed from the Records Center. URS is working on a data summary report that will be completed later this year. 8. **Are there other people knowledgeable about the site we should talk to?** He said Kim Hoang is the best source. 9. **Other topics?** None.

US Environmental Protection Agency

Appendix G
Community Interviews Report
for
Newmark Superfund Site
San Bernardino, California

Prepared by: **US Environmental Protection Agency, Region 9, San Francisco, California**

September 2008

Community Involvement

EPA conducted four community interviews (for interview summaries, see below). Interviewees were asked to participate based on their role in the community or location relative to the Newmark Superfund Site. Interviewees included the local pastor and three residents living near the Newmark site. **No interviewees voiced complaints with the cleanup processes, activities, or administration. Overall feedback was very positive.**

INTERVIEW DOCUMENTATION FORM

The following is a list of individuals interviewed for the community involvement portion of this five-year review. See the attached contact records for a detailed summary of the interviews. Interviews were conducted by Mr. Luis Garcia-Bakarich, Community Involvement Coordinator, EPA Region 9 and Ms. Jen Blonn, Superfund Intern, EPA Region 9.

Name	Title/Position	Organization	Date
1. Angel Valenpuela	Resident	----------	03/31/08
2. David Kalke	Pastor	Central City Lutheran Mission	03/31/08
3. Joe Ortega	Resident	----------	03/31/08
4. Rosie M. Merthie	Resident	----------	03/31/08

EPA staff asked each interviewee the following six questions:

1. What is your overall impression of the project? (general sentiment)
2. What effects have site operations had on the surrounding community?
3. Are you aware of any community concerns regarding the site or its operation and administration? If so, please give details.
4. Are you aware of any events, incidents, or activities at the site such as vandalism, trespassing, or emergency responses from local authorities? If so, please give details.
5. Do you feel well informed about the site's activities and progress?
6. Do you have any comments, suggestions, or recommendations regarding the site's management or operation?

INTERVIEW RECORD

Site Name: Newmark	**EPA ID No.:**	
Subject: 5-Year Review	**Time:**	**Date:** 03/31/08
Type: ☐ Telephone ☒Visit ☐ Other **Location of Visit:** San Bernardino, CA	☐ Incoming ☐ Outgoing	

Contact Made By:

Name: Luis Garcia-Bakarich	**Title:** Community Involvement Coordinator, U.S. EPA	**Organization:** US EPA, Region 9

Individual Contacted:

Name: Angel Valenpuela	**Title:** Resident	**Organization:**
Telephone No: **Fax No:** **E-Mail Address:**	**Street Address:** 1318 Gartier **City, State, Zip:** San Bernardino, CA, 92404	

Summary Of Conversation

1. Believes it looks better than the original house. However, it can be noisy and loud twice a week.
2. Stated that it could be potentially discouraging for new residents. The street is blocked a lot due to the frequent presence of the water department. Despite these effects, considers it good for the water overall.
3. Aware of periodic flooding of a neighbor's yard.
4. Broken window.
5. They have received two updates about water sampling.
6. No.

INTERVIEW RECORD

Site Name: Newmark	**EPA ID No.:**	
Subject: 5-Year Review	**Time:** 4:30PM	**Date:** 03/31/08
Type: ☐ Telephone ☒Visit ☐ Other **Location of Visit:** San Bernardino, CA	☐ Incoming ☐ Outgoing	

Contact Made By:

Name: Luis Garcia-Bakarich	**Title:** Community Involvement Coordinator, U.S. EPA	**Organization:** US EPA, Region 9

Individual Contacted:

Name: David Kalke	**Title:** Pastor	**Organization:** Central City Lutheran Mission
Telephone No: (909)381-6921 **Fax No:** **E-Mail Address:**	**Street Address:** 1354 N. G St. **City, State, Zip:** San Bernardino, CA, 92405	

Summary Of Conversation

1. 2 phases: children's play area is a place for people to sit; the green space changes the image of government. Sees it as a good thing that it was set up close to the school.
   Important: sub station?
2. Most people don't understand what the pumps are all about. The community has the benefit of mixed use
3. Not aware of any concerns. People tend not to be that aware of the operation.
4. Park area provides a place for the homeless to await the opening of other programs. The police have a problem.
5. No, not at all but maybe it's not important now. He was very involved during the planning.
6. No.

INTERVIEW RECORD

Site Name: Newmark	**EPA ID No.:**	
Subject: 5-Year Review	**Time:** 5:00PM	**Date:** 03/31/08
Type: ☐ Telephone ☒Visit ☐ Other **Location of Visit:** San Bernardino, CA	☐ Incoming ☐ Outgoing	

Contact Made By:

Name: Luis Garcia-Bakarich	**Title:** Community Involvement Coordinator, U.S. EPA	**Organization:** US EPA, Region 9

Individual Contacted:

Name: Joe Ortega	**Title:** Resident	**Organization:**
Telephone No: **Fax No:** **E-Mail Address:**	**Street Address:** 14132 W. 14th St. **City, State, Zip:** San Bernardino, CA, 92411	

Summary Of Conversation

1. It's fantastic, but needs a cleaner way to do it— trucks shouldn't produce smog and diesel exhaust.
2. Not that much. The city keeps the property well maintained.
3. No.
4. Nobody jumps the fence to mess with it. When there are problems, Mr. Ortega has a phone number and he gets good response. Open fence discourages vandalism, etc. Well lit at night.
5. Not since it was built.
6. No, it is well taken care of.

INTERVIEW RECORD

Site Name: Newmark	**EPA ID No.:**	
Subject: 5-Year Review	**Time:** 6:30PM	**Date:** 03/31/08
Type: ☐ Telephone ☒Visit ☐ Other **Location of Visit:** San Bernardino, CA	☐ Incoming ☐ Outgoing	

Contact Made By:

Name: Luis Garcia-Bakarich	**Title:** Community Involvement Coordinator, U.S. EPA	**Organization:** US EPA, Region 9

Individual Contacted:

Name: Rosie M. Merthie	**Title:** Resident	**Organization:**
Telephone No: (909)889-8449 **Fax No:** **E-Mail Address:**	**Street Address:** 1587 W. Virginia St. **City, State, Zip:** San Bernardino, CA, 92411	

Summary Of Conversation

1. "Before or after?" Doesn't approve of the development.
2. Used to be more united when sharing information. People tend to take their issues to the water department. There were concerns about property values.
3. No concerns. The neighbors have not been talking.
4. No incidents.
5. Gets some literature every now and then.
6. Maintenance has been good. Try to make the houses more similar to the actual houses.