FINAL

Second Five-Year Review Report
For
McColl Superfund Site
Fullerton, Orange County, California

Prepared by: US Army Corps of Engineers, Seattle District
Seattle, Washington

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

September 25, 2007

[This page intentionally left blank]

Five-Year Review Report

Second Five-Year Review Report
For
McColl Superfund Site
City of Fullerton
Orange County, California

September 14, 2007

PREPARED BY:

United States Army Corps of Engineers (USACE) Seattle District, Washington
With technical assistance provided by USACE Los Angeles, CA and Omaha, NE Districts

PREPARED FOR:

United Stated Environmental Protection Agency (USEPA)
Region 9
San Francisco, California

Approved by:

Kathleen Salyer
Chief, Site Clean-up Branch, Superfund Division
USEPA, Region 9

Date: 9/25/07

[This page intentionally left blank]

Table of Contents

Table of Contents, Continued

Tables *(located within body of text)*

Figures *(located after end of text)*

Attachments *(located after end of text)*

List of Acronyms

ARAR	Applicable or Relevant and Appropriate Requirement
BRA	Baseline Risk Assessment
btoc	Below Top of Casing
CA	California
CALEPA	California Environmental Protection Agency
CD	Consent Decree
CFR	Code of Federal Regulations
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
COC	Contaminant of Concern
COPC	Contaminant of Potential Concern
CX	Center of Expertise
DO	Dissolved Oxygen
DOI	Department of the Interior
DTSC	Department of Toxic Substances Control
EPA	United States Environmental Protection Agency
CFR	Code of Federal Regulations
ESD	Explanation of Significant Difference
FS	Feasibility Study
ft	Foot/Feet
FYR	Five-Year Review
GAC	Granular Activated Carbon
GCTS	Gas Collection and Treatment System
HTRW	Hazardous, Toxic, and Radioactive Waste
IAG	Interagency Agreement
IC	Institutional Control
MCL	Maximum Contaminant Level
mg/l	Milligrams Per Liter
MSG	The McColl Site Group of Oil Companies
msl	Mean Sea Level
N	No
NCP	National (Oil and Hazardous Substances Pollution) Contingency Plan
ND	Non-Detect
NE	Nebraska
NPL	National Priorities List
O&M	Operations and Maintenance
OCWD	Orange County Water District
OM&M	Operations, Maintenance, and Monitoring
OSWER	Office of Solid Waste and Emergency Response
OU	Operable Unit
PAH	Polycyclic Aromatic Hydrocarbon
PDT	Project Delivery Team
ppm	Parts per Million
PRG	Preliminary Remediation Goal
PRP	Potentially Responsible Party
psi	Pounds per Square Inch
QC	Quality Control

List of Acronyms, Continued

RA	Remedial Action
RAO	Remedial Action Objective
RCRA	Resource Conservation and Recovery Act
RD	Remedial Design
RI	Remedial Investigation
ROD	Record of Decision
SARA	Superfund Amendment Reauthorization Act
SDWA	Safe Drinking Water Act
SVOC	Semi-Volatile Organic Compound
TBC	To Be Considered
THT	Tetrahydrothiophene
TT	Treatment Technique
ug/l	Micrograms Per Liter
US	United States
USACE	United States Army Corps of Engineers
USEPA	United States Environmental Protection Agency
VOC	Volatile Organic Compound
WA	Washington
Y	Yes

Executive Summary

The U.S. Environmental Protection Agency, Region 9 has conducted the second five-year review (FYR) of the McColl Superfund Site in Fullerton, California. The purpose of this review is to determine whether the remedial actions 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 Record of Decision, 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 completion of the first FYR report on September 30, 2002.

From 1942-1946 the 22 acres composing what was to become the McColl Superfund Site, including 12 unlined sumps, was a location used as a disposal area for an estimated 72,600 cubic yards of low-pH petroleum refinery waste. Over time some of the waste constituents leached from the sumps into underlying perched groundwater and have been transported in the dissolved phase hydraulically downgradient. The site was divided into two units referred to as the source and groundwater operable units. The principal contaminants of concern are benzene, tetrahydrothiophenes, and metals.

The source operable unit Record of Decision was signed in 1993. The selected remedial action for the source operable unit principally consisted of an isolation strategy including construction of a multi layer cap over the untreated sumps with an integrated gas collection and treatment system, construction of vertical cut-off slurry walls around the sumps to prevent migration of water into the waste and outward migration of water soluble and gaseous contaminants, stabilization of steep slopes with retaining walls, and monitoring of groundwater further detailed in the groundwater remedy. Operation and maintenance of the cap, cut-off slurry wall, and site security would be required in perpetuity at the site.

The groundwater operable unit Record of Decision was signed in 1996. The selected remedial action for the groundwater operable unit consisted of measures to reduce surface water infiltration, including: redirection of surface water off the site; grading of areas adjacent to the containment system; and lining of on site drainage channels with low permeability materials. The groundwater remedy stipulated continuing groundwater monitoring; with implementation of institutional controls should certain criteria pertaining to tetrahydrothiophenes be exceeded. An Explanation of Significant Difference signed in 2005 changed the trigger chemical from tetrahydrothiophenes to benzene.

In support of this FYR, a site inspection took place on May 15, 2007. The current operations, maintenance, and monitoring (OM&M) contractor was present during the site inspection, as was a representative of the McColl Site Group, and the USEPA Remedial Project Manager. The five-year review was advertised in local newspapers to solicit public input. The following issues were noted during the inspection and

subsequent report and data review: (1) minor maintenance concerns of the remedy including stressed/bare vegetation, tree root growth, surface drainage and sediment accumulation in the drainage ditches, and well security; and (2) continuation of detailed annual OM&M report oversight and data evaluation, with emphasis on groundwater hydraulic and geochemical evaluation.

The overall remedy for both source and groundwater operable units is considered protective in the short-term of human health and the environment since there is no evidence of currently complete exposure pathways to contaminated soils and groundwater. The remedy is expected to continue to be protective for the foreseeable future.

Five-Year Review Summary Form

SITE IDENTIFICATION		
Site name *(from WasteLAN)*: McColl		
EPA ID *(from WasteLAN)*: CAD980498695		
Region: 09	**State: CA**	**City/County: Fullerton/Orange**
SITE STATUS		
NPL status: GFinal GDeleted GOther (specify)		
Remediation status (choose all that apply): GUnder Construction GOperating GComplete		
Multiple OUs?* GYES GNO	**Construction completion date:** 06 / 30 / 1998	
Has site been put into reuse? GYES GNO		
REVIEW STATUS		
Lead agency: GEPA GState GTribe GOther Federal Agency _____		
Author name: Rusty Harris-Bishop		
Author title: Remedial Project Manager	**Author affiliation: EPA Region 9**	
Review period:** 10 / 01 / 2002 to 09 / 30 / 2007		
Date(s) of site inspection: 05 / 15 / 2007		
Type of review: GPost-SARA GPre-SARA GNPL-Removal only GNon-NPL Remedial Action Site GNPL State/Tribe-lead GRegional Discretion		
Review number: G1 (first) G2 (second) G3 (third) GOther (specify) _____		
Triggering action: GActual RA Onsite Construction at OU #___ GActual RA Start at OU#____ GConstruction Completion GPrevious Five-Year Review Report GOther (specify)		
Triggering action date *(from WasteLAN)*: 09 / 30 / 2002		
Due date *(five years after triggering action date)*: 09 / 30 / 2007		

* ["OU" refers to operable unit.]

** [Review period should correspond to the actual start and end dates of the Five-Year Review in WasteLAN.]

Five-Year Review Summary Form, Continued.

Issues: *(for further detail see Section VIII of the report)*

1. Operation, maintenance, and monitoring annual report data evaluation and review.
2. Minor deficiencies in operation and maintenance of remedy such as stressed vegetation, unlocked monitoring well, tree root growth, cracking in v-ditch joint sealant.

Recommendations and Follow-up Actions: *(for further detail see Section IX of the report)*

1. Operation, maintenance, and monitoring report data evaluation and review should be more thorough to better evaluate patterns in hydraulic and geochemical data, and to determine if any wells screening the off site D zone exist hydraulically downgradient from the site.
2. Continue to address deficiencies in operation and maintenance of remedy in a timely manner to prevent them from leading to greater problems.

Protectiveness Statement(s): *(for further detail see Section X of the report)*

The overall remedy at the McColl Superfund Site for both source and groundwater operable units is protective of human health and the environment, and exposure pathways that could result in unacceptable risks are being controlled. The remedy is expected to continue to be protective for the foreseeable future.

Other Comments:

None.

McColl Superfund Site
Fullerton, Orange County, California
Second Five-Year Review Report

I. Introduction

This is the second site-wide Five-Year Review report of Remedial Actions for the McColl Superfund Site located in Fullerton, Orange County, California. The site was divided into two Operable Units (OU): the source OU and the groundwater OU. The remedial action implemented for the source OU, a disposal site for refinery wastes, included a Resource Conservation and Recovery Act (RCRA) equivalent engineered cap, vertical cut-off wall, and gas collection and treatment system, with institutional controls. The remedial action implemented for the groundwater OU was monitoring and engineering controls to reduce surface water infiltration, with a provision for institutional controls.

The purpose of a Five-Year Review (FYR) report is to determine whether the remedy at a Superfund site continues to be protective of human health and the environment. The methods, findings, and conclusions of reviews are documented in the FYR reports. In addition, FYR reports identify issues found during the review, if any, and identify recommendations to address those issues.

The United States Environmental Protection Agency (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 a 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 Code of Federal Regulations (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 FYRs 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 action implemented at the McColl Site, located at 2650 Rosecrans Avenue, Fullerton, CA. This review was conducted by the U.S. Army Corps of Engineers (USACE), on behalf of EPA, between May and September 2007. The USACE project delivery team (PDT), consisting of technical experts from Seattle, Los Angeles, and Omaha Districts, prepared this FYR through an Interagency Agreement (IAG) between EPA Headquarters and USACE.

This second FYR report is a statutory review, following five years after the completion of the first FYR report signed September 30, 2002. This statutory review is required because the remedial action was a post-SARA action that left hazardous substances on site above levels that allow for unlimited use and unrestricted exposure. The first FYR report was triggered by the beginning of site remedial construction activities on March 31, 1997 The first FYR report (EPA 2002) is the primary source of information presented in Sections II (Site Chronology, up to 2002), III (Background), and IV (Remedial Actions) of this report.

II. Site Chronology

The following table summarizes, in chronological order, the major milestones or notable events for the McColl Site.

Table 1 – Chronology of Site Events

Event	Date
Disposal of petroleum waste at the site	1942-1946
Adjacent Los Coyotes Country Club constructed	Late 1950s
Adjacent residential neighborhoods initially developed	1960s
First odor and health complaints from residents	1978
Public hearing on site held by CA DTSC	1980
Site listed on federal Superfund NPL	1982
EPA and CA/DTSC proposal to excavate and dispose waste off site is blocked in State court	1984
McColl Action Group (community organization) active	1985-1991
EPA concludes preparation of FS, proposes waste incineration, but field testing fails	1989
Fullerton Hills Community Association active	1991-1997
EPA concludes FS revisions, proposes waste solidification	1992
Source OU Record of Decision is signed; includes contingency remedy of RCRA-equivalent cap	1993
When waste solidification pilot fails, EPA decides to implement contingency remedy	1995
The McColl Site Group oil companies conduct the site groundwater RI/FS	1993-1996
Groundwater OU Record of Decision is signed; includes further measures to reduce surface water infiltration and groundwater monitoring	1996
On site construction begins, and triggers FYR process	3/31/1997
Final inspection of remedial action	11/13/1997
Issuance of Preliminary Close Out Report	6/30/1998
New holes (over site) of Los Coyotes golf course open	1998
Issuance of first 5-Year Review Report	9/30/2002
Issuance of Explanation of Significant Differences revising groundwater remedy	9/1/2005
Issuance of second 5-Year Review Report due	2007

III. Background

From 1942-1946 the 22 acres composing what was to become the McColl Superfund Site was a disposal area for petroleum refinery waste. During that period, twelve unlined pits or sumps were dug and filled with an estimated total of 72,600 cubic yards of waste. At the time the waste pits were created, the local area was sparsely populated. Refinery operations took place on land located to the north and northwest of the site. Subsequently, the Los Coyotes golf course - then later, residences - were built on adjacent land and eventually the golf course expanded to include the closed site. Over time some of the waste constituents leached from the sumps into underlying perched groundwater and have been transported in the dissolved phase hydraulically downgradient from the sumps. The principal contaminants of concern (COC) are: benzene, tetrahydrothiophenes (THTs), and metals.

Physical Characteristics

The McColl Superfund Site is located in the City of Fullerton, Orange County, California (Figure 1). The site is fenced and is currently located entirely within the boundaries of the Los Coyotes Country Club. Surface use of the site consists of in-bounds and out-of-bounds areas of the Lake Nine portion of the country club's 27 hole golf course (Figure 2). Because of its incorporation into a golf course, the site is predominantly grass-covered and ornamentally landscaped; the grass is regularly watered and mowed. The northeast corner of the site is located at the intersection of Rosecrans Boulevard and Sunny Ridge Drive. The terrain at the site slopes gently from the northeast to southwest, with a maximum relief of approximately 70 feet. The golf course and surrounding residential areas have altered the natural topography; the site generally lies at the lower southern face of the east-west trending Los Coyotes Hills. The climate at the site and surrounding area is Mediterranean, characterized by hot dry summers, and mild winters during which most of the year's rainfall occurs.

The local air quality district is the State of California's South Coast Air Quality Management District. The air district regulates various emission sources throughout the south coast region, which incorporates the Los Angeles basin and surrounding areas. During the development of the Source Operable Unit remedy, EPA consulted with the district on the substantive requirements of regulations pertaining to air emissions. This information is pertinent to the operation of the site gas collection vapor treatment system, which discharges collected landfill gases to the atmosphere following treatment with granular activated carbon. The pertinent emissions criteria for the site treatment system is a limitation such that emissions do not create a nuisance or an excess cancer risk above ten in a million at the nearest site boundary.

Surface water drainage from the 22 acres is facilitated through engineered features, including the contoured vegetated multi-layer cover system, concrete-lined v-ditches, and detention ponds. Since the waste materials are isolated beneath the cover system over which surface water drains, the surface water does not contact any site contaminants. Water which infiltrates the more-permeable upper portion of the cover system does not penetrate the impervious portion but is collected through a system of subsurface drains which channel back to the surface at the low points in the cover system. There is one surface water drainage pathway originating off site and traversing the northwest corner of the site. This surface water drainage originates on land located directly to the north of the site across Rosecrans Boulevard and predominantly west of a new fire station constructed across Rosecrans Boulevard from the site. Flow is routed into a geosynthetic-lined retention pond located on the Lake Nine portion of the golf course. The retention pond is designed to detain 100 year peak flows, and overflows through a culvert into a swale which traverses the course and enters another detention pond downstream.

Consolidated Quaternary alluvial deposits underlie major portions of Orange County, California, including the McColl Superfund Site. Regional hydrologic units consist of

three distinct formations: the La Habra Formation; the Coyote Hills Formation; and the San Pedro Formation. The La Habra formation is nearest to the surface at the site, and is an Upper Pleistocene deposit of relatively fine-grained material laid in a non-marine and floodplain environment. It consists of semi-perched aquifers of limited extent. The coarser-grained Coyote Hills formation underlies the La Habra, and is a Lower Pleistocene deposit laid in a non-marine environment. The San Pedro Formation is the deepest of the three, and is an Older Lower Pleistocene deposit consisting of shallow to deep massive sands. The principal aquifer of the Orange County basin occurs at the base of the San Pedro Formation.

Four groundwater-bearing zones at the site have been designated alphabetically from the shallowest to the deepest, A through D. Zones A, B, and C are located within the La Habra Formation. Zone D is located in the Coyote Hills Formation. On site these zones are separated from one another by clay layers which serve as barriers to vertical flow, although the C zone does appear to intersect the regional aquifer at the southern site boundary. The regional aquifer is the Upper San Pedro aquifer, and thus incorporates the lower C and D local groundwater zones. To date only arsenic (at one location) and selenium (at one different location) have been detected in concentrations exceeding the MCLs within the C or D zones. Zones A, B, and C, produce little water. Zone D appears to be capable of producing larger quantities of water.

Two municipal groundwater production wells have been identified within 7,000 feet of the site. The closer of the two is the Coyote 12A Well, located 3,000 feet cross-gradient to the site (toward the east-southeast) at the intersection of Gilbert Street and Pioneer Avenue. The “D” flow unit on site may coincide with the shallowest screened interval of the Coyote 12A Well.

Land and Resource Use

The McColl site is 22 acres, which includes two areas of approximately equal size: the Los Coyotes Sump area; and the Ramparts Sump area. Each of the two areas contained six pits or sumps (Figure 2), for a total of twelve, into which an estimated 72,600 cubic yards of petroleum refinery wastes was deposited.

The majority of the site existed as open and undeveloped space since disposal operations ceased, with the exception of the southwest portion of the Los Coyotes area, over which a portion of the Los Coyotes golf course was constructed in 1960 (this portion of the course was closed in December 1995 pending cleanup of the sump areas under CERCLA).

Based on City of Fullerton land use planning, the area encompassing the site was originally zoned R-1 (single family residential). However, a 1996 consent decree between EPA and McAuley LCX Corporation, the property owner and then- golf course operator, restricted future use of the site. The consent decree excluded excavation, construction, or development of any kind.

Surface use of the site now includes fairway and out-of-bounds areas on the Lake Nine portion of the golf course. The twelve sumps which lie beneath the surface are now covered by a multi-layered cover system. The site also includes perimeter areas which lie outside of the sumps, one portion of which contains a concrete pad and the site gas collection vapor treatment system.

The area immediately west of the site is zoned P-L (public land) and is occupied by the Ralph B. Clark Regional Park. To the north, the site is bordered by Rosecrans Boulevard, across which mixed land use exists, ranging from zoning designations 0-G (oil and gas), P-R-D (planned residential development), and R-3R (restricted multi family residential). Much of this land to the north is currently undeveloped, although a new City of Fullerton fire station has been constructed across Rosecrans Ave. from the site. To the east of the site boundary is land zoned R-l, which is occupied by an existing development (constructed in 1968) of single family homes. The area to the south of the site is taken up by the remainder of the Los Coyotes Country Club golf course, which consists of an additional 18 holes beyond the Lake Nine subsection.

History of Contamination

From 1942 through 1946, approximately 72,600 cubic yards of petroleum waste sludge was disposed into 12 sumps at a 22 acre disposal site owned by Ely McColl in Fullerton, California. During the 1950s and early 1960s, in an attempt to control site odors, three sumps in the Ramparts area were covered with drilling mud. In the late 1950s, six sumps at the lower end of the property were covered with natural fill materials during the construction of the adjacent Los Coyotes Country Club golf course. Additional soil cover was placed over the upper Ramparts sumps in September 1983.

Beginning in the 1960s, residential neighborhoods were developed on property adjacent to the former landfill. The site initially was brought to the attention of regulatory agencies as a result of odor and health complaints received from residents beginning in July 1978 (EPA 2002). The site was formally listed on the Superfund NPL in 1982. Since 1982, various investigative and removal actions were initiated to characterize the nature and extent of source and groundwater contaminants and to minimize or eliminate immediate threats to human health and the environment.

Initial Response

Community concern increased gradually through 1980, and the California Department of Toxic Substances Control (DTSC) organized a public hearing in late 1980 chaired by the Governor's special assistant on Toxic Substances Control. A panel of state agency representatives also participated.

The site was included on the EPA National Priorities List in September 1982. Following investigations conducted by responsible parties, EPA proposed in 1984 to excavate and dispose of the waste. The State of California was designated the lead agency for the site but was later stopped from implementing the plan by a court injunction.

Following the court injunction blocking the state from implementing the excavation, some community members expressed increasing concern over perceived delays in the clean-up process. This concern led to the formation of the McColl Action Group. This neighborhood committee participated actively in decisions related to the site from 1985 through 1991, when the group disbanded. Another community group, the Fullerton Hills Community Association, was formed in 1991 and participated in site-related decisions through the final remedy construction.

EPA undertook additional feasibility studies at the site, and, having assumed the lead in 1989, proposed excavation of the waste and incineration. Following public comment and field testing of the proposed incineration process, EPA reevaluated the alternatives.

In August 1992, EPA published its updated feasibility study, called the Supplemental Reevaluation of Alternatives II, and proposed to solidify the waste. The plan also identified installation of a Resource Conservation and Recovery Act (RCRA) equivalent closure system, or cap, as a contingency remedy in the event that solidifying the material was determined unfeasible.

On September 28, 1995, following extensive testing of solidification, EPA concluded that the technology was not feasible for the site and decided to implement the contingency remedy. The contingency remedy included: (1) constructing a multi layer cap over the untreated sumps with a gas collection and treatment system to prevent infiltration of water and release of hazardous air emissions; (2) building subsurface cut-off slurry walls around the sumps to prevent migration of water into the waste and outward migration of water soluble and gaseous contaminants; (3) stabilizing steep slopes on the site with retaining walls; (4) and monitoring groundwater. Operations and maintenance of the cap and slurry wall, gas collection and treatment system, and site security would be necessary in perpetuity at the site. These requirements are in the Source Record of Decision signed on June 30, 1993.

From September 1993 to April 1996, the responsible parties, known as the McColl Site Group of Oil Companies (MSG), under EPA's oversight, conducted a groundwater investigation. EPA proposed a plan for the groundwater remedy on February 15, 1996. The groundwater remedy required that infiltration of water into the ground be reduced through: (1) redirection of surface water off the site; (2) grading of areas adjacent to the containment system, and (3) lining of on site drainage channels with low permeability materials. EPA's groundwater remedy is in the Groundwater Record of Decision (ROD) signed on May 15, 1996.

Basis for Taking Action

EPA divided the McColl Superfund Site into two operable units: the source OU and the groundwater OU. The source OU addresses the threat posed by the petroleum waste itself. The groundwater OU addresses the threat posed by releases of hazardous substances to groundwater from the petroleum waste. Separate Remedial Investigations and Feasibility Studies were undertaken for the two OUs. The source OU ROD was signed in 1993 and the groundwater OU ROD was signed in 1996.

Source OU:

The following chemicals of potential concern (COPCs) were identified in samples of the petroleum waste and surrounding soil at the site:

Organic COPCs	Inorganic COPCs
Methylene Chloride	Antimony
Benzene	Arsenic
Ethyl benzene	Beryllium
Toluene	Cadmium
Xylenes	Chromium
Acetone	Copper
2-Butanone	Lead
2-Methylnapthalene	Manganese
Napthalene	Mercury
Phenanthrene	Nickel
Bis(2-ethylhexyl)phthalate	Tin
Tetrahydrothiophenes (THTs)	Vanadium
Leachable sulfate	Zinc

In addition, very low pHs (in the range of 2) are associated with the waste, although groundwater downgradient of the site is in the neutral ($6.8 < pH < 9.8$) range.

The exposure pathways of concern evaluated for potential health risks were: 1) inhalation of VOCs emitted from the waste sumps; 2) inhalation of fugitive dust and inorganic compounds generated by wind erosion; 3) incidental ingestion of contaminated soil; 4) ingestion of contaminated garden vegetables; 5) dermal contact with contaminated soil.

Benzene and sulfur dioxide were judged to be the primary chemicals of concern. The possible toxic effects of benzene in humans include leukemia, central nervous system effects, hematological effects, and immune system depression. Benzene is a known human carcinogen. Sulfur dioxide is readily absorbed upon contact with the moist surfaces of the nose and upper respiratory passages. Once inhaled, most of the sulfur dioxide is then transferred into systemic circulation. The major toxic effects include increased airway resistance or other bronchioconstrictive effects. Sulfur dioxide is an odor nuisance.

The Department of the Interior (DOI) prepared a preliminary natural resources survey in 1990 to determine whether any natural resources under the DOI trusteeship would be affected by hazardous substance releases at the site. The conclusions of this survey indicated that wildlife exposure to contaminants from the pits was minimal, and it would be hard to demonstrate if wildlife were contaminated or impacted by wastes prior to capping. It was also determined that a damage assessment to quantify injuries and damages to resources held in trust by the DOI was not needed. Further, the EPA has evaluated the ecological risk at the site and determined no unacceptable ecological risk exists (Attachment 6).

The adult exposure scenario resulted in carcinogenic risks that fell outside of the NCP's acceptable risk range of 1 x 10 (-4) and 1 x 10 (-6), with an excess cancer risk of approximately 1:2,000. The hazard index reading for noncancer risk was highest for adult exposure at a value of 1.8, which exceeds the benchmark level of 1. EPA noted a few limitations to its risk assessment, namely: airborne chemical concentrations resulting from sulfur dioxide and volatile organic chemicals (VOCs) were estimated without consideration of the probable contribution of emissions from active seeps; the potential noncarcinogenic effects of inhalation of fugitive dusts could not be evaluated quantitatively because of the lack of toxicity criteria for inhalation exposure to the COPCs; exposure to seeps via dermal contact and/or incidental ingestion could not be evaluated quantitatively; the surface soil data base was considered to be limited and potentially unrepresentative of the entire site; potential exposure to surface water runoff could not be evaluated quantitatively because surface runoff data representing then current site conditions were not available; and there were no EPA verified reference doses for sulfur dioxide and benzene. Based on the available data, taking the mentioned uncertainties into consideration, EPA concluded that the site may present an imminent and substantial endangerment to public health, welfare, or the environment.

Groundwater OU:

The following COPCs were identified in groundwater at the site:

Organic COPCs			Inorganic COPCs
THIOPHENES:	*VOCs:*	*SVOCs:*	
Tetrahydrothiophene	Acetone	Bis(2-ethylhexyl)phthalate	Aluminum
2-methyltetraydrothiophene	Benzene	Butylbenzylphthalate	Arsenic
3-methyltetrahydrothiophene	2-Butanone	Dimethylphthalate	Barium
	Carbon Disulfide	Di-n-butylphthalate	Beryllium
	Chloroform	Isophorone	Cadmium
	1,2-dichloroethane	2-Methylphenol	Chromium
	Ethyl benzene	Nitrobenzene	Cobalt
	2-hexanone	Phenol	Copper
	Methylene Chloride	Pyrene	Lead
	Toluene		Manganese
	Xylenes		Mercury
			Nickel
			Selenium
			Thallium
			Vanadium
			Zinc

Most of the COPCs were detected only in the perched zones, and at levels below MCLs, with the exception of the following: benzene and 1,2-dichloroethane were found at levels above their respective MCLs and were found in the C zone (which communicates with the regional aquifer system) as well as the perched A and B zones. THTs were also found in the C zone as well as the perched A and B zones. There is no MCL for THTs. Four inorganics have historically exceeded MCLs in the perched zones: arsenic; beryllium; chromium; and manganese.

The Baseline Risk Assessment (BRA) for the Groundwater Operable Unit was completed in November 1995 by ICF. For the purpose of performing risk calculations, single monitoring wells were selected to represent groundwater in the A zone (well P-3S); the C zone (well P-5L); and the D zone (well W-4). Two monitoring wells were selected to represent the B flow unit primarily because different chemical constituents were detected in those two wells (wells P-2I and P-6S).

Of the chemicals identified as COPCs at the site, 11 were considered to be known or suspected human carcinogens: arsenic; benzene; cadmium; beryllium; bis(2-ethylhexyl)phthalate; butylbenzylphthalate; chloroform; 1,2-dichloroethane; isophorone; methylene chloride; and lead.

The exposure assessment determined that groundwater is not currently used as a source of potable water within the site. Water for adjacent communities is supplied by the local water district through a municipal distribution system. Therefore, no complete

exposure pathways exist under current land use scenarios. Potential future use may result in the development of private or municipal supply wells, within the restrictions imposed by local ordinances. Future use scenarios were based on incidental ingestion and dermal absorption of chemicals in groundwater, and inhalation of chemicals released from the groundwater during domestic uses.

Carcinogenic risk associated with the perched zones was calculated at 4 x 10(-3). Carcinogenic risk associated with on site groundwater zones in communication with the regional aquifer system was calculated at 1 x 10(-4). Noncancer risk associated with the perched zones was calculated at a hazard index of 300. Noncancer risk associated with the regional aquifer system on site was calculated at a hazard index of 4.

The BRA recognized that, with the potential exception of D zone monitoring wells, groundwater on site (in perched zones) does not have sufficient yield to support domestic or commercial use, therefore the potential exposure is limited. However, historical detections of THTs in the D zone suggest that transport of site related contamination to the regional aquifer system is possible, although the potential extent was unknown at the time, and is still somewhat unknown. The potential risks associated with THTs could not be assessed quantitatively because of the lack of EPA-verified toxicity criteria.

Based on this information, EPA concluded that the site may present an imminent and substantial endangerment to public health, welfare, or the environment.

IV. Remedial Actions

Remedy Selection

The Source Record of Decision was signed on June 30, 1993. Following extensive testing of solidification, EPA concluded that the technology was not feasible for the site and selected the contingency remedy, a RCRA equivalent closure system. The contingency remedy included: (1) constructing a multi layer cap over the untreated sumps with a gas collection and treatment system to prevent infiltration of water and release of hazardous air emissions; (2) building vertical cut-off slurry walls around the sumps to prevent migration of water into the waste and outward migration of water soluble and gaseous contaminants; (3) stabilizing steep slopes on the site with retaining walls; (4) and monitoring groundwater. Operations and maintenance of the cap and cut-off slurry wall, gas collection and treatment system, and site security would be necessary in perpetuity at the site.

The Groundwater Record of Decision was signed on May 15, 1996. The groundwater remedy required that infiltration of water into the ground be reduced through: redirection of surface water off the site, grading of areas adjacent to the containment system, and

lining of on site drainage channels with low permeability materials. The groundwater remedy stipulated continuing groundwater monitoring, with implementation of institutional controls should certain criteria pertaining to THTs be exceeded.

An Explanation of Significant Difference (ESD) pertaining to the groundwater OU was issued on September 1, 2005. The primary change documented in the ESD was the removal of THTs and replacement with benzene as the trigger chemical for further remedial measures should it be detected above its MCL in any off site, downgradient monitoring well. Specifically, the fifth remedial action objective in the groundwater OU ROD, which stated:

> *Implement institutional controls if the regional aquifer beyond the site boundary is found to contain site-specific contaminants above Maximum Contaminant Levels (MCLs) or, in the case of Tetrahydrothiophenes (THTs), the recommended or revised Preliminary Remediation Goal*.

The fifth groundwater RAO was removed and replaced with the following:

> *Immediately initiate a revised risk assessment should benzene be determined to be present at levels at or above the MCL in one or more of the McColl Superfund Site's off site monitoring wells (specifically in the C and/or D zone as defined in the groundwater OU ROD). Should the revised risk assessment indicate that cancer or noncancer risks fall outside of acceptable exposure levels as defined in the NCP, 40 C.F.R. Section 300.430(e)(2)(i), EPA may require additional remedial measures, including institutional controls.*

As the remedy is currently stated, institutional controls are required for the source OU of the site and may be required for the groundwater OU if benzene is detected above its MCL in any of the hydraulically downgradient wells monitoring C and/or D groundwater zones and if a revised risk assessment concludes risks fall outside of acceptable exposure levels. Figure 2 depicts monitoring well locations and the generalized groundwater flow direction.

Remedial Action Objectives:

Remedial action objectives for the source OU and the groundwater OU are closely linked at this site. In fact, the groundwater OU ROD refers to and incorporates source OU selected response actions. The site Remedial Action Objectives as summarized in the Superfund Closeout Report (EPA, June 1998, *Superfund Closeout Report, McColl Superfund Site*) include:

1) Long-term isolation of waste materials
2) Minimization of infiltration of rain water into waste
3) Control of any gases emitted from the waste
4) Provision of adequate bearing capacity for the end use of the site

Items 1 and 3 above are considered source control response objectives, as they are intended to physically contain waste materials and off-gas in order to prevent human contact. Item 2 is considered a management of migration response objective as it is intended to minimize the potential for development of vertically downward hydraulic gradients within the perched groundwater zones at the site, which could result in migration to and contamination of the regional drinking water aquifer. Item 4 is also a management of migration response objective, as it is intended to prevent breaches of containment, either through direct penetration, or by alteration of the surface so as to increase surface water infiltration to the containment system.

The major components of source control for the two combined OUs are as follows:

- Installation of subsurface cut-off walls
- Installation of an impermeable multi-layer, RCRA-equivalent, cover
- Construction of erosion control and retaining structures
- Construction of a gas collection system and treatment plant

Components of migration management for the two combined OUs are as follows (the source control measures listed above also provide a degree of migration management):

- Installation of drainage structures and grading of surface elevations to minimize surface water infiltration
- Monitoring existing conditions to allow for the development of additional response measures in a timely manner should they be required

With respect to monitoring existing conditions, in the case of the gas collection system, a network of dedicated pressure probes at the site is periodically tested to ensure that there is negative pressure within the sump containment structures relative to the surrounding area. In the case of the groundwater remedy, a network of monitoring wells is periodically tested to assist in determining any trends, specifically whether site related contaminants are decreasing, stable, or increasing, at points beyond the site boundary.

Remedy Implementation

Construction activities, performed by MSG with oversight from EPA, began on July 1996 (with an official on site construction date of March 31, 1997) and were completed in November 1997. These activities included the following:

- Installation of Subsurface Cut-off Walls
- Installation of an Impermeable Cover
- Grading to Facilitate Surface Water Control
- Erosion Control Measures
- Building a Gas Collection & Treatment Plant, and
- Golf Course Restoration Activities.

There are actually two cover systems, one encompassing the Los Coyotes sump area, and the other covering the Ramparts sump area. These systems are identical except for their location, and differences in acreage and elevation. Design criteria for the two systems are identical: a barrier layer with maximum hydraulic conductivity of 1 x 10 (-7) cm/sec; a drainage layer with minimum hydraulic conductivity of 1 x 10 (-2) cm/sec; and a vegetative layer of 24 inch minimum thickness and three to five percent grade.

Prior to cap construction, two vertical cutoff walls, which serve as subsurface barriers, were installed, one each encircling the Ramparts and Los Coyotes sump areas. Each barrier was constructed using a slurry mixture of soil and bentonite clay. The bottom elevation of both walls is above the static elevation of groundwater; hence the cutoff walls were primarily designed for vapor containment and not hydraulic isolation, although prevention of horizontal movement of minor perched water through the wall is a beneficial byproduct of the design. The design criteria for the cutoff walls was a maximum hydraulic conductivity of 1 x 10 (-7) cm/sec.

The gas collection systems installed beneath the Los Coyotes and Ramparts cover systems consist of a series of eight-inch mains and four-inch laterals. Underground vaults allow access to individual laterals for inspection and flow measurement. The Los Coyotes and Ramparts networks are interconnected, and a single blower induces a vacuum to draw the subsurface gases through the above-ground vapor treatment system. The vapor treatment system is located on site at a location due west of Sunny Ridge Drive near its intersection with Rosecrans Ave., and consists of two granular activated carbon (GAC) vessels operated in series. In addition to the coal-based coarse mesh granular activated carbon used to remove benzene and other organics, the vessels also originally included a top bed of sodium hydroxide impregnated carbon to remove sulfur compounds. The design flow rate for the system is 1,500 cubic feet per minute. The gas collection and vapor treatment systems are collectively referred to as the Gas Collection and Treatment System (GCTS).

On November 13, 1997, EPA and the California DTSC conducted a final inspection of the McColl Superfund Site. EPA determined that construction had been completed according to specifications and the remediation had been successfully implemented. In April 1998, EPA approved the Final Remedial Action Report for the McColl Site. On June 30, 1998, EPA signed the Superfund Closeout Report for the site.

Additional components of the remedy beyond physical construction include institutional controls and long term monitoring. Institutional controls have been implemented as part of the source OU remedy. The property owner, McAuley LCX Corporation, in a Consent Decree with the federal government, agreed to no further development of the site property. McAuley LCX agreed to record a deed restriction on the Los Coyotes and Ramparts areas. This deed restriction runs with the land and is binding on any potential future owner of the site. Long term monitoring at the source OU includes observation of pressure probes to ensure a negative pressure exists within the sump containment systems, and surveying of settlement monuments for the purpose of identifying any areas of differential settlement which could affect the integrity of the containment

systems. Long term monitoring at the groundwater OU consists of sampling the existing network of monitoring wells to determine whether migration of site related contaminants is occurring.

The Groundwater ROD specified continued groundwater monitoring to determine whether migration of site related contaminants is taking place off site. For the purposes of monitoring groundwater, there is a network of 20 wells from which hydraulic head and chemistry data may be collected. All wells are located outside of the capped areas as there were to be no perforations of the cap. Most wells are grouped, i.e. they can monitor several of the groundwater zones at one latitude/longitude. The P-2 (P-2S, P-2I, P-2DR), P-3 (P-3S, P-3D), and P-4 (P-4I, P-4D) series wells are located on site at the hydraulically downgradient boundary of the site, within the boundaries of the Los Coyotes Country Club golf course. The P-10 series wells (P-10D, P-10L, P-10XD) and P-9D are the hydraulically downgradient off site wells. Well W-8B and the P-5 series wells (P-5S, P-5I, P-5D, P-5L) are located east of the site on Fairgreen Drive. Well W-6A is located on the downgradient side of the Lower Ramparts area. The W-9 series wells (W-9B and W-9C) and W-10B are located hydraulically upgradient of the site. Figure 2 shows the well locations with respect to the McColl Site.

System Operations, Maintenance, and Monitoring (OM&M)

In 2002 (at the time of the first Five Year Review), O&M activities, with the exception of site security and surface maintenance performed by the golf course operator, were being performed by a team consisting of EPA, the U.S. Army Corps of Engineers, and the Corps' contractor Montgomery Watson Harza (MWH). A transition to O&M by the McColl Site Group and their contractor C2 REM occurred in late September 2002.

The site security and surface maintenance portions of the site are the responsibility of the golf course operator, previously McAuley LCX Corporation, and currently AG Los Coyotes, LLC. When the McColl Site Group drew up the plan for O&M, they negotiated and signed a side agreement with McAuley LCX (one to which the federal government was not a party). Under that settlement agreement, in exchange for an annual payment from the McColl Site Group, McAuley LCX would perform surface maintenance and site security. Surface maintenance obligations included:

1) Regular watering and fertilizing of the site sufficient to maintain green vegetation and to prevent over watering such that erosion occurs.
2) Routine site inspections of irrigation system components.
3) Repair of malfunctioning irrigation components.
4) Maintenance of surface drainage systems to allow normal drainage (maintenance did not include removal of silt from the retention pond).
5) Routine maintenance to the site perimeter fencing to ensure security.
6) Routine repair of surface conditions leading to erosion.
7) Routine removal of all surface vegetation not reflected in the approved design which could result in root growth that may impact the containment system.

8) Routine control of burrowing animals from areas where the containment system exists.

In 2001, EPA was approached by McAuley LCX Corporation and American Golf Corporation, stating McAuley's intention to lease golf course operations to American Golf. EPA considered the request, and agreed under certain conditions, one condition being that American Golf (through AG Los Coyotes LLC) would enter into an agreement with the federal government to perform the surface maintenance obligations previously agreed to between the McColl Site Group and McAuley LCX.

Beyond surface maintenance, O&M procedures are documented in the O&M manual developed by a former MSG contractor (Parsons Environmental Science, October 1997, *Operations and Maintenance Plan at the McColl Superfund Site*).

O&M consists of three categories of tasks: (1) operation and maintenance of the gas collection and treatment system; (2) inspection of the cap and retaining walls, maintenance of ground cover, and site security; and (3) collection of groundwater monitoring data for use in evaluating the groundwater remedy.

From March 2000 through September 2002, O&M was performed by the federal government using funds provided by an Interim Settlement Agreement between the federal government and the McColl Site Group. The total cost of O&M during this 31 month period was $695,000. This averaged out to $22,400 per month, or $269,000 per year.

O&M reverted back to the McColl Site Group in September 2002 and has continued to the present date. O&M cost information was requested by the USACE on behalf of EPA from the McColl Site Group environmental contractor C2 REM during the May 15, 2007 site inspection and in a follow-up request; however, C2 REM indicated their client group does not share this information. The O&M Site Manager for the MSG environmental contractor did indicate, however, that all activities have been conducted within the allotted budgetary constraints. The following table shows available OM&M cost data:

Table 2 – Available Annual System Operation and Maintenance Costs

O&M Period	Total Period Cost
November 13, 1997 – March 8, 2000	Data not available to EPA
March 9, 2000 – September 26, 2002	$695,000
September 27, 2002 – September 30, 2007	Data not available to EPA

The ROD cost estimates for annual O&M were as follows:

- SOURCE OU $828,000 (1990 dollars [EPA 1993])
- GROUNDWATER OU $146,000 (ROD date l996 [EPA 1996])
- TOTAL, BOTH OUs $974,000 (not normalized or adjusted for inflation)

Comparing actual annualized O&M costs over the most recent 31 months ($269,000/yr) to the ROD O&M cost estimate ($974,000), it can be seen that significant cost savings appear to have been achieved. In fact, actual costs for that period ran at only 28% of estimated costs, although minor reductions to the OM&M scope have been realized (i.e., reduction in analytical sampling strategy, reduced operating costs associated with passive-active mode of GCTS). Because of the downsizing of scope, a direct comparison between the original cost estimate and recent data are not entirely appropriate.

V. Progress Since the Last Five-Year Review

This report documents the second five-year review period for the site which encompasses the time period of October 2002 to September 2007. Therefore, progress is measured in comparison to the site status as of the first Five Year Review signed in September 2002.

Protectiveness statement(s) from the last FYR

> *All immediate threats at the site have been addressed, and the remedy is expected to continue to be protective of human health and the environment for the foreseeable future. The 100 year design life of the containment system continues to ensure the long-term protectiveness of the remedial action. Within the intervening five years between this Review and the next scheduled review, groundwater monitoring will continue as a safeguard to determine whether migration of site related contaminants toward drinking water aquifers is taking place. No water supply wells are currently impacted by site-related contamination, nor are they likely to be impacted during the next Review period, given the low concentrations of THTs detected in off site monitoring wells, and given the inconclusiveness of the data with respect to their movement over the past five years.*

Status of recommendations and follow-up actions from last review

Four recommendations were made in Section IX (Recommendations and Follow-up Actions) of the first Five-Year Review. These included (1) drafting and implementation of a compliance monitoring program (specifically pertaining to lack of consistent off gas monitoring), (2) maintain consistency in parties conducting O&M, (3) continued groundwater monitoring and addressing how to handle off site groundwater exceedances (potential triggering of groundwater ICs), and (4) further evaluation of surface water drainage patterns on site. These items were addressed as shown in the following table.

Table 3 – Follow-Up to 2002 FYR Recommendations

ISSUE/ ACTION	LEAD ENTITY	PROPOSED SCHEDULE	ACTION TAKEN (Y/N)
1. No Consistent Off-gas Monitoring			
Review regulatory criteria	EPA/Oil Companies	Jan 2003	Yes
Review toxicity data and exposure assumptions	EPA/Oil Companies	Jan 2003	Yes
Review existing monitoring program for adequacy	EPA/Oil Companies	Jan 2003	Yes
Make changes to monitoring program as appropriate	EPA/Oil Companies	Jul 2003	Yes
2. Changes in Parties Conducting O&M			
Survey stakeholders	EPA	Jan 2003	Yes
Assemble stakeholder team	EPA	Apr 2003	Yes
Convene team and establish ground rules of operation	EPA	Jul 2004	Yes
3. Potential Triggering of Groundwater Institutional Controls			
Refer issue to stakeholder team to develop work plan	EPA	Sep 2004	Yes
Work plan developed	Stakeholder team chair	Nov 2004	Yes
Work plan tasks assigned to staff and/or consultants	Stakeholder team chair	Jan 2005	Yes
Findings/recommendations issued	Staff of and/or consultants to stakeholder team	Jul 2005	Yes
Possible ESD or other decision document drafted	EPA	Sep 2005	Yes, ESD issued Sep 2005
4. Surface Water Drainage Patterns w/ Potential to Impact Water Quality			
Review existing monitoring plan for adequacy	EPA/Oil companies	Jan 2003	Yes
Make changes to monitoring plan as appropriate	EPA/Oil companies	Jul 2003	Yes

The following items of progress are noted since October 2002:

- Continued O&M of remedy and site controls, including gas collection and treatment system performance optimization (GAC change out protocol established, air monitoring regime established, concrete footing repaired, inclusion of passive operation of system to reduce downtime and operational costs), v-ditch settlement and joint repairs, settlement assessment and findings of no significant settlement
- Excavation of north storm water detention pond (by golf course) to add sedimentation capacity to extend life of pond.
- Continued groundwater monitoring, although reduced frequency and quantity of wells sampled and change in sample methodology from traditional 3-well-volume purge to low-flow.

- ESD finalized for groundwater in September 2005 in which review found that the chemical class of compounds known as Tetrahydrothiophenes (THTs) no longer adequately predicts the movement of groundwater contamination at the site, as was presumed in the groundwater ROD. ESD selected benzene to replace THTs as new chemical for predicting groundwater contaminant movement. To date no benzene has been detected in the monitoring wells farthest hydraulically downgradient from the source area, which include the P-10D, P-10L, and P-10XD grouping about 1,000 feet from the edge of the Los Coyotes parcels.
- Generally non-detect or low concentrations of COCs in groundwater except at well P-2I, where a Mann-Kendall test for trend showed stable (no trend at the 90% confidence level; sample size of six points) levels of benzene, arsenic, and beryllium.

VI. Five-Year Review Process

Administrative Components

Members of the McColl Site Group (PRPs) and the California DTSC were notified of the initiation of the five-year review. The McColl Five-Year Review team was led by Rusty Harris-Bishop of EPA Region 9, Remedial Project Manager (RPM) for the McColl Site, and included members of the United States Army Corps of Engineers (USACE) staff with expertise in geology and hydrogeology (Mr. Jefferey Powers, Seattle District), biology and environmental protection (Mr. Evan Lewis, Seattle District), risk assessment (Ms. Cheryl Davis, Omaha District), and construction (Mr. Richard Lane, Los Angeles District). Ms. Jacalyn Spiszman of the California Department of Toxic Substances Control (DTSC) assisted in the review as the representative for the support agency.

By May 1, 2007, the review team had been formed, and had established the review schedule and its major components including:

- Document Collection and Review;
- Data Assessment/Analysis;
- Site Inspection;
- Interviews and Community Notification and Involvement
- Five-Year Review Report Development and Review.

The FYR has a statutory completion date of September 2007.

Community Notification and Involvement

Community notification and involvement was lead by the EPA and involved notification that EPA was conducting a FYR in the local newspaper. The advertisement was placed

in two local papers, one Spanish language and one English language paper. A copy of the ad is provided in Attachment 9.

Community interest in the site has waned since the completion of the construction of the remedy. Interviews conducted by EPA with the on-site OM&M manager, the golf course maintenance manager, the DTSC representative on the site, and the USACE site representative all indicated that there had been no inquiries regarding the site from community members. In addition, EPA has not received any inquiries from citizens regarding the site since the ESD in 2005.

Document Review

A review of reports pertinent to this Five-Year Review was conducted by the review team. The types of documents reviewed included decision documents; risk assessment documents; operation, maintenance and monitoring annual data reports; routine site inspection forms; technical memoranda; and other supporting materials. Attachment 1 is a complete list of documents reviewed during this Five-Year Review.

Data Review and Evaluation

A. Cap Settlement

A settlement monument survey has not occurred since 2002, hence there was only one round of settlement data from 2002 collected since the last FYR. A reduced settlement survey frequency was established because the design analysis indicated the majority of settlement would occur soon after cap placement and would be minor at later times due to non-methanogenic, low pH conditions. The draft version of the first FYR (MWH 2002) included a settlement assessment which concluded in general that some post-construction settlement had occurred between 1997 and 2001. The largest amount of settlement has occurred at Ramparts sumps R-1 and R-2. Minor horizontal displacement to the south-southeast was also observed at the toe of the caps. Additionally, the 2002 OM&M Annual Report (C2 REM 2003) stated settlement during the fifth year of operation occurred in some areas of the cover system, but the degree of settlement did not appear to be compromising the effectiveness of the cover system. Vertical settlement values between 1997 and 2002 ranged from 0.030 to 0.560 feet. The maximum horizontal displacement was 0.395 feet. Settlement has occurred in a relatively stable manner (i.e. no severe breaks or issue of shear) and is within calculated settlement rates. Additional settlement post-2002 was predicted to be minor (C2 REM 2003), and a reduced settlement survey frequency of once every five years was implemented beginning in 2002. The most recent scheduled settlement survey was conducted in two events, late July and early August 2007. The collected data will be analyzed at which time any settlement of the capped areas will be assessed.

B. Gas Collection and Treatment System Operation

The Gas Collection and Treatment System (GCTS) has experienced several periods of down time due to various malfunctions, electrical problems, and upgrades since the first FYR. Routine site visits every other week were timely in identifying issues of concern with the GCTS. A damaged system concrete footing was replaced with a high-density plastic footing in September 2004. The blower motor was non-operational most of January 2003, during periods in 2004 and 2005 through mid-2005. In April 2005 EPA gave the MSG and C2 REM approval to operate the GCTS using a dual, passive-active protocol, whereby the system would passively treat off gas via the carbon canisters except one day per month (for about nine hours) the blower would be turned on and the system would be operated actively. Initially the paired gas collection/measurement probes were monitored at an increased frequency during the new GCTS operational configuration; however, negligible (e.g., less than 0.5 psi based on all 2006 monitoring data) pressure build-up was observed inside the caps due to this change, and monitoring frequency has since been reduced several times. The passive-active operational mode has appeared to work well.

C2 REM developed a protocol for GCTS carbon replacement in order to ensure off gas at the stack would meet local air quality requirements (C2 REM, Oct. 2003). This involved annual confirmational air analytical sampling using Summa canisters to verify manual PID emissions readings, and the development of a carbon change-out protocol in 2004. Based on the newly developed carbon efficiency table, carbon replacement was conducted in June 2004 (last previous replacement was in August 2001). The 2006 data was suggestive that a carbon change-out was due because of low calculated carbon efficiencies; however, this was not done. When questioned about this instance, C2 REM replied that the cause of low carbon efficiencies was low influent concentrations, and effluent values within acceptable emission standards (less than 5.9 ppm) is the predominate factor in making decisions regarding carbon change-out. If the influent concentrations are steady state and the effluent values are well below emission standards then carbon is not changed. C2 REM monitors these values at system startup and with the system only operational one time per month, emission values are easily controlled.

C. Groundwater Levels and Gradients

A summary of pertinent groundwater monitoring well information and screened water-bearing zones is included in the following table.

Table 4 – Groundwater Monitoring Well Summary

Well ID	Screened Water-Bearing Zone	Elevation Top of Casing (ft msl)	Depth Top of Screen (ft btoc)	Depth Bottom of Screen (ft btoc)	Screen Length (ft)	Elevation Top of Screen (ft msl)	Elevation Bottom of Screen (ft msl)	Currently Sampled ?
P-2S	A	266.46	20.8	25.8	5	245.66	240.66	N
P-3S	A	281.42	59.9	69.9	10	221.52	211.52	N
P-2I	B	266.39	126.6	136.6	10	139.79	129.79	Y[1]
P-4I	B	283.34	115.5	125.5	10	167.84	157.84	N
P-5I	B	259.77	82.0	92.0	10	177.77	167.77	Y[2]
P-5S	B	259.26	69.9	79.9	10	189.36	179.36	N
P-10D	B	248.42	186.0	196.0	10	62.42	52.42	Y[1]
P-2DR	C	266.15	213.8	223.8	10	52.35	42.35	N
P-3D	C	282.40	239.9	249.9	10	42.50	32.50	N
P-4D	C	282.53	225.0	235.0	10	57.53	47.53	N
P-5L	C	258.13	195.5	205.5	10	62.63	52.63	Y[2]
P-9D	C	263.26	214.1	231.1	17	49.16	32.16	Y[2]
P-10L	C	248.63	248.3	258.3	10	0.33	-9.67	Y[1]
W-6A	C	293.35	29.8	49.8	20	263.55	243.55	N
P-5D	D	259.40	254.9	264.9	10	4.50	-5.50	Y[2]
W-8B	D	247.12	284.6	294.6	10	-37.48	-47.48	N
P-10XD	C & D	266.44	259.5	310.5	51	6.94	-44.06	Y[1]
W-9B	D	316.71	214.0	224.0	10	102.71	92.71	Y[2]
W-9C	D	316.09	308.7	318.7	10	7.39	-2.61	Y[2]
W-10B	D	314.55	204.3	214.3	10	110.25	100.25	Y[2]

Notes:
[1]Sample schedule is once per year
[2]Sample schedule is once every two years

Review of measured data from the A zone perched wells (P-2S and P-3S) indicate the stability of shallow water levels over time. Groundwater elevations measured in 2006 were only slightly higher than pre-source remedy implementation (less than three feet) and are consistent with water level ranges observed during the first FYR. These small changes are likely influenced by seasonal recharge rates as well as infiltration from golf course irrigation. The gradient can not be determined with certainty because a network of just two wells will not provide a precise flow direction or gradient magnitude; however, significant topographic relief on site suggests a southwestern flow direction consistent with the direction of groundwater in other units on site. The vertical gradient between the A and B zones is downward, and has been consistently so over time.

Review of water levels in the B zone perched wells (P-2I, P-4I, P-5I, P-5S, and P-10D) indicate relatively stable to very modest declining water levels over the last five years. Concern over increased recharge rates between pre-source remedy and 2002 to the B zone was raised in the first FYR (MWH 2002). It has been hypothesized that this occurred at least in part by recharge of the B zone by the surface water detention pond located on the northwestern part of the site (now engineered with a low-permeability

liner), and by local site recharge (now intercepted by the concrete-lined v-ditches). The previous trend of increased B zone recharge appears to have been reversed. The gradient in the B zone is in a southwestern direction, with a magnitude of about 0.034. The vertical gradient between B and C zones is downward.

Groundwater levels in C zone wells (P-2DR, P-3D, P-4D, P-5L, P-9D, P-10L, W-6A, and likely P-10XD) indicate a modest decline in potentiometric surface elevation between the time of the 2002 FYR until about May 2005, followed by a noticeable upward trend based on qualitative evaluation of data available since that time. The modest decline in water level elevations since 2002 continued a pattern of decreasing levels since about November 1994 (the time of the RI; pre-source remedy). Water elevations, as of the latest available data set (November 2006) are at about the maximum on record, matching the higher elevations in 1994. Gradient direction is to the southwest, and the magnitude varies widely (greater near northeastern part of site) with a gradient magnitude near the southwestern site boundary of approximately 0.012. The vertical gradient between the C and D water-bearing zones is predominantly upward.

Groundwater levels in D zone wells (P-5D, W-8B, W-9B, W-9C, W-10B, potentially P-10XD) indicate relatively stable to slightly increasing elevations in the majority of these wells. This follows a trend of moderately increasing water level elevations for the period of 1997 to 2002. There is no definitive cause for the increased water level elevations in the D zone wells over time; however it has been suggested that since the D zone is considered a regional groundwater zone that does not outcrop at the site, these increases are likely due to regional influences unrelated to site infiltration rates. D zone gradient direction is to the southwest with a magnitude of about 0.042. Note that others (for example, C2 REM 2007) have grouped well P-10XD with the D zone but groundwater fluctuations and elevations suggest it belongs within the C zone grouping (it's likely screened in both C and D zones to some extent). If P-10XD is a C zone well, there would be no off site hydraulically downgradient monitoring wells screened in the D zone to assess deeper off site migration of COCs. The upward vertical gradient from D to C zones suggests that contaminants would be inhibited from reaching the D zone from above.

D. Groundwater Chemistry

Chemical data collected from the 11 wells in the current groundwater monitoring network (Tables 4 and 5) since the first FYR up to May 2006 were analyzed and compared against the performance criteria provided in the groundwater ROD, as amended by the ESD, for the remediation goals for downgradient regional groundwater. Hence, this evaluation focused on COCs in the off site, hydraulically downgradient C and D zone wells.

Table 5 shows groundwater MCL or action level exceedances, and all detections of THTs, in all monitoring wells regardless of water-bearing zone during the second FYR period. Well P-2I, in the B zone at the southwestern boundary of the site (Figure 2), contains the highest concentrations of benzene, THT, 3-THT, arsenic, beryllium, and lead of any site-related well. Further, P-2I contains the only detectable concentrations

of benzene and lead. The only MCL exceedances detected since 2003 in off site deep (C or D zone) groundwater were arsenic at P-10XD (with a 50 foot screening interval, is in both the lower C and D zone, 17 ug/l, May 2005), and selenium at P-9D (C zone, high of 64 ug/l in November 2003). THT has been detected in off site deep well P-10L (C zone, high of 12 ug/l in May 2005), as has 3-THT (high of 16 ug/l in May 2005). Selenium was not identified as a risk-driving COC in the baseline risk assessment. No benzene has been detected in any of the off site monitoring wells, which is the trigger (when in exceedance of the 5 ug/l MCL) for groundwater remedy implementation.

Because most locations were either non-detect or had fewer than three detections in the last five years, statistical trend analyses could only be performed for benzene, arsenic, and beryllium at well P-2I. The Mann-Kendall nonparametric test for trend is commonly used for environmental time-series data and was utilized to assess well P-2I data. The results of Mann-Kendall test for trend on these three COCs indicated stability in the concentrations, i.e. no trend at the 90% confidence level.

Further discussion of groundwater chemistry is provided in Section VII, paragraphs A.1 and A.6.

Table 5 – 2003-2006 Groundwater Analytical Summary

Well ID	Zone	RELATIVE LOCATION	Sample Date	VOCs			Total Metals			
				Benzene (ug/l)	THT (ug/l)	3-THT (ug/l)	Arsenic (ug/l)	Beryllium (ug/l)	Lead (ug/l)	Selenium (ug/l)
			MCL	5	n/a	n/a	10	4	15 (TT)	50
P-2I	B	ON SITE DOWN-GRADIENT (D.G.) BOUNDARY WELL	3/6/2003	96	**400**	**670**	200	110	ND	ND
			6/4/2003	83	ND	ND	180	110	52	ND
			11/20/2003	84	**290**	ND	320	120	ND	ND
			5/27/2004	86	<200	<200	200	85	<50	<50
			5/18/2005	78	**490**	**840**	270	97	30	<50
			5/8/2006	100	<120	<120	230	91	<25	<50
P-5I	B	ON SITE D.G. BOUNDARY WELL	11/20/2003	ND	ND	ND	ND	ND	ND	ND
			11/7/2005	<0.5	<5	<5	<5	<4	<5	<10
P-10D	B	OFF SITE DOWNGRADIENT COMPLIANCE WELL	2/27/2003	ND	**92**	**420**	ND	ND	ND	ND
			6/4/2003	ND	ND	ND	ND	ND	ND	ND
			11/20/2003	ND	ND	ND	ND	ND	ND	ND
			5/27/2004	<0.5	**10**	**6.2**	<5	<4	<5	<5
			5/18/2005	<0.5	<5	<5	<5	<4	<5	<10
			5/8/2006	<0.5	<5	<5	<5	<4	<5	<10
P-5L	C	ON SITE D.G. BOUNDARY WELL	11/20/2003	ND	ND	ND	ND	ND	ND	ND
			11/7/2005	<0.5	<5	<5	12	<4	<5	<10
P-9D	C	OFF SITE D.G. WELL	11/20/2003	ND	ND	ND	ND	ND	ND	64
			11/7/2005	<0.5	<5	<5	<5	<4	<5	55
P-10L	C	OFF SITE DOWNGRADIENT COMPLIANCE WELL	2/27/2003	ND	**4.4**	**3**	ND	ND	ND	ND
			6/4/2003	ND	ND	ND	ND	ND	ND	5
			11/20/2003	ND	**11**	ND	ND	ND	ND	ND
			5/27/2004	<0.5	<5	<5	<5	<4	<5	<5
			5/18/2005	<0.5	**12**	**16**	<5	<4	<5	<10
			5/8/2006	<0.5	<5	**12**	<5	<4	<5	<10
P-5D	D	ON SITE D.G. BOUNDARY WELL	11/20/2003	ND	ND	ND	ND	ND	ND	ND
			11/7/2005	<0.5	<5	<5	<5	<4	<5	<10
P-10XD	C & D	OFF SITE DOWNGRADIENT COMPLIANCE WELL	2/27/2003	ND	ND	ND	8	ND	ND	ND
			6/4/2003	ND	ND	ND	ND	ND	ND	ND
			11/20/2003	ND	ND	ND	8	ND	ND	ND
			5/27/2004	<0.5	<5	<5	<5	<4	<5	<5
			5/18/2005	<0.5	<5	<5	17	<4	<5	<10
			5/8/2006	<0.5	<5	<5	8.1	<4	<5	<10
W-9B	D	UPGRADIENT WELL	11/7/2005	<0.5	<5	<5	<5	<4	<5	<10
W-9C	D	UPGRADIENT WELL	11/20/2003	ND	ND	ND	ND	61	ND	ND
			11/7/2005	<0.5	<5	<5	<5	<4	<5	<10

Well ID	Zone	RELATIVE LOCATION	Sample Date	VOCs			Total Metals			
				Benzene (ug/l)	THT (ug/l)	3-THT (ug/l)	Arsenic (ug/l)	Beryllium (ug/l)	Lead (ug/l)	Selenium (ug/l)
W-10B	D	UPGRADIENT WELL	11/20/2003	ND	ND	ND	ND	ND	ND	ND
			11/7/2005	<0.5	<5	<5	<5	<4	<5	<10

Notes:
Only analytes with at least one exceedance shown
ND = Analyte not detected at or above reporting limit and reporting limit not specified in OM&M report
< Symbol indicates analyte not detected at or above depicted numerical reporting limit
Shading indicates MCL or Treatment Technique (TT) action level exceedance
Bold fond indicates THT or 3-THT detection

E. ARARS Review

As part of the document and data review, a review of applicable or relevant and appropriate requirements (ARARs) was conducted. Only those ARARS that address risk posed to human health or the environment were reviewed. Several changes in both State and Federal regulatory standards were noted. The only CPOC with a change in regulatory standard is arsenic (the current MCL is 0.01 mg/l, reduced from 0.05 mg/l in January 2006).No changes to the existing ARARs affecting the protectiveness of the remedy were identified. Attachment 2 has further details regarding the review of ARARS, including specific changes in regulatory standards.

Site Inspection

A site visit and inspection was conducted on May 15, 2007, to gather information about the site's status. The review team visually inspected and documented the conditions of the site, the remedy, and the surrounding area for inclusion into the second five-year review. Representatives of the EPA, USACE, the McColl Site Group, and their contractor C2 REM were present for the site inspection. This FYR inspection was back checked against the more routine periodic inspections performed by the USACE Los Angeles District on behalf of the EPA. For additional details regarding the site inspection and findings, including site photographs of select features and a roster of attendees, see the Site Inspection Trip Report (Attachment 3) and Site Inspection Checklist (Attachment 4).

Observations during the site inspection indicated the site to be well-maintained and in good operational order. Deficiencies noted during the site inspection included minor sedimentation in a few portions of the v-ditches and cracking or degradation of sealant material at a small percentage of v-ditch joints, an unlocked above-grade monitoring well (W-6A), and minor stressed vegetation over the lower Ramparts and lower Los Coyotes caps.

The site inspection on May 15, 2007 did not include a visit to the site document repository. The designated public information repository for the site is the City of

Fullerton Public Library located at 353 West Commonwealth Avenue, Fullerton, CA. A follow up telephone call and visit to the library by the USACE LA District team member obtained a copy of the administrative record retained at the library (Attachment 7). The entire administrative record is to be compared to that on file at the EPA Region 9 office and will be updated by EPA if incomplete.

Interviews

Site-related interviews were lead by the EPA, with USACE support. The site inspection team interviewed the current senior project manager, Jack Keener, and the junior project manager, Stefan Klemm, both from the PRP environmental contractor C2 REM, immediately after the site inspection conducted on May 15, 2007. EPA lead interview documentation is included in Attachment 5.

EPA offered the PRPs, their contractors, the current site owner, and the State of California an opportunity to review and comment on the draft version of this report. Comments are in Attachment 8, and relevant information has been incorporated as appropriate into the final report.

VII. Technical Assessment

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

Answer: The second FYR evaluation indicated the remedy is functioning as intended; this conclusion was also reached in the first FYR. The following subsections support the evaluation.

A.1 Remedial Action Performance and Monitoring Results:

Performance and monitoring results for the source OU indicate the remedy is functioning as intended. The GCTS is currently operating effectively in the passive-active mode. Vapor analytical results confirm the low manual PID measurements which indicate off-gas generation is well below regulatory-required levels for COCs. The negligible pressure differential inside vs. outside the capped areas indicate gas generation, as anticipated, is limited and is easily controlled. Cap settlement monitoring results have not been updated since 2002; however, there were no observable problems with excessive or differential settlement at the time of the May 15, 2007 site inspection.

Groundwater OU performance and monitoring results also indicate the remedies together are functioning as intended. The source remedy is an integral component of the groundwater remedy. Recent groundwater hydraulic data suggests a reversal of the

infiltration and recharge conditions described in the first FYR. Currently, measures to inhibit surface water recharge to perched groundwater outside the capped areas, particularly in the B zone, appear to be working, as lower water levels have been observed in these shallower units. Additionally, the slightly higher groundwater elevations observed in late 2004 to 2005 in the deeper units are likely a result of increased infiltration caused by above average precipitation in 2004-2005.

Groundwater VOC chemical data indicate that no benzene has been detected hydraulically downgradient (off site) in any water-bearing zone. Additionally, THT and 3-THT, which are no longer trigger chemicals for active groundwater remedial action or institutional control implementation, have only been detected at low levels (i.e., parts per billion).

Metals in groundwater have not been found in more than one hydraulically downgradient off site well above the MCLs during any monitoring event. The only MCL exceedances in off site wells have been arsenic (Well P-10XD: 17 ug/l in 2005; current MCL is 10 ug/l, although was 50 ug/l in 2005) and selenium (well P-9D: 64 ug/l in 2003, 55 ug/l in 2005; current MCL is 50 ug/l). The only well where consistently elevated metals concentrations have been detected, including MCL exceedances of arsenic and beryllium, and treatment technique action level for lead, are at well P-2I, at the downgradient boundary (but not off site) just at the southern edge of the site (Figure 2). An additional arsenic exceedance was detected at boundary well P-5L for arsenic at 12 ug/l in 2005. Field water quality purge parameters were reviewed (available only in 2004-2005 data) and generally, reducing conditions appear to be present at or near the source OU. A slight to moderate increase in dissolved oxygen (DO) was observed in the wells at the downgradient site boundary when compared to upgradient and near-source wells. Also the same increase in DO was observed at the downgradient off site wells when compared to the boundary wells. Average DO ranged from 0.8 to 1.5 mg/l at boundary wells (2005 and 2004 data, respectively) and ranged between 1.5 and 5.4 mg/l at downgradient off site wells (2005, 2004). This data suggests that transitional metal concentrations such as iron, manganese, and arsenic may be amenable to precipitation from solution as groundwater flows away from the more anaerobic source area environment, and that natural attenuation of these metals may be occurring.

A.2 System Operations and Maintenance:

The source OU GCTS has experienced some operational difficulties over the timeframe of this FYR, including blower motor and electrical component failure and associated downtime, and a damaged footing. The components have been repaired and appear to be in good operational order. The operation of the GCTS in a passive mode (i.e., one day per month) should improve the long-term reliability and performance of the system.

Maintenance of the cap, cut-off slurry wall, and slope retention components of the source remedy has generally been adequate, with minor exceptions such as inhibited grass cover growth over one sump in each of the Ramparts and Los Coyotes cap areas.

A.3 Costs of System Operations, Maintenance, and Monitoring:

The approvals to operate the GCTS in a passive-active mode and to reduce groundwater monitoring frequency since the last FYR have effectively reduced OM&M costs. Although specifics regarding costs to operate, maintain, and monitor the remedy have not been made available to the EPA at this time for this FYR reporting period by the PRP OM&M contractor, there are no indications that costs are significantly above budgetary amounts.

A.4 Opportunities for Optimization:

Based on the site inspection, reviewed documents and data, the remedy appears to be operating efficiently and effectively. Optimization strategies are not warranted at this time. Minor maintenance issues should continue to be identified during the routine site inspections by the OM&M contractor and timely corrective actions reported to the EPA.

A.5 Early Indicators of Potential Remedy Problems:

The following have been identified as early indicators of potential remedy problems:

- Stressed vegetation/bare grass cover was observed over two of the sumps. While the lack of vegetation and its associated root structure have not currently led to slope erosion, the potential exists for erosional channels to develop in the soil cover material during heavier rainfall and runoff events.
- The deep-root-structure of deciduous trees could affect the source remedy. One tree was identified as a concern as its roots may eventually damage the cap and/or cut-off slurry wall. The routine O&M program should identify and address these concerns before adverse impact occurs.
- Unsealed joints and minor sediment accumulation in v-ditches could affect source and groundwater remedies. If not repaired and maintained, the v-ditches' effectiveness at reducing on site infiltration of surface water to groundwater may be impacted.
- Additional metals in groundwater could affect groundwater remedy. Low levels of metals (arsenic and selenium) have been detected sporadically at downgradient on site boundary well P-5L and off site compliance wells P-10XD and W-9C. The high frequency of non-detects at these wells, along with the presence of beryllium in an upgradient well and lack of VOCs or THTs in the downgradient wells make associating these metals with the source waste inconclusive. Groundwater analytical data should be closely watched and assessed during future sampling rounds to determine if and when off site groundwater becomes affected.

A.6 Implementation of Institutional Controls and Other Measures:

Institutional controls for the source OU include prohibitions against the construction of structures or addition of materials that may compromise the integrity of the engineered caps. A 1996 consent decree between EPA and the property owner restricted future use of the site, prohibiting excavation, construction, or development of any kind. The property owner in 1996 also agreed to record a deed restriction on the Los Coyotes and Ramparts areas to this effect with the Office of Recorder of Orange County, California. This deed restriction runs with the land and is binding on any potential future owner of the site. The Orange County Water District (OCWD) manages the groundwater basin underlying north and central Orange County. This area includes the McColl Superfund Site and surrounding areas. OCWD has implemented a permitting process through which applications are required for all proposed groundwater wells. The permitting process includes a review of the quantity and quality of water to be extracted and includes consideration of existing and potential sources of groundwater contamination. The responsible parties have complied with the source IC measures.

The 1996 groundwater ROD stated that off site institutional controls were to be implemented in the event that the regional aquifer beyond the current site boundary is found (in more than one off site well) to contain site-specific contaminants above State or Federal MCLs or above the recommended or revised PRG for THTs. The 2005 ESD replaced THTs with benzene as the new trigger chemical. Currently, any deep (C or D zone) benzene exceedance of the MCL (5 ug/l) in groundwater at any off site monitoring well will trigger the initiation of a revised risk assessment and possibly additional remedial measures, including ICs. Regarding metals, there are no metals trigger chemicals, and monitoring data did not indicate chronic, high-level exceedances of any metals MCLs. So far benzene has been non-detect at all off site wells; hence no groundwater institutional controls are currently being implemented.

Other measures not considered ICs include physical access controls such as fencing, gates, locks, and signage. Physical access controls generally appear to be working effectively. The wrought iron decorative fencing encompassing the Los Coyotes Country Club and associated gates and locks appear in good condition. Minor rusting of a portion of the fence near the intersection of Rosecrans Ave. and Sunny Ridge Drive was observed during the site inspection, although that would not affect performance at this time. One monitoring well was unlocked (W-6A) during the May 15, 2007 site inspection. While not in an area of the golf course intended for access by golfers, the potential for tampering with an unsecure well is present.

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

Answer: The second FYR evaluation indicated the remedy remains valid. The following subsections support the evaluation.

B.1 Changes in Exposure Pathways:

The baseline risk assessment for groundwater was based on future residential use scenarios for onsite groundwater. Application of this scenario was supported by uncertainties regarding the potential for offsite migration of site related contaminants, in combination with the fact that the lower contaminated perched zones within the site communicate with the regional drinking water aquifer. Given the continued uncertainty with respect to offsite migration, this part of the exposure assumption still holds true. However, data collected since the Groundwater ROD (1996) suggest that the universe of contaminants present in downgradient monitoring wells is smaller than used in the baseline risk assessment. Furthermore, the contaminants which are currently present occur at lower concentrations than used in the baseline risk assessment. The baseline risk assessment prepared for the Source OU evaluated exposure to refinery waste by a child resident, adult resident, and country club worker. The landfill cover eliminates potential exposure of all three to the refinery waste and surrounding soil; therefore, exposure pathways are incomplete.

There have been no significant changes to either existing or expected land use on or near the site since the first five-year review. There have been no newly identified contaminants or contaminant sources. There have been no unanticipated toxic byproducts of the remedy not previously addressed.

B.2 Changes in Toxicity and Other Contaminant Characteristics:

Changes to carcinogenic and noncarcinogenic toxicity criteria for several source area contaminants have occurred in the intervening years since the Source OU and the Groundwater OU risk assessments were prepared. These changes do not affect the protectiveness of the remedy, since the remedy eliminated exposures to the refinery waste and surrounding soil. Groundwater monitoring indicates the contamination is contained within the site.

B.3 Changes in Risk Assessment Methods:

There have been no revisions to the standardized risk assessment methodology that could affect the protectiveness of the remedy, although exposure via vapor intrusion is of emerging concern. The vapor intrusion pathway was not evaluated in either the source or groundwater OU baseline risk assessment. The EPA describes vapor intrusion as the migration of volatile chemicals from the subsurface into overlying buildings. Volatile chemicals in buried wastes and/or contaminated groundwater can emit vapors that may migrate through subsurface solid and into air spaces of overlying buildings. At the McColl Site, vapors in the source area (under the cap) are collected and treated in the gas collection and treatment system. A network of dedicated pressure probes at the site is periodically tested to ensure that there is negative or negligible positive pressure within the sump containment structures relative to the surrounding area, indicating off-gassing is not of concern. The EPA has developed a

tiered approach for screening and evaluating vapor intrusion into buildings from underlying groundwater contamination. (EPA 2002, Draft Guidance for Evaluating the Vapor Intrusion to Indoor Air Pathway from Groundwater and Soils (Subsurface Vapor Intrusion Guidance), EPA 530-D-02-004) The first step in the screening process is to determine if volatile and toxic chemicals are known or suspected to be present in the subsurface near (within 100 feet of) currently occupied buildings or areas that could be developed in the future. If that is the case, analytical data from the site are compared with generic risk-based concentrations for residential exposure settings. This screening approach was applied to the McColl Site as part of this FYR and the results are summarized below.

As described earlier in this report, benzene has been detected in the groundwater at the site. Additional volatile chemicals that have been detected at least once since the first FYR are acetone, carbon disulfide, and 2-butanone. Due to the proximity of occupied houses near the site, these detections were compared to screening values as shown in the following table.

Table 6 – Groundwater VOCs Compared to Screening Values

Well	Depth to groundwater (ft)	Date of most recent detection	Chemical	Concentration detected (ug/L)	Risk-based Screening Value (ug/L)
MW P-2I (B Zone)	86.64	5/8/06	Benzene	100	140
MW P-10D (B Zone)	81.86	5/18/05	Carbon Disulfide	2.8	560
MW P-2I (B Zone)	86.88	5/27/04	Acetone	570	220,000
MW P-2I (B Zone)	86.88	5/27/04	2-Butanone	370	440,000

As indicated, all detections are below the screening values. The wells where the detections occurred are greater than 100 feet from occupied buildings, which reduces the potential for exposure via this pathway. Wells W-6A and W-8B are near occupied buildings, but have not been sampled for volatile chemicals within the past five years. Since depth to groundwater in Well W-8B is approximately 150 feet, it would not be of concern for the vapor intrusion pathway, but the depth to groundwater in W-6A is approximately 50 feet. Volatile chemicals were not detected in samples from Well P-5I (approximately 57 ft to groundwater) which is also near occupied buildings.

Overall, the conditions at the site do not indicate a cause for concern from the vapor intrusion pathway. The lack of analytical data for volatile chemicals from Well W-6A is an uncertainty that may warrant further investigation.

B.4 Changes in standards and TBCs:

The only CPOC with a change in regulatory standard is arsenic (the current MCL is 0.01 mg/l, reduced from 0.05 mg/l in January 2006). Although the MCL for arsenic was

reduced, the remedy is still protective because there is no change in risk to human health or the environment with the current remedy. Cleanup levels were not expressly designated in the source OU ROD (1993). It was determined that the entire extent of the source area (i.e. the sumps) needed to be treated or capped (contingency remedy). Although not designated as a cleanup level, the only numeric criteria specified in the Groundwater ROD was the action level set for THTs of 3.6 ug/L, which as originally envisioned would trigger institutional controls. The 2005 ESD for the groundwater OU removed this criterion and replaced it with the benzene MCL.

B.5 Expected Progress Towards Meeting RAOs:

This review indicates that the combined remedial action objectives for the Groundwater and Source OUs are still valid: 1) Long-term isolation of waste materials; 2) Minimization of infiltration of rain water into waste; 3) Control of any gases emitted from the wastes; 4) Provision of adequate bearing capacity for the end use of the site. There have been no changes in site conditions or toxicity criteria to suggest that either existing response actions are no longer required or that additional actions need to be taken.

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

Answer: No new information was evaluated that raised questions about the protectiveness of the remedy. No ecological risks are associated with the site as summarized in Attachment 6. The region is known to be seismically active; however, the OM&M plan includes provisions for additional inspections should a significant earthquake occur. Drainage and infiltration of surface water to perched groundwater has been mitigated but likely remains one of the most important controls to maximize protectiveness of the remedy. Also, source institutional controls (ICs) are in place and working. Groundwater ICs are implied, but not explicitly stated, should benzene be detected above its MCL in deep off site wells. No off site benzene has been detected to date.

Technical Assessment Summary

According to the data reviewed, the site inspection, and the interviews, the remedy is functioning as intended by the source ROD, the groundwater ROD, and ESD. There have been no changes in the ARARs, standards or TBCs that should affect the protectiveness of the remedy. The remedy is still protective of human health and the environment. There is no other information that calls into question the protectiveness of the remedy with the exception of lack of definitive groundwater ICs.

VIII. Issues

This section addresses issues that, either currently or in the future, prevent the source and groundwater RAs from being protective.

Groundwater hydraulic and geochemical data as well as other site information about maintenance is being collected as set forth in the ROD and relevant amendments. However, there is concern that the data is not being thoroughly evaluated or used to its full potential. For example, the first FYR noted moderate to large changes in groundwater elevations within the B and C zones, and questioned whether this was being caused by remedial measures performed to reduce precipitation infiltration. None of the annual OM&M report conclusions subsequent to the 2002 FYR addressed the apparent shift in infiltration to different units since that time.

Additionally, there were occasional minor errors or mis-statements observed in the site annual OM&M reports. For example, the wrong well was referenced in a discussion of a high historical 3-THT concentration (C2 REM 2007). In this instance, the error may lead the reader to misinterpret the contaminant distribution. However, it appears nothing was intentionally mis-stated or mis-represented.

GCTS operational data should be routinely checked against the carbon change out protocol by all parties to ensure the GAC is replaced as required.

There continues to be stressed vegetation, specifically bare spots in otherwise grassy areas, along the southern edge of the lower Ramparts and southeast edge of lower Los Coyotes caps. The same areas were observed to contain stressed vegetation as noted in the 2002 site inspection checklist; hence this appears to be a persistent maintenance issue.

Minor joint degradation was noted on some of the concrete-lined v-ditch joints. This represents a very small percentage of the total number of joints present and therefore does not appear to be a pervasive issue. Minor sediment accumulation and standing water in a ditch located immediately west of the fenced GCTS area was observed on May 15, 2007.

The May 15, 2007 site inspection revealed a location along the southern edge of the lower Ramparts (sump R-1 or R-2) in which a deciduous tree has grown sufficiently large such that its roots soon may impact the cap and/or upper cut-off slurry wall integrity. The PRP environmental contractor's O&M Site Manager agreed with the assessment and need for removal of the tree in the near future.

One monitoring well with no lock was observed during the May 15, 2007 site visit. Wells should be kept secured in order to prevent physical tampering with well or accessible groundwater.

All of the above are relatively minor issues which can easily be addressed either by simple administrative quality control (QC) or maintenance improvements. They are listed, and assessed with regard to current and future protectiveness, in Table 7.

Table 7 – Issues of the 2007 Five-Year Review

Issue	Affects Protectiveness? (Y or N)	
	Current	Future
1. OM&M report oversight and data evaluation (emphasis on groundwater hydraulic and geochemical evaluation, determining the need for downgradient off site D zone well)	N	N
2. Maintenance of remedy (grass cover, tree root growth, surface drainage, and well security)	N	N

IX. Recommendations and Follow-up Actions

Table 8 lists developed recommendations and follow-up actions for each issue identified in Table 7.

Table 8 – Recommended Follow-Up Actions

Issue	Recommendations/ Follow-Up Actions	Party Responsible	Oversight Agency	Planned Completion Date
1. OM&M report oversight/ data evaluation	Improve report generation QC; Completely evaluate data with respect to objectives and fill data gaps if determined to exist	PRP	EPA	Feb 2008 (2007 OM&M report)
2. Maintenance and upkeep of remedy controls	Aggressively address maintenance issues before they adversely affect protectiveness	PRP	EPA	Immediately (Sep 2007), and ongoing

Specific to the second listed issue, the PRP and/or their O&M contractor should continue to maintain v-ditch joints since waterproofing joint sealant typically cracks and degrades relatively quickly. Also the PRP and/or their O&M contractor should continue to remove sediment from sections of the v-ditch system as it accumulates, fix broken well-head locks, and repair distressed vegetation as necessary.

X. Protectiveness Statement(s)

Source OU Protectiveness Statement: The remedy at the McColl Site for the source OU is protective of human health and the environment, and in the interim, exposure pathways that could result in unacceptable risks are being controlled. The remedy is expected to continue to be protective for the foreseeable future.

Groundwater OU Protectiveness Statement: The remedy at the McColl Site for the groundwater OU is protective of human health and the environment, and in the interim, exposure pathways that could result in unacceptable risks are being controlled. The remedy is expected to continue to be protective for the foreseeable future.

Combined Comprehensive Site-Wide Protectiveness Statement for Construction Complete Site: The overall remedy at the McColl Superfund Site for both source and groundwater OUs is protective of human health and the environment, and exposure pathways that could result in unacceptable risks are being controlled. The remedy is expected to continue to be protective for the foreseeable future.

All immediate threats have been addressed adequately and issues related to operation and maintenance of remedial actions will and should continue to be addressed and resolved as they appear. Between finalization of this second FYR and the next scheduled review, routine O&M will continue for components of both the source and groundwater OUs, as will routine groundwater hydraulic and chemical monitoring to ensure contaminants in excess of the MCLs do not migrate off site to potentially threaten regional groundwater supplies. No water supply wells are currently impacted by site-related contamination, nor are they likely to be impacted during the next review period, given the low concentrations of THTs and non-detections of benzene in off site monitoring wells and the large distance between the site and the closest regional water supply wells. Furthermore, the vertical upward hydraulic gradient from the D zone to the C zone which currently exists supports short-term and potentially long-term protectiveness by preventing downward migration of contamination, at least at the observed monitoring well locations..

XI. Next Review

The next five-year review for the McColl Superfund Site is required by September 2012, five years from the date of this review.

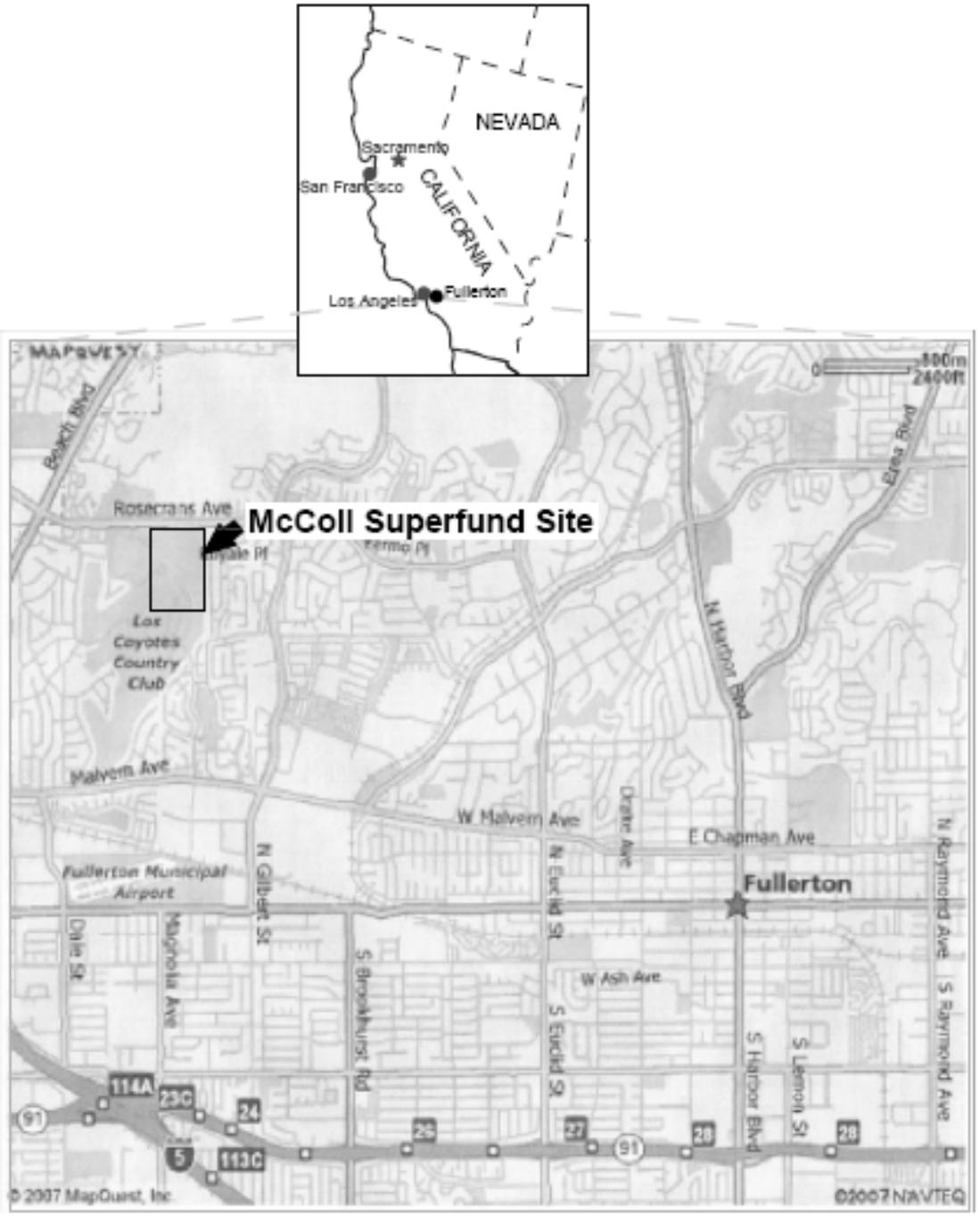
Figures

[This page intentionally left blank]

Figure 1

Site Location Map

[This page intentionally left blank]



U.S. ARMY CORPS OF ENGINEERS SEATTLE DISTRICT		
McColl Site Location Map		
Second Five-Year Review Report		
Fullerton	**Figure 1**	California

[This page intentionally left blank]

Figure 2

Site Plan

[This page intentionally left blank]

Figure adapted from 2002 OM&M Annual Report (C2 REM, 5/1/03)

LEGEND:

- McColl Site Boundary
- Vertical Cutoff Wall
- Ramparts Sump Parcels
- Los Coyotes Sump Parcels
- ⊕ Groundwater Monitoring Well
- Generalized Groundwater Flow Direction

N

U.S. ARMY CORPS OF ENGINEERS SEATTLE DISTRICT		
McColl Site Plan		
Second Five-Year Review Report		
Fullerton	**Figure 2**	California

[This page intentionally left blank]

Attachments

Attachment 1 – List of Documents Reviewed
Attachment 2 – Review of ARARS
Attachment 3 – Site Visit/Trip Report, with Photographs
Attachment 4 – Site Inspection Checklist
Attachment 5 – Interview Reports
Attachment 6 – Ecological Risk Assessment Memorandum
Attachment 7 – Administrative Record at Public Document Repository
Attachment 8 – Comments Received on Draft FYR and Response to Comments
Attachment 9 – Advertisement for Notice of Five Year Review, McColl Superfund Site

[This page intentionally left blank]

Attachment 1

List of Documents Reviewed

[This page intentionally left blank]

LIST OF DOCUMENTS REVIEWED

C2 REM, December 2002, Phased Technical Memorandum for Proposed OM&M Modifications.

C2 REM, October 2003a, Technical Memorandum, OM&M Modification #2, Proposed Carbon Bed Change Out Protocol.

C2 REM, May 2003, 2002 Operations, Maintenance & Monitoring Annual Report for McColl Superfund Site, Fullerton, California. Prepared for the McColl Site Group.

C2 REM, February 2004, 2003 Operations, Maintenance & Monitoring Annual Report for McColl Superfund Site, Fullerton, California. Prepared for the McColl Site Group.

C2 REM, February 2005, 2004 Operations, Maintenance & Monitoring Annual Report for McColl Superfund Site, Fullerton, California. Prepared for the McColl Site Group.

C2 REM, March 2006, 2005 Operations, Maintenance & Monitoring Annual Report for McColl Superfund Site, Fullerton, California. Prepared for the McColl Site Group.

C2 REM, February 2007, 2006 Operations, Maintenance & Monitoring Annual Report for McColl Superfund Site, Fullerton, California. Prepared for the McColl Site Group.

Clement International Corporation and ICF Technology, Incorporated, May 1992, Baseline Public Health Evaluation, McColl Superfund Site, Fullerton, California. Prepared for USEPA.

Clement International Corporation and ICF Technology Incorporated, July 1992, Addendum to the Baseline Public Health Evaluation (BPHE), McColl Superfund Site, Fullerton, California. Prepared for USEPA.

ICF Technology Incorporated, November 1995, Final Baseline Risk Assessment for the McColl Superfund Site Groundwater Operable Unit, Fullerton, California, Prepared for USEPA.

Montgomery Watson Harza, May 2002, (First) Five-Year Review Site Inspection Checklist for McColl Superfund Site, Fullerton, California. Prepared for USACE and USEPA.

Montgomery Watson Harza, July 2002, McColl Superfund Site, Fullerton, California, (Draft) Five-Year Review Report. Prepared for USACE and USEPA.

United States Environmental Protection Agency, June 1993, Record of Decision for the McColl Superfund Site Source Operable Unit, Fullerton, California.

United States Environmental Protection Agency, May 1996, Record of Decision Groundwater Operable Unit, McColl Superfund Site, Fullerton, California.

United States Environmental Protection Agency, October 1995, Newsletter: EPA Selects Contingency Remedy of Closure, McColl Superfund Site, Fullerton, California.

United States Environmental Protection Agency, June 1996, Newsletter: U.S.EPA Announces a Record of Decision for Groundwater at the McColl Superfund Site, Fullerton, California.

LIST OF DOCUMENTS REVIEWED, Continued

United States Environmental Protection Agency, October 1997, Community Update: McColl Superfund Site, Fullerton, California.

United States Environmental Protection Agency, July 1998, Fact Sheet: EPA Announces Intention to Delete the McColl Site From the National Priorities List, McColl Superfund Site, Fullerton, California.

United States Environmental Protection Agency, June 2002, Fact Sheet: U.S.EPA Announces Five-Year Milestone For the McColl Superfund Site Cleanup, McColl Superfund Site, Fullerton, California.

United States Environmental Protection Agency, September 2002, (Final) First Five-Year Review Report for McColl Superfund Site, City of Fullerton, Orange County, California.

United States Environmental Protection Agency, September 2005, McColl Superfund Site Explanation of Significant Differences.

United States Environmental Protection Agency, December 2005, Fact Sheet: EPA Updated Groundwater Strategy at McColl, McColl Superfund Site, Fullerton, California.

United States Environmental Protection Agency, May 2007, Site Summary: Institutional Controls Narrative, McColl, Fullerton, California.

Attachment 2

Review of Applicable or Relevant and Appropriate Requirements (ARARS)

[This page intentionally left blank]

Review of Applicable or Relevant and Appropriate Requirements (ARARs)

Per comprehensive 5-year review guidance from EPA, an ARAR review was performed for the McColl site. Per the guidance, only those ARARs that address risk posed to human health or the environment were reviewed.

Regulatory Requirements Reviewed

Consistent with the first 5-year review in 2002, ARARs reviewed to support evaluation of the groundwater operable unit (OU) included National Primary Drinking Water Standards (including maximum contaminant levels and maximum contaminant level goals) and California State Drinking Water Standards. For the source OU, Resource Conservation and Recovery Act (RCRA) regulations and regulations under the Clean Air Act were reviewed.

Specific citations of regulatory standards and regulations reviewed included the following:

- National Emission Standard for Equipment Leaks, Fugitive Emission Sources (40 CFR 61.240 to 61.247)
- National Emission Standard for Benzene Waste Operations (40 CFR 61.344)
- National Primary Drinking Water Regulations (40 CFR Part 141)
- Identification and Listing of Hazardous Waste, Characteristics of Hazardous Waste (40 CFR 261.20 to 261.24)
- Releases from Solid Waste Management Units (40 CFR 264.90 to 264.101)
- California Safe Drinking Water Act and related laws and regulations (California Code of Regulations, Title 22, Division 4, Articles 4, 5.5, 16)
- California Code of Regulations, Environmental Health Standards for the Management of Hazardous Waste (California Code of Regulations, Title 22, Division 4.5, Chapter 11, Article 3)
- Five-Year Review Report, McColl Superfund Site, Fullerton, California, prepared by Montgomery Watson Harza, July 2002
- First Five-Year Review Report, McColl Superfund Site, City of Fullerton, Orange County, California, prepared by Region 9, U.S. Environmental Protection Agency, September 2002.
- Feasibility Study Report, Groundwater Operable Unit, Fullerton, California, February 7, 1996.

Comparison of ARARs

The Groundwater OU Record of Decision (EPA, May 1996) identified federal and state drinking water standards at chemical specific ARARs. The Feasibility Study Report, Groundwater OU, evaluated a full range of potential ARARs (see Table 2 of the Feasibility Study Report). These ARARs remain valid. The main performance criteria selected in the ROD for evaluating the effectiveness of the remedy was not a state or federal drinking water standard, but a "PRG concentration of 3.6 ppb total THT" (tetrahydrothiophenes).

Water quality standards were compared to the Feasibility Study Report and the first five-year review report. Changes are noted in the following table.

Regulatory Standard	Chemical	Previous Standard (mg/L)	Current Standard (mg/L)
Federal MCL	Antimony	0.005	0.006
	Arsenic	0.05	0.01
Federal MCLG	Antimony	0	0.006
California MCL	Arsenic	0.05	0.01[b]
California NL	Carbon Disulfide	0.16	0.16

a MCL was for chloroform prior to Dec. 31, 2003. The current MCL based on the total of dichlorobromomethane, chlorodibromomethane, bromoform and chloroform.
b California implements the Federal MCL until California adopts a proposed regulation to establish a 0.01 mg/L arsenic MCL.

mg/L denotes milligrams per liter, which are equivalent to parts per million.
MCL denotes maximum contaminant level.
MCLG denotes maximum contaminant level goal.
NL denotes notification level.

Since none of the above standards were selected as cleanup goals or performance criteria in the ROD, the new standards would not affect the outcome of the decision-making process followed in the ROD.

No changes have occurred in regulations or standards with bearing on the Source OU ARARs as identified Appendix C of the Source OU ROD.

Suggested modifications to the monitoring program for treatment system off gas, which take into account standards recommended in the 2002 five-year review, were implemented starting in 2003. No changes with regard to standards for air emissions have been noted since the 2002 five-year review.

No changes to the existing ARARs affecting the protectiveness of the remedy were identified.

Attachment 3

Site Visit/Trip Report, with Photographs

[This page intentionally left blank]

TRIP REPORT
McCOLL SUPERFUND SITE, CITY OF FULLERTON, ORANGE COUNTY, CA
(EPA ID: CAD980498695)

---

1. INTRODUCTION:

a. Date of Visit: 15 May 2007

b. Location: 2650 Rosecrans Ave, Fullerton, California

c. Purpose: A site visit was conducted to provide information about the site's status and to visually inspect and document the conditions of the remedy, the site, and the surrounding area for inclusion into the second five-year review site inspection checklist and report.

d. Traveler/principal trip report author:

Jefferey Powers	USACE Seattle District Hydrogeologist	(206) 764-6586

e. Contacts:

Rusty Harris-Bishop	USEPA Region 9 Remedial Project Manager (RPM)	(415) 972-3140
Richard Lane	USACE Los Angeles District, Construction Rep.	(626) 401-4046
Cheryl Davis	USACE Omaha District, Risk Assessor	(402) 221-7681
Jack Keener	C2REM (PRP Environmental Contractor)	(949) 261-8098
Stefan Klemm	C2REM (PRP Environmental Contractor)	(949) 261-8098
Cindy Kezos	Atlantic Richfield Company (ARCO)	N/A

2. SUMMARY:

Jefferey Powers arrived in Fullerton, California on the evening of 14 May 2007 to participate in the site visit for the McColl Superfund Site (McColl) on 15 May 2007. On 15 May 2007 Ms. Davis and Mr. Powers arrived together at the McColl site gate at 2650 Rosecrans Avenue at approximately 0900 hrs, the prearranged meeting time. The weather was overcast changing to partly sunny later in the morning, with a temperature of about 60^{o}F. Ms. Davis and Mr. Powers spent an half hour before the meeting driving around the northern, western, and eastern perimeter of the site including Rosecrans Ave. Ralph B. Clark Regional Park, Beach Blvd., Los Coyotes Dr. to the Los Coyotes Country Club, Sunny Ridge Dr., Fairford Dr., and Fairgreen Dr. Abundant moderately-sized single-family homes were observed surrounding the McColl site to the west, northwest, northeast, east, and southeast.

The USACE team met with others in attendance at the site visit which began at approximately 0900 hrs. The participants in attendance are listed in paragraph 1.d and 1.e above. Mr. Keener, with C2REM the consultant to the PRPs (the McColl Site Group, or MSG, including ARCO) led the site visit and he, along with Mr. Klemm (also with C2REM) provided much of the site background narrative during the site walk (See Section 3, DISCUSSION, for details). The site visit concluded at approximately 1130 hrs.

The three members of the USACE team, along with Mr. Keener and Mr. Klemm, met over lunch at Millie's Restaurant on the corner of Rosecrans and Beach to further discuss the site

and issues relevant to the five year review. This working lunch lasted about 1.5 hrs (approximately 1130-1300 hrs).

Mr. Powers returned to Seattle via Santa Ana Orange County Airport on the afternoon of 15 May 2007.

3. DISCUSSION:

The completed second five-year review Site Inspection Checklist is the responsibility of the USACE as detailed in the McColl Statement of Work and is an important component of the five-year review process. USACE personnel visited the site to better understand site layout and remedy components for inclusion and discussion into the checklist and second five-year review report for the site.

McColl is a USEPA-led CERCLA site in which a five-year review is being conducted, with technical assistance provided by an interdisciplinary regional USACE team. The remedies that have occurred on site for the source operable unit (OU) include a RCRA-equivalent landfill closure consisting of two multi-layer engineered caps with associated cutoff walls, a gas collection and treatment system (GCTS), reinforced earthen slopes (RES) to stabilize steep slopes, and associated operation and maintenance of the system. The remedy implemented for the groundwater OU included surface water run-on controls, lining drainage channels with low permeability materials, grading, and groundwater monitoring. Site access controls are also a part of the functioning remedy.

Access is restricted by a wrought iron fence surrounding the Los Coyotes Country Club, which encompasses the entire McColl site. The country club is a private golf club which is not accessible by the general public. The only access point near the GCTS is through a gate which was secured by a padlock at the time of the site visit (Photograph 1). Other than minor cosmetic deficiencies (i.e., peeling paint), the gate and fencing appeared to be in good condition. Signage was in place along the perimeter/out-of-bounds areas of the golf course stating “Environmentally sensitive area, entering this area is prohibited, please note local rule” (Photograph 2; this signage has been implemented by the country club and is not a CERCLA requirement). There are no visible signs warning of the presence of the McColl CERCLA site; however, since there is no direct exposure pathway to the waste or groundwater, this is not considered a deficiency. Trespassing and vandalism reportedly are not issues of concern for the site. Animals such as coyotes and rabbits have been seen at the site.

The only site-related document retained on site is the O&M manual for the GCTS. There is no complete on-site document repository because no permanent site-specific structures currently exist on site. Documents are maintained in the offices of USEPA Region 9, C2REM, and the City of Fullerton Public Library (the local repository for McColl Administrative Record file, though not verified).

The site walk began with the GCTS (Photograph 3) and proceeded to the Lower Ramparts area. The configuration between cap extents and vertical cutoff wall was viewed, as

was the close proximity of off site residences to this area down a fairly steep slope (Photograph 4). Primarily shallow-rooting vegetation covered the slope in which the lower RES was constructed. A-Zone groundwater monitoring well W-6A was observed and was noted to be unlocked (Photograph 5). Mr. Keener stated wells within the fenced golf course are not locked because locks have degraded due to frequent saturation from the sprinkler system. The edge of the Lower Ramparts cap contained minor stressed grass vegetation areas. Next, two gas piping valve vaults were observed between the Lower and Upper Ramparts (Photograph 6). A new solar-powered sump pump has been installed in one of the vaults to prevent irrigation water from building up in this vault.

The group then walked along the edge of the Lower Coyotes area, where some stressed grass cover was observed along the slope (Photograph 7). Attempts to reseed this area have been largely unsuccessful, although no erosion was observed at the time of the visit. The group then walked to beyond the southern extents of the capped area past downgradient compliance monitoring wells P-10L and P-10XD (Photograph 8), then along the western perimeter of the Coyotes cap to the retention pond which collects run-off from the north of Rosecrans Ave. The pond was observed to contain several feet of water but the level was well below the outfall intake elevation. The pond was reported to be lined with compacted clay above a geosynthetic layer to reduce local, shallow perched groundwater recharge. Sediment is deposited within the northern portion of the pond (Photograph 9) and was recently removed by the golf course.

The northern perimeter beside Rosecrans Ave. was walked back to the GCTS area. Currently the only structure bordering the site to the north of Rosecrans Ave. is a newly constructed firehouse (Photograph 10), although the vacant land surrounding the firehouse is reportedly slated for future residential development. Many survey settlement monuments and concrete-lined surface drainage v-ditches (Photograph 11) were observed during the site walk through. The site visit concluded by observing the upper RES which was constructed on the slope between the Lower and Upper Ramparts. This RES, also partially covered by shallow-rooting landscaped vegetation appeared in good condition (Photograph 12).

The only current waste steams from the McColl site are purged groundwater, and stack emissions and spent carbon from the GCTS. The purge water historically has been analyzed for disposal characterization, and is currently disposed in the pond located in the southeastern portion of the golf course which is used for golf course and site irrigation. The next groundwater sampling event is scheduled for June 2007.

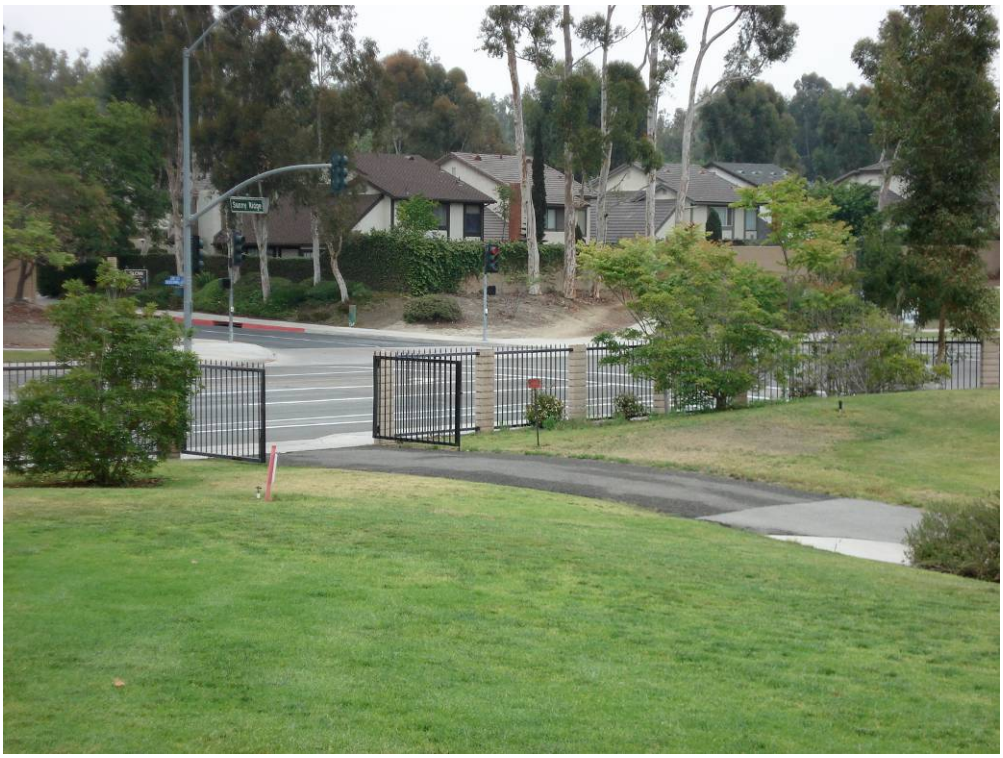
The site visit revealed there were a series of recent technical memos (within the 2002-2007 Five-Year Review timeframe) which the USACE may not have copies of. Mr. Powers plans to obtain these documents, as needed, from Mr. Harris-Bishop.

Further details of the site visit may be contained within the attached site inspection checklist.

4. RECOMMENDATIONS:

The USACE will incorporate the information obtained from the site visit into the completed McColl site inspection checklist and second five-year review report.

Jefferey Powers, L.G.
Hydrogeologist
CENWS-EC-TB-GE



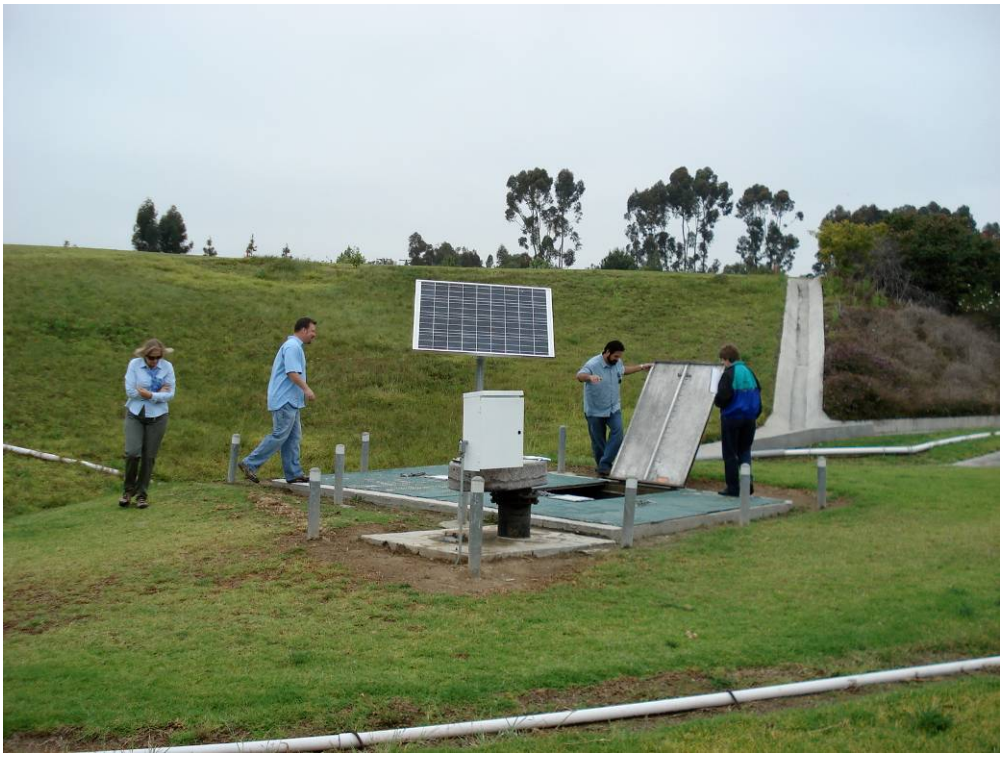
Photograph 1. Driveway gate to McColl gas collection & treatment system (GCTS) off Rosecrans Ave. looking northeast (unlocked and open for site visit).

Photograph 2. Country club signage on upper slope of Lower Coyotes cap.

Photograph 3. Granular activated carbon (GAC) vessels for landfill gas treatment.

Photograph 4. Edge of Lower Ramparts at cutoff wall (below v-ditch), showing residential proximity.

Photograph 5. Shallow, A-Zone groundwater monitoring well W-6A.



Photograph 6. Lower Ramparts gas collection system valve vault and solar-powered pump control panel.

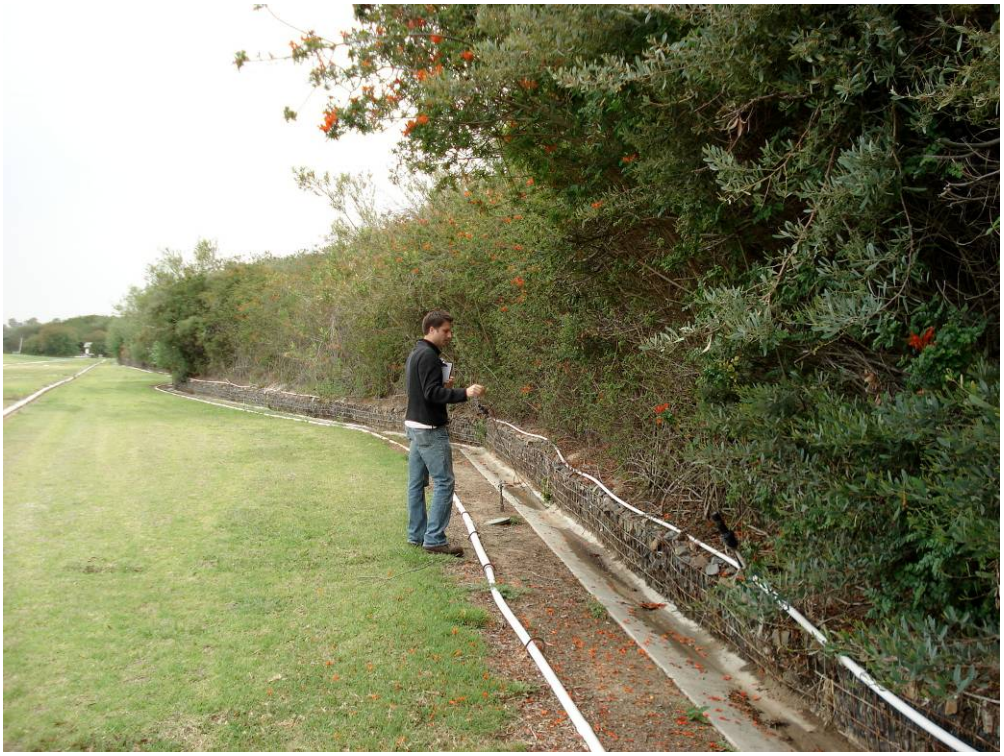
Photograph 7. View looking southeast of Lower Coyotes cap area, showing stressed vegetation.

Photograph 8. Deep, downgradient compliance wells P-10L and P-10XD.

Photograph 9. Surface water retention pond showing inlet culverts, looking northeast.

Photograph 10. New fire station north of site (country club fencing in foreground) and Rosencrans Ave.

Photograph 11. Concrete V-ditch along Upper Ramparts, showing new silicone joint sealant and minor sedimentation.



Photograph 12. Reinforced earthen slope between Upper and Lower Ramparts.

Attachment 4

2007 Site Inspection Checklist

[This page intentionally left blank]

Site Inspection Checklist (2007 McColl 5YR)

I. SITE INFORMATION	
Site name: McColl Superfund Site	**Date of inspection: 15 May 2007**
Location and Region: Fullerton, CA	**EPA ID: CAD980498695**
Agency, office, or company leading the five-year review: US EPA Region 9/USACE Seattle District	**Weather/temperature: Overcast to partly sunny, 60°F**

Remedy Includes: (Check all that apply)

√ Landfill cover/containment
√ Access controls
√ Institutional controls
□ Groundwater pump and treatment
□ Surface water collection and treatment
√ Monitored natural attenuation
□ Groundwater containment
√ Vertical barrier walls
√ Other: (1) Gas Collection and Treatment System consisting of a network of buried perforated pipe in each of 2 cover systems connected to a 30-hp blower through a common header. The vapor abatement system (vacuum side of blower) consists of 2 granular activated carbon canisters each filled with 2,000 lbs bituminous carbon. (2) Surface water infiltration inhibitors including lined retention pond and concrete V-ditches draining to storm water collection system.

Attachments: √ Inspection team roster attached √ Site map attached

II. INTERVIEWS (Check all that apply)

1. **O&M site manager** Mr. Jack Keener (Name) Senior Project Manager (Title) 15 May 2007 (Date)
   Interviewed √ at site □ at office □ by phone Phone no. (946) 633-4530
   Problems, suggestions; □ Report attached

2. **O&M staff** Mr. Stefan Klemm (Name) Project Manager (Title) 15 May 2007 (Date)
   Interviewed √ at site □ at office □ by phone Phone no. (946) 261-8098
   Problems, suggestions; □ Report attached

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 _____
Contact _____ _____ _____ _____
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
_____
_____

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

4. **Other interviews** (optional) ☐ Report attached.

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 Gas Collection and Treatment System (GCTS)

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 Reportedly at site document repositories, not on site and not verified

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

   Remarks

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_____ — ☐ 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 Surveys conducted 1998, 1999, 2000, 2001, 2002. Next survey planned for 2007.

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 Contractor for PRP is C2REM; responsible for O&M since 2002. At that time USACE Los Angeles District (Federal Agency) responsible for O&M

2. **O&M Cost Records**

 Readily available Up to date
 Funding mechanism/agreement in place
Original O&M cost estimate Source OU: $828K/annum
Groundwater OU: $146K/annum Breakdown attached

Total annual cost by year for review period if available

From_____ To_____ _____ Breakdown attached
Date Date Total cost
From_____ To_____ _____ Breakdown attached
Date Date Total cost
From_____ To_____ _____ Breakdown attached
Date Date Total cost
From_____ To_____ _____ Breakdown attached
Date Date Total cost
From_____ To_____ _____ Breakdown attached
Date Date Total cost

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

Describe costs and reasons: None. Details of O&M costs for period 2002-2007 not provided by PRP
Contractor; however they report the O&M costs have always been within budgeted amount.

V. ACCESS AND INSTITUTIONAL CONTROLS √ Applicable N/A

A. Fencing

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

Remarks Wrought iron and brick perimeter fencing separating golf course and site from adjacent residential housing. Fencing is in good condition

B. Other Access Restrictions

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

Remarks Warning signs posted along edge of golf course – "Environmentally Sensitive Area, Entering This Area is Prohibited" and along steep slopes – "Danger, Steep Slope, Fall Protection Required Beyond This Point." Signs at gas pipeline valve vaults – "Warning, Confined Space, Authorized Personnel Only."

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) Visual site inspection
Frequency Daily by Los Coyotes Golf Course (LCGC) and weekly by C2REM until Feb 2003, then twice per month thereafter
Responsible party/agency C2REM (PRP Environmental contractor) and LCGC Management
Contact Mr. Jack Keener Sr. Project Manager 15 May 2007 (949) 261-8098
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 Source IC of insuring cap/barrier wall are not penetrated is adequate; Groundwater IC of monitoring to insure benzene is not detected above MCL at compliance wells is adequate

D. General

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

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

3. **Land use changes off site** √ N/A
Remarks Area north of site reportedly to be developed as residential housing in the near future. Fire house north of site on Rosecrans Ave. either newly constructed or renovated in 2004. Five-year report will address details on land use.

VI. GENERAL SITE CONDITIONS

A. Roads √ Applicable ☐ N/A

1. **Roads damaged** ☐ Location shown on site map √ Roads adequate ☐ N/A
Remarks Paved vehicular access road from Rosecrans Ave. to GCTS in good condition, as are concrete golf cart paths on the golf course

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 Minor settlement (<0.5 ft vertical) observed based on monument survey data between time caps were installed and 2002 (last year surveyed); however, none physically/visibly evident. Next settlement survey scheduled for 2007.

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 Landscaping throughout site including mowed grass on sump areas. Slightly stressed vegetation (bare spots in grass) along SE slope of Los Coyotes cap and S slope Lower Ramparts cap. Reseeding and rewatering has been attempted in the past with only limited success. One tree approx. 17 ft tall in need of removal adjacent to S cut-off wall beside sump R-1 or R-2

6. **Alternative Cover (armored rock, concrete, etc.)** □ N/A
   Remarks Terraced retaining walls (reinforced earthen slopes, RES) constructed with geogrid between Upper and Lower Ramparts

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 All gas probes are to be refitted with upper reaches of piping less prone to leakage, and new flush mount vaults, corrosion-resistant brass locks should be installed for security

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 All groundwater monitoring wells are outside the landfill sumps and addressed elsewhere within checklist.

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 Most but not all of 47 monuments were located. Annual inspection and historical annual survey, now reduced to once every 5 years, is conducted. Provision to survey after significant seismic event or significant rainfall event has not been required to be implemented

E. Gas Collection and Treatment √ Applicable □ N/A

1. **Gas Treatment Facilities**
   □ Flaring □ Thermal destruction □ Collection for reuse
   √ Good condition □ Needs Maintenance
   Remarks Operated continuously (with blower on) until June 2005, at which time approval was given to operate in active mode one day per month, working passively (blower off) rest of time

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 Includes concrete V-ditches which occasionally are prone to minor sedimentation and joint-sealant failure. Only minor sediment observed in V-ditch beside Upper Ramparts sump R-6. Joints have occasionally failed at which time silicone joint sealant is applied

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 No visible siltation; however LCGC recently cleaned out north end of retention pond (nearest culvert inlet) of plant growth and sediment

2. **Erosion** Areal extent_____Depth_____
   √ Erosion not evident
   Remarks_____
   _____

3. **Outlet Works** √ Functioning □ N/A
   Remarks Pond surface elevation several feet below outlet drain at time of site visit
   _____
   _____

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

H. Retaining Walls √ Applicable □ N/A

1. **Deformations** □ Location shown on site map √ Deformation not evident
   Horizontal displacement < 0.5 ft Vertical displacement < 0.5 ft
   Rotational displacement_____
   Remarks Deformation not visibly evident; however, minor displacements reported in 2002 OM&M annual report and as above.

2. **Degradation** □ Location shown on site map √ Degradation not evident
   Remarks Visibly a large amount of vegetation on RES slopes, reportedly all planned for landscaping aesthetics and slope stability but with shallow root structures not interfering with engineered intent

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

1. **Siltation** □ Location shown on site map □ Siltation not evident
   Areal extent Approx. 30 LF Depth < 1 inch
   Remarks Minor sedimentation observed in V-ditch E edge of Upper Ramparts sump R-6

2. **Vegetative Growth** □ Location shown on site map √ N/A
   □ Vegetation does not impede flow
   Areal extent_____ Type_____
   Remarks Concrete V-ditches well maintained with no vegetation growing within or at joints

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 Air pressure differential at 12 paired gas pressure/sampling probes
   □ Performance not monitored
   Frequency 2/yr until 6/2005; once every 2 months 6/2005-6/2006, once every 3 months thereafter
   □ Evidence of breaching
   Head differential Max differential has been 0.101 psi
   Remarks Low to zero pressure differential between probe points paired inside and outside the caps indicate the GCTS is functioning, and very little gas is being generated

IX. GROUNDWATER/SURFACE WATER REMEDIES

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

B. Surface Water Collection Structures, Pumps, and Electrical √ Applicable □ N/A

1. Collection Structures, Pumps, and Electrical

√ Good Condition □ Needs Maintenance

Remarks Retention pond NW of site inside golf course

2. Surface Water Collection System Pipelines, Valves, Valve Boxes, and Other Appurtenances

√ Good Condition □ Needs Maintenance

Remarks Concrete V-ditches

3. Spare Parts and Equipment

□ Readily available □ Good condition √ Readily available □ Good condition

Remarks Joint sealant for V-ditches

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)_____
□ 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_____
□ Quantity of surface water treated annually_____
Remarks_____
_____

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 No monitoring wells used as part of a pump-and-treatment remedy

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

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 Groundwater monitored although not a part of a Groundwater Treatment System. Beginning Feb 2003, water levels monitored twice per year at all wells while sampling 4 wells annually and 7 wells every 2 yrs, before June 2003 sampling was via high-flow/fixed 3 well volume technique, after June 2003 use low-flow/minimal drawdown sampling technique. No locks on wells due to irrigation water corrosion problems.

X. OTHER REMEDIES

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.).
Groundwater operable unit intended to significantly reduce infiltration of precipitation and surface water outside waste sump areas, and adequately monitor subsurface hydraulic and contaminant behavior.

Source operable unit intended to prevent infiltration of water to waste sumps through multi-layer cap and vertical cut-off wall, thereby preventing contaminated groundwater from leaching out of the cells, and to collect and treat gasses to eliminate hazardous air emissions. RES intended to stabilize steep slopes. Groundwater monitoring is ongoing.

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.

O&M procedures and frequencies appear adequate for monitoring the remedies

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.

During the past 5 years persistent troubles with the GCTS, specifically the blower motor, electrical system, fuses, and modem have been experienced. The system had multiple upgrades and repairs and appears to be operating correctly since 2006. Also, the GCTS is only actively run one day per month and continues to remain protective.

The GCTS monitoring activities twice per month are designed to assess the treatment efficiency of the GCTS in the collection of fugitive soil vapor emission from the sand layer of the cap and to maintain balanced flow conditions through the system.

D. Opportunities for Optimization

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

The groundwater monitoring program has been optimized for cost by a reduction in the number of wells sampled for chemical analysis and a reduction in sample frequency.

Attachment 1 to Site Inspection Checklist
Site Inspection Team Roster

Cheryl Davis
Risk Assessor
US Army Corps of Engineers (USACE), Omaha District, NE
Telephone (402) 221-7681

Richard Lane
Construction Representative
USACE Los Angeles District, CA
Telephone (626) 401-4046

Jefferey Powers
Hydrogeologist
USACE Seattle District, WA
Telephone (206) 764-6586

Rusty Harris-Bishop
Remedial Project Manager (RPM)
US EPA Region 9, San Francisco, CA
Telephone (415) 972-3140

Attachment 2 to Site Inspection Checklist
Site Map

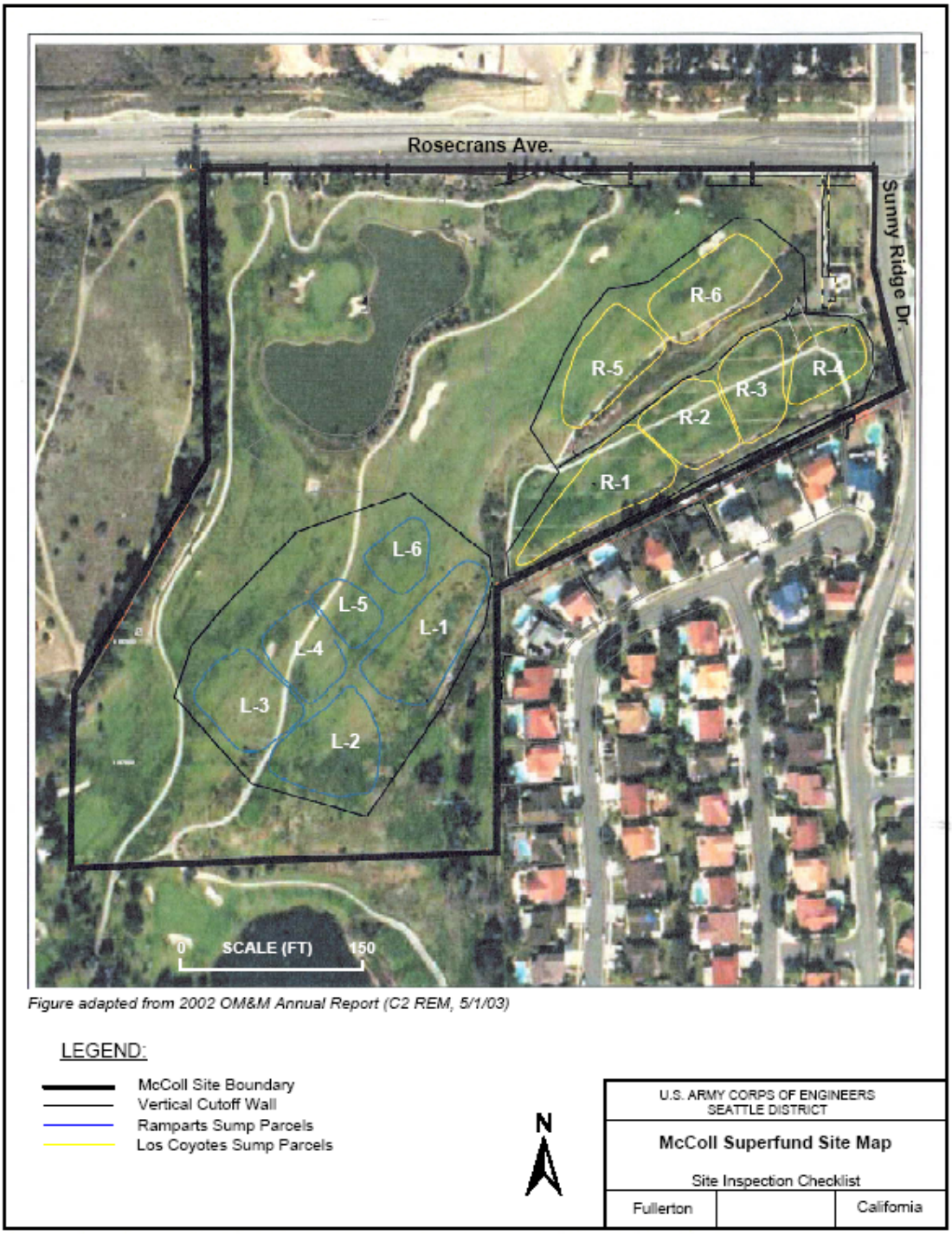


Figure adapted from 2002 OM&M Annual Report (C2 REM, 5/1/03)

[This page intentionally left blank]

Attachment 5

Interview Reports

[This page intentionally left blank]

McColl Superfund Site
Five-Year Review Community Interviews

Interview #1
Name: Arnie Peredia
Involvement: Golf Course Superintendent, Los Coyotes Country Club
Address: 8888 Los Coyotes Dr., Buena Park, CA. 90621
Phone: (714) 994-7779
Fax: (714) 994-7785

Q. What is your overall impression of the project? (general sentiment)
A. Stated that the vapor extraction and clean-up system is doing a pretty good job. The treatment system and surrounding area looks clean and organized.

Q. What effects have site operations had on the surrounding community?
A. None to his knowledge. He said that some neighbors and members have asked about the sites maintenance, but little besides that.

Q. Are you aware of any community concerns regarding the site or its operation and administration? If so, please give details.
A. Hadn't heard of any.

Q. 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.
A. Vandalism has occurred to golf carts belonging to the golf course, but no vandalism to his knowledge has occurred to the treatment system or capped area.

Q. Do you feel well informed about the site's activities and progress?
A. He hadn't heard much about what had been going on at the time of the interview. He had known about some weekly inspections that were occurring, but has not seen anything recently.

Q. Do you have any comments, suggestions, or recommendations regarding the site's management or operation?
A. No. He said that a good job was being done. Perhaps some additional signage regarding the site could be provided to inform visitors and players.

Interview #2
Name: Jacalyn Spiszman
Involvement: Senior Hazardous Substance Scientist, Dept. of Toxic Substance Control
Address: Dept. of Toxic Substance Control, Site Mitigation and Brownfields Reuse Division- Cypress, 5796 Corporate Ave., Cypress, CA. 90630
Phone: (714) 484-5460
Fax: (714) 484-5438
JSpiszman@dtsc.ca.gov

Q. What is your overall impression of the project? (general sentiment)
A. She thinks that the treatment system is running smoothly and that she knows of no major incidents in containing the site contamination

Q. Have there been routine communications or activities (site visits, inspections, reporting activities, etc.) conducted by your office regarding the site? If so, please give purpose and results.
A. She mentioned that she had participated in some of EPA's communication activities, but that her agency has not conducted any.

Q. Have there been any complaints, violations, or other incidents related to the site requiring a response by your office? If so, please give details of the events and results of the responses.
A. None

Q. Do you feel well informed about the site's activities and progress?
A. Yes

Q. Do you have any comments, suggestions, or recommendations regarding the site's management or operation?
A. No

Interview #3
Name: Rich Lane
Involvement: Army Corps of Engineer
Address: 645 N. Durfee Ave., S. El Monte, CA. 91733
Phone: (626) 401-4046
Fax: (626) 401-4007

Q. What is your overall impression of the project? (general sentiment)
A. He believes that the system is running smoothly and that the contractors are doing a good job of monitoring the treatment system. He felt that the contractors are always looking for ways to improve the system and that they are also quick to respond to any concerns that may be expressed.

Q. Have there been routine communications or activities (site visits, inspections, reporting activities, etc.) conducted by your office regarding the site? If so, please give purpose and results.
A. Yes, monthly. Quarterly communication has taken place in regards to the gas probing.

Q. Have there been any complaints, violations, or other incidents related to the site requiring a response by your office? If so, please give details of the events and results of the responses.
A. No

Q. Do you feel well informed about the site's activities and progress?
A. Yes

Q. Do you have any comments, suggestions, or recommendations regarding the site's management or operation?
A. No

Interview #4
Name: Jack Keener
Involvement: Contractor
Address: 2382 S.E. Bristol Street, Suite B, Newport Beach, CA. 92660
Phone: 949-261-8098
Fax: 949-261-8097

Q. What is your overall impression of the project? (general sentiment)
A. He felt it was going very well and the components are performing as designed. The O & M has been optimized and is now a more appropriate level of response for the contamination. The treatment is protective of human health and the environment

Q. Is the remedy functioning as expected? How well is the remedy performing?
A. Yes

Q. What does the monitoring data show? Are there any trends that show contaminant levels are decreasing?
A. The data shows that groundwater contamination is static. There has been no increase or decrease in the past 6 years at the property. Soil gas collection has shown a drop in contamination.

Q. Is there a continuous on-site O&M presence? If so, please describe staff and activities. If there is not a continuous on-site presence, describe staff and frequency of site inspections and activities.
A. Not continuous. On-site presence ranges from once every 2-3 months. Last year it was every 4 months. The site is monitored remotely on a daily basis.

Q. Have there been any significant changes in the O&M requirements, maintenance schedules, or sampling routines since start-up or in the last five years? If so, do they affect the protectiveness or effectiveness of the remedy? Please describe changes and impacts.
A. Modified groundwater monitoring to twice annually. There are now 11 total wells being monitored (4 of them are for benzene and VOCs) annually with the other 7 being checked every other year. Groundwater levels are being checked twice a year.

Q. Have there been unexpected O&M difficulties or costs at the site since start-up or in the last five years? If so, please give details.
A. The blower unit needed to be replaced in 2001

Q. Have there been opportunities to optimize O&M, or sampling efforts? Please describe changes and resultant or desired cost savings or improved efficiency.
A. Changes were noted in various technical memorandums.

Q. Do you have any comments, suggestions, or recommendations regarding the project?

A. The remedy is functioning as intended. He looks forward to working with EPA in the future on this and other sites.

[This page intentionally left blank]

Attachment 6

Ecological Risk Assessment Memorandum

[This page intentionally left blank]

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 9
75 Hawthorne Street
San Francisco CA 94105-3901

Memorandum

DATE: 14 May 2007

FROM: Ned Black, Ph.D.
Regional CERCLA Ecologist, SFD-8-4

TO: Rusty Harris-Bishop
Remedial Project Manager, SFD-7-2

SUBJECT: Evaluation of Ecological Risk at McColl Superfund Site

Based on my review of the available McColl Superfund site information and a site inspection on 29 March 2007, I conclude there are no actual or potential complete exposure pathways from wastes left on site to ecological receptors. Accordingly, so long as the integrity of the cap is maintained, there is no unacceptable ecological risk associated with the site and no need for further ecological risk assessment work.

[This page intentionally left blank]

Attachment 7

Administrative Record at Public Document Repository

[This page intentionally left blank]

McColl Superfund Historical Data
Administrative Record on File at Fullerton Public Library

Nos	Descriptions	Date
1	Task 4—Full Scale Treatability Study Report Vol I-VIII	May 1985
2	Technical Memorandum No. II,	Sept 1996
3	Summary of Comments of EPA Task 4 Full Scale Demonstration Report, Appendix Z	Sept 1995
4	Full Scale Demonstration Test Report, Volume I	July 1995
5	California Department of Health Services Adversary Proceedings	Nov 1981
6	McColl Site Health Survey	Oct 1984
7	McColl Site Health Survey	Apr 1983
8	Ecology & Environment, Inc Background Information Search	Oct 1980
9	McColl Site Investigation Final Report	Nov 1984
10	Health & Safety Plan Remedial Action McColl Site, Vol I&II	Nov 1984
11	Task 4 – Full Scale Demonstration Test Report	Nov 1997
12	Operation & Maintenance Plan	Oct 1997
13	Superfund Closeout Report	May 1998
14	Final Construction Quality Assurance	Nov 1997
15	Fourth Semi-Annual Groundwater Monitoring Report	Sept 1998
16	McColl Cost Effectiveness Final Report	June 1983
17	ATSDR - Public Health Statement	1992
18	McColl Public Information	Apr 1992
19	McColl Groundwater Monitoring Report Seventh Semi-Annual Sampling Event (SA7), (SA8), & (SA9)	Nov 2000; Dec 2000 ; Sept 2001
20	California Department of Health Service, “McColl-Los Coyotes Hazardous Waste Property Evaluation Report	Oct 1981
21	Full - Scale Demonstration Test Report Volume I & II	July 1995
22	McColl Site Investigation Final Report	July 1982
23	Hearing in the Matter of the McColl Hazardous Waste Site	Nov 1980
24	Lists of Properties Being Considered	Oct 1981
25	Final Report of The Air Quality & Odor	July 1982
26	California Assessment Manual for Hazardous Waste	June 1981
27	Criteria for Evaluation of Remedial Alternateness the McColl Hazardous Waste Site	Feb 1983
28	McColl Phase II – Additional Testing of Select McColl Waste Samples	Feb 1983
29	Results from Stage 4 - Formal Laboratory Testing Support of Remedial Design	May 1983
30	McColl Superfund Site Fullerton California Public Hearing	Mar 1989
31	Draft Environmental Impact Report for Remediation of the McColl Hazardous Waste Site	Jan 1989
32	McColl Site Adult Health Survey	---- 1982
33	Volume II, Final Responsiveness Summary for the Source	

Operable Unit Record of Decision McColl Superfund Site June 1983

34 Study of the Community Near the McColl Waste Site Regarding Health Symptoms, Odor Complaints, and Knowledge of an Earlier Study Oct 1990

35 Volume I - Record of Decision for the McColl Superfund Site Source Operable Unit, Fullerton California Jun 1993

36 Record of Decision Remedial Alternative Selection Apr 1984

37 Final Groundwater Monitoring Report Jul 1992; Mar 1992

38 Remedial Action Report Apr 1998

39 Record of Decision Groundwater Operable Unit May 1996

40 Volume I -- Record of Decision for McColl Superfund Site Source Operable Unit Jun 1993

41 Environmental Assessment of Soil in that Portion Part of the Los Coyotes Country Club Dec 1980

42 California Department Services McColl Hazardous Waste Site Cleanup, Negative Declaration ----------

43 McColl Technical Memorandum, "Remedial Technology Identification Screening and Description Jan 1993

44. California Department of Health Services McColl Hazardous Waste Site Cleanup, Negative Declaration…….July 1983

45 Environmental Assessment of Remedial Action Alternatives For the McColl Site Fullerton California……June 1983

46 McColl Phase 2—Remedial Technology Identification, Screening and Description, Technical Memorandum……..January 1983

45. McColl Phase II—Hydrogeologic Aspects of The McColl Site, Fullerton, California, Technical Memorandum…….March 1983

46. McColl Phase II—Summary of Nature and Extent of the Problem at the McColl Site, Fullerton, California, Technical Memorandum…….March 1983

47. McColl Phase II—Environmental Setting of the McColl Site, Fullerton California, Technical Memorandum……..March 1983

48. Remedial Action Alternatives For the McColl Site, Fullerton California…March 1983

49. Determination of the Air Quality at the Abandoned Waste Disposal Site In Fullerton, California……Oct 1981

50. McColl Phase II Emission Control Test Data Summary, Technical Memorandum …….May 1983

51. McColl Phase II Modeling of the Air Emissions from the McColl Site Investigation, Fullerton California……..March 1983

52. Characterization of the Atmospheric Contaminate Emissions from the McColl Site, Fullerton California----------February 1983

53. Hard Copy Documents represent only a portion of the documents listed in the Administrative Record Cumulative Index. Please see microfiche for the remainder of the documents……Oct 1983

54. Hard Copy Documents represent only a portion of the documents listed in the Administrative Record Cumulative Index. Please see microfiche for the remainder of the documents……May 1983

55. Results from McColl Phase II—Task 4, Stage 3: Investigative Laboratory Testing for Remedial Alternative and Technology Design……May 1983
56. Quality Assurance Project Plan For Wastes and Soils Investigation……Feb 1987
57. Final Draft Groundwater Investigation Report……Sept 1987
58. Final Sampling Plan Waste and Soil Investigation……..March 1987
59. Community Relations Plan……Dec 1987
60. Demonstration of a Trial Excavation at the McColl Superfund Site, Applications Analysis Report……..Oct 1992
61. The McColl Supplemental ReEvaluation of alternatives II (SROAii)….Apr 1992
62. Baseline Public Health Evaluation……May 1992
63. Field Report, McColl Site Fullerton California Various Tasks to Supplement the Previous RI/FS Efforts & Waste and Contaminated Soil Investigated……Oct 1987
64. The McColl Site Pediatric Health Surveys……..Feb 1983
65. Final Groundwater Monitoring Report……Jan 1991/Apr 1991
66. McColl Site IRM/FS WA 11-9L04.2, “Interim Site Stabilization Analysis of Slope Stability Preliminary Draft Report.”……Aug 1986
67. Final Groundwater Monitoring Report……Dec 1991
68. Feasibility Study Report Groundwater Operable Unit……Feb 1996
69. Final Groundwater monitoring Report ……June 1990
70. Technical Assistance Team McColl In-Situ Treatment Evaluation….July 1991
71. Final Groundwater Investigation Report……..Aug 1990
72. Public Health Evaluation Remedial Alternatives PHERA), Volume 2 Attachments……..May 1992
73. Start Program Special Investigation……..Jun 1991
74. Tenth Annual Report to the Legislature on the McColl Hazardous Waste Site ……Nov 1992
75. Letter Report for Waste Sampling collections Activities……Aug 1993
76. Remedial Alternatives Focusing report……June 1988
77. Permeation of Plastic Pipes: Literature Review and Research Needs..July 1986
78. McColl Interagency Committee Meeting……..May 1987
79. Annual Reports for Years 2000 and 2001……Oct 2002
80. Draft Remedial Action Plan for Remediation of the McColl hazardous Waste Site ..Jan 1989
81. IAC Review Draft, “Supplemental Reevaluation of Alternatives, Executive Summary and Chapters 6 &7, EPA WA 11-9L04.0……Oct 1988
82. IAC Review Draft, “Supplemental Reevaluation of Alternatives, EPA WA 11-9L04.0……Aug 1988
83. Final Work Plan McColl Groundwater Investigation……..April 1986
84. Remedial Action and Stabilization Plan……May 1987
85. Community Contingency Plan……July 1991
86. Completion Report for Waste removal Activities 9/27/93 to 10/4/93…..Oct 1993
87. Public Health Evaluation of Remedial Alternatives (PHERA)……..May 1992
88. Groundwater Monitoring Report Eleventh Semi-Annual Sampling Event (SA11) ----------May 2002
89. Demonstration of a Trial Excavation at the McColl Superfund Site……Oct 1992

90. Community Safety/Contingency Response……..…..April 1987
91. Revised Community Relations Plan……May 1992
92. Remedial Action/Construction Work Plan……..Sept 1996
93. Work Plan Various Tasks To Supplement The Previous RI/FS Efforts..Sept 1986
94. Development and Screening of Remedial Alternatives Groundwater RI/FS..May 1995
95. McColl Task 4---Site Preparation/Mobilization/Grading Plan……..Sept 1994
96. Misc Minutes of McColl Site Group's (MSG)……Jun 1995
97. Revised Summary Tables for Monitoring Report Second Quarter Sampling Period……..June 1995
98. Final Draft Supplemental Reevaluation of Alternatives Appendixes…….Feb 1989
99. McColl Superfund Project Transmittal Sheet of Draft Remedial Action Report……March 1998
100. Task 4—Interim Reagent Delivery QA/QC Plan Draft……..Sept 1994
101. Executive Summary of Task 4 Full-Scale Treatability Study Report….May 1995
102. Misc Minutes of March 21, 1995 McColl IAC Meeting……..Mar 1995
103. Technical Assistance Team –McColl Treatability Study: Results and conclusions Revision 5……..Apr 1992
104. Administration Order for Remedial Design and other Response Designs..Jul 1993
105. Treatability Study Report: Results of Treating McColl Superfund Waste in Ogden's Circulating Bed Combustor Research Facility……..Nov 1990
106. Groundwater Monitoring Report Tenth Semi-Annual Sampling Event (SA10)……Dec 2001
107. Health Risk Assessment for Trial Excavation at the McColl Superfund Site..May 1990
108. Excavation Management Plan for Trail Excavation at the McColl Superfund Sit…May 1990
109. The McColl Supplemental Reevaluation of Alternative II (SROA II)……..Apr 1992
110. Pilot-Scale Incineration of contaminated Soil From The Purity Oil Sales and McColl Superfund Site……Feb 1991
111. CSPOC Cancer Surveillance Program of orange County……Mar 1988, Revised Apr 1988
112. Technology Evaluation Report: Site Program Demonstration of a Trial Excavation at the McColl Superfund Site……..Dec 1990
113. Technology Demonstration of a Trial Excavation at the McColl Superfund Site……..Sept 1990
114. Five-Year Review Report……Nov 2002

Attachment 8

Comments Received on Draft FYR and Response to Comments

[This page intentionally left blank]

Response to Comments Received on the Draft 2nd Five-Year Review for the McColl Superfund Site, Fullerton, Orange County, California

Comments by Thomas Georgian (USACE Omaha HTRW CX):

Comment # 1: Page 19, top of page, second bullet: The sample sizes for the Mann-Kendall (M-K) trend tests should be specified. As page 13 states that trend evaluations are done to determine if "site related contaminants are decreasing, stable, or increasing, at points beyond the site boundary," the document should mention that the power of the M-K test to detect trends will be low when the sample size is small (though trends were not evident when the groundwater data in Table 5 was evaluated).

The current sample size seems small. According to Table 5, it is not larger than six. About 15 data points would be desirable to test for trends. If groundwater monitoring results were collected for the first Five-Year Review Report (issued in 9/30/2002), then these results should be pooled with the current data for the trend evaluations.

Response: The sample size for benzene, arsenic, and beryllium analyses at P-2I is six, and has been added to the report. Having reviewed data at this well going back to 1994, these three COCs are generally stable except for a slight increase during 1999-2002, likely associated with increased water levels due to infiltration.

Comment # 2: Page 19, top of page, second bullet: It is recommended that time series plots and the p-values of the M-K tests also be included in the document (e.g., in an appendix).

Response: P-values of the M-K tests have been stated in the text for the completed analyses, however, the three plots have not been added as an appendix since they show no significant, increasing or decreasing trends.

Comment # 3: Table 5: Non-detections should be reported using numerical limits rather than as "ND," as is not possible to compare non-numerical values to numerical decision limits (e.g., MCLs). The reporting/quantitation limits should also be listed in the data summary table.

Response: When available, non-detections were reported using numerical reporting limits in the revised report. In the case of the 2003 data, the lab tables were inadvertently omitted from Appendix F of the OM&M therefore reporting limits are not known by the FYR authors.

Comment # 4: Page 23, second paragraph: The document should clarify whether or not the water level "trends" discussed here refer to statistical trends (e.g., identified by the M-K test) or subjective evaluations.

Response: The water level trends were determined by qualitative evaluations and not rigorous statistical methods. Text has been revised to clarify this point.

Comment # 5: Page 24: The document should discuss whether detections (above the method detection limit but) less than the reporting/quantitation limits are being reported. Detections less than the reporting limit would be qualified as estimated (e.g., with J-flags), but none of the results in Table 5 are qualified as estimated. Reporting detections to the reporting/quantitation limit rather than the method detection limit would increase data censoring and adversely affect statistical evaluations. It should also be noted that uncensored results can typically be reported for metals analyses (e.g., by ICP or ICP/MS), but most of the metals data are censored.

Lastly, the document should address (e.g., in Section VIII) the usability of the data if any of the reporting limits are greater than the decision limits.

Response: A few of the data points shown in Table 5 were above the decision limits due to matrix dilution effects; however, lower reporting limits from previous or subsequent analyses supported the conclusions made that there were no significant usability data gaps.

Comment # 6: Section A.1, page 2-7: The document states: "Vapor analytical results confirm the manual PID measurements which indicate off-gas generation is well below regulatory levels for COCs." The document should discuss in what sense the manual PID measurements "confirm" the vapor analytical results (e.g., statistical comparisons of split samples).

Response: The manual PID measurements were of low concentration, as were the vapor analytical samples. The correlation between the qualitative (PID) and quantitative (lab analytical results) values show confirmation that manual readings are indicative of lab results.

Comment # 7: Section IX: The document should discuss whether or not future chemical analyses for THTs are needed, as the document states "The 2005 ESD for the groundwater OU removed this criterion [the 3.6 μg/L decision limit for THTs] and replaced it with the benzene MCL."

Response: The fact that benzene appears to be transported farther than THTs at McColl should allow the monitoring of benzene alone to be protective; however, as a means of conservatism to insure protectiveness, THTs will continue to be sampled and analyzed. This is reflected in the current monitoring plan, and implied in the FYR.

Comment # 8: Section B.5 ("Expected Progress Toward Meeting RAOs"): It does not appear that this question was answered. If the decision limits in Table 5 are the RAOs, but decreasing trends were not identified for wells containing contamination above the RAOs, then it does not appear that any progress was made toward meeting RAOs.

Alternatively, if the decision limits in Table 5 are not RAOs, there does not seem to be a well-defined end point for the monitoring.

Response: The RAOs, as stated in Section VII, Paragraph B.5, are being achieved.

Comments by Terry L. Walker (USACE Omaha HTRW CX):

Comment # 1: Thiophenes, page 10. Please verify the spelling of "2-methyltrahydrothiophene" and "3-methyltrahydrothiophene."

Response: The typographical errors have been corrected.

Comment # 2: Penultimate paragraph, page 10. Please verify the spelling of "hid(2-ethylhexyl)phthalate."

Response: The typographical error has been corrected.

Comment # 3: Section X, page 36. The statement is made that both remedies are "expected to continue to be protective in the foreseeable future," yet Table 7 indicates that protectiveness is questionable beyond one year without addressing the issues in that table. Please rectify this apparent discrepancy.

Response: The issues brought up in Table 7 are currently being addressed to an adequate level; hence future protectiveness based on current levels has been revised to "yes" and is now in agreement with Section X.

Comments by Rick Waples (USACE Omaha HTRW CX):

Comment # 1: Page 10, paragraph III, Groundwater OU. In the 4th paragraph where the 11 COCs are listed for the site, please correct the typo for "Bis(2-ethylhexyl)phthalate". Currently it is listed as "hid".

Response: Typographical error has been corrected.

Comment # 2: Page 23, paragraph VI.D, Groundwater Chemistry. Recommend that final FYR direct the reader to the discussion made in Paragraphs VII, A.1 on page 28 and VII, A.6 on page 30. Recommend the discussion on page 30 include the point that the monitoring data did not appear to be chronic, high-level exceedances for the metals MCLs.

Response: The referenced paragraphs are brought to the attention of the reader, and the point regarding lack of chronic, high-level metals exceedances was added to Section VII of the text.

Comment # 3: Page 26, paragraph VII.A.6. Please add a place holder to this discussion in the final FYR so it can be documented that EPA has verified that the deed restriction on the Source of contamination has been recorded by the Office of Recorder for Orange County.

Response: This information has been verified to the satisfaction of EPA.

Comment #4: Page 33, paragraph VII.B.4. Recommend an additional statement be added to this discussion that clarifies that although the MCL for arsenic was reduced, the remedy is still protective. It would be desirable to relate this to there is no change in risk to human health or the environment with the current remedy. This could be added to paragraph VII.B.3. The technical assessment summary makes a statement that the remedy remains protective but it would be helpful if additional support to why a lowering of the MCL for arsenic is still not a potential problem at this site.

Response: Recommended statement was added to text.

Comments by Dave Becker (USACE Omaha HTRW CX):

Comment # 1: General. This is a very good, concise 5YR report.

Response: Comment noted.

Comment # 2: p. 10, table. I defer to the chemists, but I would think the methyl THT should have "tetra" in the name rather than just "tra" (e.g., 3-methyltetrahydrothiophene rather than 3-methyltrahydrothiophene).

Response: You are correct, and the typographical errors associated with THTs have been corrected.

Comment # 3: p. 21. The reported low efficiencies of the carbon treatment and the low effluent concentrations suggest that treatment for VOCs may not be needed. Without carbon change out, the carbon is probably not currently doing much. I defer to the comments from the process engineer.

Response: Comment noted. This may be addressed in the future and would fall under "OM&M oversight and data evaluation."

Comment # 4: p. 25, Table 5. Please indicate the detection limits, if known.

Response: When known, the reporting limits have been included in Table 5.

Comment # 5: p. 28, sec. VII.A.1. a) Suggest you note the increases in the water levels in the deeper units and ascribe that to more regional reactions to high precipitation in 2005(?). b) As a side comment to the authors, is there a good conceptual model explanation for the upward gradient between the D and C zones, especially if the deeper units are used for water supply?

Response: Text has been added noting increased water levels at some wells in late 2004 to 2005, which appear to be related to above average precipitation those years.

- Comments provided by the USEPA Region 9 were embedded in an earlier electronic version of the FYR report, therefore separate listing of their comments/response to comments have not been included herein. All USEPA comments have been incorporated into this version of the report.

- Comments provided by the PRP were provided via phone conversation between the PRP and the EPA on September 6th, 2007. The comments were incorporated into the report to the extent practicable.

[This page intentionally left blank]

Attachment 9

Advertisement for Notice of Five Year Review,
McColl Superfund Site

[This page intentionally left blank]

Notice of Five-Year Review
McColl Superfund Site
Fullerton, CA

The U.S. Environmental Protection Agency (U.S. EPA) is conducting a second Five-Year Review of the cleanup of the McColl Superfund Site (Site) in Fullerton, CA. The first Five-Year Review was completed in June 2002. The second Five-Year Review will cover the air, groundwater and soil at the site. The purpose of Five Year Reviews is to evaluate every five years the implementation and effectiveness of the cleanup to ensure it remains protective of human health and the environment.

From 1942-1946 the site was used as a petroleum refinery waste disposal facility covering approximately 22 acres. The primary contaminants of concern in the air, groundwater and soil on site are thiophene compounds, sulfur dioxide, and various volatile organic compounds (VOCs) including benzene.

The Source Record of Decision (1993) and Groundwater Record of Decision (1996) for the Site called for a Resource Conservation Recovery Act (RCRA)-equivalent cap over the twelve old waste sumps at the site and a below grade soil/bentonite slurry wall around the sumps. A treatment system captures and treats any gases generated beneath the cap, and regular sampling of the groundwater monitors for migration of site contaminants off-site. The previous Five-Year Review (2002) found that the selected site remedy is working as designed and is protective of human health and the environment.

The U.S. EPA anticipates that the second Five-Year Review report will be completed by September 30, 2007. If you have any concerns or questions regarding the McColl Superfund Site Five-Year Review, please contact either of the EPA personnel listed below:

Rusty Harris-Bishop
75 Hawthorne St., SFD-7-2
San Francisco, CA. 94105
(415) 972-3140
harris-bishop.rusty@epa.gov

José Francisco García
75 Hawthorne St., SFD-3
San Francisco, CA. 94105
(415) 972-3331
(800) 231-3075
garcia.jose@epa.gov

Website: http://www.epa.gov/region09/mccoll