Five-Year Review Report

Third Five-Year Review Report

for

Beckman Instruments Superfund Site

Porterville, California

September 2008

PREPARED BY:

United States Environmental Protection Agency
Region 9
San Francisco, California

Approved by: Kathleen Salyer **Date:** 9/18/08

Kathleen Salyer, Assistant Director
Superfund Division
California Site Cleanup Branch
U.S. EPA, Region 9

Five-Year Review Report

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List of Acronyms

ARAR	applicable or relevant and appropriate requirement
bgs	below ground surface
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
DCA	dichloroethane
1,1-DCE	1,1-dichloroethylene
EPA	United States Environmental Protection Agency
MNA	monitored natural attenuation
MCL	Maximum Contaminant Level
NCP	National Contingency Plan
O&M	Operation and Maintenance
µg/L	micrograms per liter
ppm	part per million
RAOs	remedial action objectives
RPM	Remedial Project Manager
ROD	Record of Decision
TCA	trichloroethane
TCE	trichlorethylene
VOC	volatile organic compound

Executive Summary

The original 1989 remedy for contaminated groundwater and soil at the Beckman Instruments Superfund Site (the Site) in Porterville, California was groundwater pump and treat and soil excavation. After successfully removing the contaminated soil and cleaning up 95% of the contaminated groundwater, the United States Environmental Protection Agency (EPA) amended the remedy in 2005 to monitored natural attenuation (MNA) for two small areas of groundwater contaminated with 1,1-dichloroethylene (1,1-DCE) that exceeded cleanup levels. The trigger for this five-year review was the second five-year review conducted in 2003.

This five-year review found that both the original remedy and amended remedy were implemented in accordance with the requirements of the September 1989 Record of Decision and the September 2005 Record of Decision Amendment. The current MNA remedy is functioning as designed. The remedy is protective of human health and the environment.

Five-Year Review Summary Form

SITE IDENTIFICATION		
Site name: Beckman Instruments		
EPA ID: CAD048645444		
Region: 9	**State: CA**	**City/County: Porterville, Tulare County**
SITE STATUS		
NPL status: ☒ Final ☐ Deleted ☐ Other (specify)		
Remediation status (choose all that apply): ☐ Under Construction ☒ Operating Complete		
Multiple OUs?* ☐ YES ☒ NO	**Construction completion date:** 9/21/1993	
Has site been put into reuse? ☐ YES ☐ NO ☒ N/A		
REVIEW STATUS		
Lead agency: ☒ EPA ☐ State ☐ Tribe ☐ Other Federal Agency _____		
Author name: Holly Hadlock		
Author title: Remedial Project Manager	**Author affiliation: U.S. EPA Region 9**	
Review period: 3/2008 to 9/2008		
Date(s) of site inspection: 7/10/2008		
Type of review: ☒ Post-SARA ☐ Pre-SARA ☐ NPL-Removal only ☐ Non-NPL Remedial Action Site ☐ NPL State/Tribe-lead ☐ Regional Discretion		
Review number: ☐ 1 (first) ☐ 2 (second) ☒ 3 (third) ☐ Other (specify) _____		
Triggering action: ☐ Actual RA Onsite Construction at OU #2 ☐ Actual RA Start at OU#____ ☐ Construction Completion ☒ Previous Five-Year Review Report ☐ Other (specify)		
Triggering action date *(from WasteLAN)*: 09/29/2003		
Due date *(five years after triggering action date)*: 09/29/2008		

* ["OU" refers to operable unit.]

Issues:

There are no issues that affect protectiveness.

Protectiveness Statement:

The Beckman Instruments remedy is protective of human health and the environment.

Other Comments:

None

Five-Year Review Report

I. Introduction

The purpose of five-year reviews is to determine whether the remedy at a site is protective of human health and the environment. The methods, findings, and conclusions of reviews are documented in five-year review reports. In addition, five-year review reports identify issues found during the review and present recommendations to address them. EPA is preparing this five-year review report pursuant to the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) §121 and the National Contingency Plan (NCP). CERCLA §121 states:

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

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

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

EPA Region 9 has conducted a five-year review of the remedy implemented at the Beckman Instruments Superfund Site in Porterville, California. This review was conducted from March 2008 through September 2008 by the Remedial Project Manager (RPM). This report documents the results of the review.

This is the third five-year review for the Site. EPA is preparing this five-year review as a matter of policy because the remedial action has taken longer than five years to complete. The triggering action for this policy review is the date of second five-year review, September 29, 2003.

II. Site Chronology

Table 1: Chronology of Site Events

Event	Date
Industrial wastes disposed on-site	1967 - 1983
Leak detected in on-site evaporation pond	1978
CA RWQCB issued order to investigate groundwater contamination	1982
Discharge to pond discontinued	1983
Beckman begins operation of groundwater pump and treat system	July 1985
NPL Listing	June 10, 1986
Beckman installs 2nd pump and treat system in eastern portion of site	July 1987
ROD selecting the final remedy	September 26, 1989
Contaminated soil excavated and disposed off-site	1990
Cleanup levels reached in upper aquifer	1990
Additional extraction wells added to upper aquitard and lower aquifer	1992-1993
First five-year review	1998
Pump test of upper aquitard/lower aquifer extraction wells	1998
EPA approves Beckman proposal to change remedy to monitored natural attenuation	2001
Second five-year review	2003
ROD Amendment	September 2005
Interim Remedial Action Report	March 2007

III. Background

Physical Characteristics

The Site, which includes the Beckman plant and surrounding study area, is located near the southern limit of the City of Porterville, California. Porterville is located in Tulare County about 25 miles southeast of Visalia on the eastern fringe of California's San Joaquin Valley (Figure 1, Site Location Map). The Site is approximately 160 acres and consists of the Beckman plant property and other privately owned commercial, agricultural, and residential property located to the west of the Beckman plant.

The Beckman plant is located at 167 West Poplar Avenue and occupies approximately 12 acres. The Site is generally bounded by the Tule River to the north, plant property to the east, Poplar ditch to the south, and Newcomb Drive to the west (Figure 2, Hydrogeologic Units).

The City of Porterville is situated on a broad alluvial fan of the Tule River. Much of this fan forms a relatively flat alluvial plain, characterized by surfaces of low topographic relief which rarely exceed 10 feet of elevation change, except in the vicinity of the river.

The Site aquifer system consists of an upper aquifer, upper acquitard, and lower aquifer. These units are the uppermost portions of a westward thickening wedge of sediments of continental origin. The upper aquifer is comprised of silt, sand, gravel, and cobbles. Groundwater first occurs in the upper aquifer under unconfined conditions. Historical depth to water has ranged from approximately 7 to 42 feet bgs. Groundwater flow in this aquifer is to the west and northwest across the site. Analysis of groundwater flow in the aquifer predicts the remaining contaminant plume will travel less than 1,350 feet by the year 2025.

The top of the upper aquitard is located approximately 50 feet bgs in the vicinity of the Beckman plant and is approximately 46 to 51 feet thick in that location. It is comprised of a fine-grained sequence of silt, clayey silt, and sandy clay. The upper aquitard is a low-permeable confining unit between the upper aquifer and the lower aquifer.

The lower aquifer occurs below the upper aquitard throughout the Site. The top of this unit ranges in depth from approximately 80 to 130 feet below ground surface. The lower aquifer is comprised of silty to clayey sand and gravel with interbedded silt and clay. Generally, the lower aquifer materials contain a greater percentage of fine-grained sediments and interbeds than the upper aquifer. The lower aquifer is estimated to extend to a depth of approximately 180 to 220 feet bgs throughout the Site.

Land and Resource Use

Land use in the Beckman area includes residences, field crops, orchards, grazing, commercial/industrial, and vacant land. The City of Porterville uses groundwater wells thoughout the city for its drinking water supply. The groundwater aquifers underlying the historical area of Beckman contamination associated with the Site are currently not used as a drinking water source due to a moratorium on well use and well construction issued by Tulare County.

History of Contamination

Beckman Instruments, now operating as Beckman Coulter, Inc., has manufactured electronic equipment assemblies and printed circuit boards in Porterville since 1967. Industrial processes used at the plant include electroplating and degreasing. From 1975 until early 1983, waste streams were discharged to an on-site evaporation pond. The leak detection system detected a leak in the waste pond in July 1978 and then detected intermittent leaks until 1981. Additionally, an above-ground pipe carrying electroplating wastes to the pond also leaked, contaminating soil near the plant with lead.

Initial Response

In 1983, Beckman closed the evaporation pond due to leaking. Beckman conducted groundwater monitoring activities in late 1982 and early 1983, which revealed the presence of volatile organic compounds (VOCs) in the groundwater below the evaporation pond. VOCs were also present in residential wells located west of the plant. After the discovery of the groundwater contamination, the California Department of Health Services and the

California Regional Water Quality Control Board directed Beckman to determine the extent of the groundwater contamination. Beckman provided bottled water to approximately 300 residences located near the plant and eight private wells were sealed or replaced to further limit the spread of contamination. Eventually all residences in the area were connected to the City water system.

On December 2, 1983, the County of Tulare Health and Human Services Agency issued a memorandum to all District Sanitarians that imposed a moratorium on well drilling in areas downgradient of the Site. This institutional control prohibits the approval of building permits for property owners proposing to obtain water from wells in the Site area. The moratorium remains in effect today.

By June 1985 Beckman determined that contaminants had migrated westward 9,000 feet downgradient of the Site. In July 1985 Beckman installed an upper aquifer extraction and treatment system and expanded it in July 1987. The treated groundwater from the air stripping facility was used for agricultural irrigation or discharged to infilitration basins located near the Tule River.

EPA added the Site to the National Priorities List in June 1986.

Basis for Taking Action

Volatile organic compounds (VOCs) were the primary contaminants found above state and federal drinking water standards at the Beckman site. The VOCs found are mobile in groundwater and are probable and/or potential carcinogens. The most prevalent contaminant in the upper aquifer was 1,1,1-trichloroethane (1,1,1-TCA). The most prevalent contaminant in the lower aquifer was 1,1-dichloroethylene (1,1-DCE). Other contaminants found in the groundwater were Freon 113, trichloroethylene (TCE), and 1,1 dichloroethane (1,1-DCA). Exceedances of drinking water standards for 1,1,1-TCA and 1,1-DCE were detected in the upper aquifer, upper aquitard, and lower aquifer, and up to 9,000 feet downgradient in the upper aquifer.

IV. Remedial Actions

Remedy Selection

1989 ROD

EPA issued the ROD for the Beckman Instruments Site on September 26, 1989. For remedial purposes, the Site was separated into three areas: 1) Upper Aquifer, 2) Upper Aquitard and Lower Aquifer, and 3) Lead-contaminated Soils. The remedial action objectives were to restore groundwater to beneficial use and to remove lead-contaminated soil to below residential levels. The cleanup goal for the groundwater was the more stringent level among the State or Federal Maximum Contaminant Level (MCL) and the State Action Level for each contaminant.

Table 2
1989 ROD Cleanup Standards

Groundwater	**1,1,1-TCA**	**200 µg/L**
	1,1-DCE	**6 µg/L**
	Freon 113	**1200 µg/L**
	1,1-DCA	**5 µg/L**
	TCE	**5 µg/L**
Soil	**Lead**	**200 ppm**

The following remedies were selected:

- Upper Aquifer: Continuation of the existing upper aquifer extraction, treatment and discharge systems
- Upper Aquitard/LowerAquifer: Concurrent upper aquitard and lower aquifer extraction, treatment, and discharge; installation of extraction wells and treatment of extracted water using existing air stripping facilities
- Soils: Excavation of lead-contaminated soils and off-site disposal of the excavated soils

2005 ROD Amendment

By 1999 1,1-DCE was the only contaminant above its cleanup goal of 6 µg/L. It was present in two small, localized areas of the lower aquifer. Further study indicated these small areas were not likely to be cleaned up by various pump and treat alternatives in a reasonable time frame and at reasonable cost. EPA determined it was no longer cost effective to address the remaining groundwater contamination with an engineered remedy. On September 27, 2005, EPA amended the ROD and changed the remedy from groundwater extraction and treatment to monitored natural attenuation (MNA).

Remedy Implementation

1989 ROD Implementation

In March 1990 Beckman completed the removal and off-site disposal of soil contaminated with lead. Beckman removed 18 cubic feet of soil, which was shipped in drums to Kettleman City. Confirmation samples indicated that all soils above 200 ppm lead had been removed. The excavated area was backfilled with clean soil.

Due to the groundwater cleanup actions taken by Beckman before the ROD was signed, the upper aquifer was successfully cleaned up by September 1989 and all contaminants were below their respective MCLs. In 1990 Beckman ceased operation of the upper aquifer wellfield.

The upper aquitard and lower aquifer remedial action took place in two phases. The Phase I extraction wellfield, which included four upper aquitard extraction wells and five lower aquifer extraction wells, began operating in August 1991. Operation of the Phase II wellfield, which added four new monitor wells and 10 new extraction wells, began in January 1993.

The site achieved construction complete status when EPA issued the Preliminary Close Out Report on September 21, 1993. EPA and the State determined that all RA construction activities were performed according to specifications.

2005 ROD Amendment Implementation

The MNA remedy included installation of four new monitor wells, three of which are downgradient sentinel wells, as well as use of five existing monitor wells. Beckman installed three sentinel monitor wells downgradient of the two areas with 1,1-DCE above 6µg/L (Figure 3, Monitoring Locations). Beckman prepared an MNA plan that calls for annual monitoring and submittal of an annual monitoring report to EPA. Monitor well L-03, which had the highest 1,1-DCE concentration, was abandoned in 2007 and replaced with MNA-4 due to the new property owner's pending development. All of the newly installed MNA wells are in public rights-of-way to avoid complications of private site access and the resulting need to maintain long-term lease agreements with private land owners.

System Operations/Operation and Maintenance (O&M)

1989 ROD

The upper aquifer groundwater extraction system operated from 1985 to 1990. Monitoring continued until 1997, after which all upper aquifer wells were abandoned. The upper aquitard/lower aquifer extraction system operated from 1991 to 1999, by which time virtually all of the upper aquitard and lower aquifer was successfully remediated.

In 1999 only two small localized areas of the upper aquitard and lower aquifer remained above cleanup goals. Further focused operation of the pump and treat system in one of these areas failed to show progress toward achieving cleanup goals due to the inability to accelerate contaminant removal from the upper aquitard. This inability to clean up the groundwater with the pump and treat system led EPA to amend the ROD in 2005.

2005 ROD Amendment

Operation and maintenance activities for the MNA remedy are minimal. The only O&M activities are the annual water level measurements and sampling of the lower aquifer groundwater. The MNA remedy required four quarterly sampling of the four newly installed lower aquifer monitor wells followed by annual sampling. In May 2007 Beckman submitted to EPA the first annual MNA report. Beckman now conducts annual monitoring.

V. Progress Since the Last Review

In the previous (second) five-year review EPA recommended amending the ROD to change the remedy from pump and treat to MNA. EPA issued a ROD amendment on September 27, 2005.

VI. Five-Year Review Process

Administrative Components

The Beckman Five-Year Review team was led by Holly Hadlock of EPA, Remedial Project Manager (RPM) for the Site. Cynthia Wetmore, Superfund Technical Support, and Richard Mednick, Regional Counsel, provided assistance.

Community Notification and Involvement

For the five-year review EPA sent a public notice to the Porterville newspaper, the *Porterville Recorder*, on August 19, 2008. Notices were also published in Spanish in two Spanish-language papers, *Noticiero Seminal* in Porterville on August 22 and *El Sol* in Visalia on August 23. These notices informed the public that EPA was conducting the five-year review and that the five-year review report would be available both online and in the local repository, the Porterville Library.

Document Review

This five-year review consisted of a review of relevant documents (Attachment 1), O&M records, and monitoring data. Applicable groundwater cleanup standards of the 2005 ROD Amendment were reviewed (Attachment 2, ARAR Analysis).

Data Review

1,1-DCE is the only contaminant remaining in the groundwater above ROD cleanup goals. At the time of the second five-year review, 1,1-DCE was present west of the Beckman plant in two small areas in the lower aquifer. Three wells, L-03, L-27-EW and L-29-EW, had 1,1-DCE above 6 µg/L, with the highest concentration in L-03. The following table shows contaminant concentrations when the ROD was amended in 2005:

Table 3
Contaminant Concentrations in Groundwater (µg/L), February 2005

WELL	1,1,1-TCA	1,1-DCE	FREON 113	1,1-DCA	TCE
Cleanup Goal	*200*	*6.0*	*1200*	*5.0*	*5.0*
Upper Aquitard Wells					
AQ-02-EW	<0.5	<0.5	<0.5	<0.5	<0.5
AQ-02-PZ1	<0.5	<0.5	<0.5	<0.5	<0.5

AQ-02-PZ2	<0.5	<0.5	<0.5	<0.5	<0.5
AQ-11-EW	<0.5	<0.5	<0.5	<0.5	<0.5
AQ-11-PZ1	<0.5	<0.5	<0.5	<0.5	<0.5
AQ-11-PZ2	<0.5	2.4	1.6	<0.5	<0.5
Lower Aquifer Wells					
AQ-02-LO	<0.5	4.9	2.8	<0.5	<0.5
AQ-02-LP	<0.5	3	1.4	0.57	<0.5
L-03	<0.5	**31**	16	1.2	0.62
L-05	<0.5	<0.5	<0.5	<0.5	<0.5
L-06	<0.5	<0.5	<0.5	<0.5	<0.5
L-07	<0.5	1.2	<0.5	0.73	<0.5
L-08	<0.5	<0.5	<0.5	<0.5	<0.5
L-09	<0.5	<0.5	<0.5	<0.5	<0.5
L-17	<0.5	<0.5	<0.5	<0.5	<0.5
L-27-EW	<0.5	**6.7**	3.9	<0.5	<0.5
L-28	<0.5	2.1	1.7	<0.5	0.68
L-29-EW	<0.5	**8.3**	4	1.4	<0.5

The new monitor wells, MNA-1, MNA-2, MNA-3 and MNA-4, were installed in the lower aquifer zone in 2006 during implementation of the MNA remedy, with MNA-4 replacing L-3. The six upper aquitard wells and one lower aquifer well, AQ-02-LP, were decommissioned in 2007.

As part of the MNA program, Beckman conducted quarterly sampling of the four new wells for the first year and annual sampling thereafter. The annual sampling program includes nine monitor wells. Four wells, L-05, L-08, L-09 and L-17 are considered contingent wells and are not sampled annually. All of the wells are in the lower aquifer; there are no more wells in the upper aquifer. Beckman prepares an annual performance monitoring report, comparing the trends in groundwater concentrations to the predicted trends in the MNA analysis.

Results from the first annual MNA report (Feb. 2008) show that seven of the ten wells had concentrations below action levels for all contaminants of concern. The compound, 1-1-1 TCA was non-detect for all wells. Three wells had exceedences of 1,1-DCE as shown below. All other contaminants of concern were below their respective action level.

The second annual MNA report (June 2008) indicated that only one well, MNA-4, exceeded the cleanup goal. The data in Table 4 show that concentrations of 1,1-DCE continue to decline. Both L-27-EW and L-29-EW are now below the cleanup goal of 6 µg/L. According to the annual monitoring reports, the contamination concentrations are following their predicted trends.

Table 4
Data from MNA Program

Results for 1,1-DCE

	May-06	Aug-06	Nov-06	Feb-07	May-07	Mar-08
MNA-4	NS	33 µg/L	42 µg/l	46 µg/l	30 µg/l	19 µg/L
L-27-EW	6.6 µg/L	NS	NS	NS	NS	5.0 µg/L
L-29-EW	5.3 µg/L	NS	NS	NS	NS	4.7µg/L

Site Inspection

Holly Hadlock conducted the site inspection on July 10, 2008. Robert Keeler, the Beckman Project Manager, participated in the inspection and provided information. The purpose of the inspection was to locate all monitor wells and confirm that they were properly secured and in good condition. All wells were found to be in good condition. A copy of the Site Inspection Checklist is included in Attachment 3.

Interviews

The RPM telephoned the Porterville City Manager John Longley on July 18, 2008, and asked him if there were/are issues or concerns about the Beckman Superfund Site. He replied that the Site has not been an issue of significant concern in the community, that Beckman has done a very good job of taking care of the groundwater contamination, and that there has been no major City involvement in the past five years. During Mr. Longley's last contact with Beckman he was told the cleanup is in the final stages.

VII. Technical Assessment

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

The review of documents, ARARs, risk assumptions, and the results of the site inspection indicate that the remedy is functioning as intended by the ROD Amendment. The remedy has achieved the remedial objective of protecting human health and the environment by continuing to eliminate exposure to contaminated groundwater. Progress is being made toward meeting the second remedial objective, which is to reduce contamination in groundwater to concentrations that meet cleanup goals and return groundwater to beneficial use. Concentrations of 1,1-DCE in the groundwater continue to decrease.

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

There have been no changes in the physical conditions of the site that would affect the protectiveness of the remedy. The RAOs used at the time of remedy selection are still valid. There have been no changes in the ARARs and no new standards or requirements affecting the protectiveness of the remedy.

There have been several changes to the toxicity values since the completion of the Baseline Risk Assessment in 1988 (see Attachment 4, Toxicity Review Summary Memorandum). The greatest change in values is for TCE, where current information indicates that TCE may be more toxic than originally assumed. However, current levels of TCE in groundwater are below the MCL which is considered protective. Recent toxicity data for 1,1-DCE indicate that it is less toxic than originally assumed in the Baseline Risk Assessment.

The current screening level for soil ingestion of lead is 400 ppm for residential exposure which is greater than the clean-up level used in 1989.

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

There is no other information that calls into question the protectiveness of the remedy.

Technical Assessment Summary

According to the data reviewed and the site inspection, the remedy is functioning as intended by the ROD Amendment. There have been no changes in the physical conditions of the site that would affect the protectiveness of the remedy. Witht the exception of the MCL for 1,1-DCE, the remedy is meeting all ARARs in the ROD Amendment and there have been no changes in ARARs affecting the protectiveness of the remedy. With respect to 1,1-DCE, the remedy is on target to attain that ARAR. There have been no changes in the toxicity factors for the contaminants of concern that were used in the previous risk assessments or the standardized risk assessment methodology that could affect the protectiveness of the remedy. There is no other information that calls into question the protectiveness of the remedy.

VIII. Issues

There are no issues at the Beckman site. The current monitoring plan is adequate.

IX. Recommendations and Follow-up Actions

EPA has no recommendations and follow-up actions.

X. Protectiveness Statement

The remedy at Beckman Instruments is protective of human health and the environment.

XI. Next Review

The next five-year review for the Beckman Instruments Superfund Site is required by September 2013, five years from the date of this review.

Attachment 1 – List of Documents Reviewed

Comprehensive Five-Year Review Guidance, U.S. Environmental Protection Agency, EPA 540-R-01-007, OSWER No. 9355.7-03B-P, June 2001.

Record of Decision, Beckman Instruments Superfund Site, U.S. Environmental Protection Agency, Region 9. September 26, 1989.

Second Five-Year Report for Beckman Instruments Superfund Site, Porterville, California. U.S. Environmental Protection Agency. September 2003.

Record of Decision Amendment, EPA Region 9. September 2005.

Interim Remedial Action Report, Beckman Instruments Superfund Site, Porterville, California, EPA Region 9. March 30, 2007.

Annual Performance Monitoring Report for Monitored Natural Attenuation, 2006-2007, Beckman Instruments Superfund Site, Porterville, California, Hargis & Associates, Inc. February 15, 2008.

Annual Performance Monitoring Report for Monitored Natural Attenuation, 2008, Beckman Instruments Superfund Site, Porterville, California, Hargis & Associates, Inc. June 19, 2008.

Attachment 2
ARAR Analysis, Third Five-Year Review

MEMORANDUM FOR RECORD

SUBJECT: ARAR Analysis, Beckman Instruments Superfund Site, Five-Year Review

PREPARED BY: Emile Pitre, Chemical Engineer, Seattle District, U.S. Army Corps of Engineers

DATE: 1 August 2008

Seattle District, U.S. Army Corps of Engineers is assisting the U.S. Environmental Protection Agency, Region 9, with the completion of statutorily required five-year reviews. As requested by EPA, one of the steps in evaluating the protectiveness of an implemented remedy is a review of the applicable or relevant and appropriate requirements (ARARs) for federal, state, or local regulations related to human health or the environment. The goal of the ARAR review is to determine if changes in the ARARs identified in the Record of Decision (ROD) impact the protectiveness of the remedy. This memorandum is the ARAR evaluation for the Beckman Instruments Superfund Site five-year review.

All chemical specific ARARs have remained unchanged from the date of the original ROD. Only proposed MCLs for 1,1-dichloroethane and Freon 113 were available at the time the ROD was signed. These levels have since been promulgated and are now State Primary Drinking Water MCLs. These contaminants are no longer present at the site.

The initial ROD and ROD Amendment mention the ARARs, but lack detail to how the regulations are applicable or relevant and appropriate to the remedy. This ARAR analysis was performed by reviewing the ARARs in the ROD Amendment in conjunction with a review of current ARARs from other similar sites in California. The ROD amendment, dated September 2005, selected monitored natural attenuation (MNA) as the remedy that will reduce concentrations of the sole remaining chemical of concern, 1,1-dichloroethene (1,1-DCE), to below the State maximum contaminant level (MCL) of 6 µg/L. This cleanup goal meets all drinking water ARARs. There are no other ARARs for this site.

All of the cleanup goals listed in the ROD, listed below in Table 1, remain unchanged.

Table 1. Treatment standards identified in the ROD and changes to regulatory standards.

Contaminant	Standard in ROD (µg/L)	Citation	New Standard (µg/L)
1,1-dichloroethane	5	State MCL	unchanged
1,1-dichloroethylene	6	State MCL	unchanged
1,1,1-Trichloroethane	200	State /Federal MCL	unchanged
Trichloroethylene	5	State /Federal MCL	unchanged
Freon 113	1,200	State MCL	unchanged

Table 2. ARARS applied in the Beckman Instruments Superfund Site ROD Amendment.

Medium / Authority	ARAR	Status	Standard Applied in ROD	Current Standard
Contaminant Specific ARARS				
Groundwater / Safe Drinking Water Act	Federal – SDWA – Maximum Contaminant Levels (MCLs) (40 CFR Part 141.11-141.6) and non-zero Maximum Contaminant Levels Goals (MCLGs)	Relevant and Appropriate	Federal or State MCL, whichever is most stringent.	Federal standards are unchanged from the date the ROD was finalized.
Groundwater / Safe Drinking Water Act	State – SDWA – Health and Safety Code, Div 5, Part 1, Chapter 7, 4020 et. seq., California Domestic Water Quality Monitoring Regulations, CAC Title 22, Division 4, Chapter 15, 64401 et seq.	Relevant and Appropriate	Federal or State MCL, whichever is most stringent..	State standards for 1,1-dichloroethane and Freon 113 promulgated.
Action Specific ARARS				
Groundwater / Porter – Cologne Water Quality Control Act	Porter-Cologne Water Quality Act	Relevant and Appropriate	Establishes authority for State and Regional Water Boards to determine site-specific discharge requirements and to regulate disposal of waste to land.	

Attachment 3

Please note that "O&M" is referred to throughout this checklist. At sites where Long-Term Response Actions are in progress, O&M activities may be referred to as "system operations" since these sites are not considered to be in the O&M phase while being remediated under the Superfund program.

Five-Year Review Site Inspection Checklist (Template)

(Working document for site inspection. Information may be completed by hand and attached to the Five-Year Review report as supporting documentation of site status. "N/A" refers to "not applicable.")

I. SITE INFORMATION

Site name: Beckman Instruments	**Date of inspection:** 7/10/08
Location and Region: Porterville, Reg 9	**EPA ID:** CAD048645444
Agency, office, or company leading the five-year review: US EPA	**Weather/temperature:** 109°, hazy w/ smoke

Remedy Includes: (Check all that apply)

- ☐ Landfill cover/containment
- ☐ Access controls
- ☐ Institutional controls
- ☐ Groundwater pump and treatment
- ☐ Surface water collection and treatment
- ☐ Other _____
- ☒ Monitored natural attenuation
- ☐ Groundwater containment
- ☐ Vertical barrier walls

Attachments: ☐ Inspection team roster attached ☐ Site map attached

II. INTERVIEWS (Check all that apply)

1. **O&M site manager** Robert Keeley (Name) Mgr. Environ. Affairs (Title) 7/10/08 (Date)
   Interviewed ☒ at site ☐ at office ☐ by phone Phone no. 559-782-5250
   Problems, suggestions; ☐ Report attached _____

2. **O&M staff** Ed Nemacek (Name) Principal Hydrogeologist (Title) numerous days (Date)
   Interviewed ☐ at site ☐ at office ☒ by phone Phone no. 480-345-0888 x 260
   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 RWQCB
Contact Shelton Grey (Fresno) _____ _____ _____
Name Title Date Phone no.
Problems; suggestions; ☐ Report attached _____

Agency Calif. DTSC
Contact Ed Cargile Site Manager _____ 916-255-3703
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.

John Longley, Porterville City Manager (7/18 phone call)

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

1. **O&M Documents** – MNA Plan + Reports
   - ☒ 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

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

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

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_____

2. **O&M Cost Records**

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

Total annual cost by year for review period if available

From_____ 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

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

A. Fencing

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

B. Other Access Restrictions

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

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) _____
Frequency _____
Responsible party/agency _____
Contact _____ _____ _____ _____
Name Title Date Phone no.

Reporting is up-to-date ☐ Yes ☐ No ☐ N/A
Reports are verified by the lead agency ☐ Yes ☐ No ☐ N/A

Specific requirements in deed or decision documents have been met ☐ Yes ☐ No ☐ N/A
Violations have been reported ☐ Yes ☐ No ☐ N/A
Other problems or suggestions: ☐ Report attached

_____
_____
_____
_____

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

D. General

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

2. **Land use changes on site** ☐ N/A
Remarks_____
_____

3. **Land use changes off site** ☐ N/A
Remarks_____
_____

VI. GENERAL SITE CONDITIONS

A. Roads ☐ Applicable ☐ N/A

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

B. Other Site Conditions

Remarks _____

_____

_____

_____

_____

_____

VII. LANDFILL COVERS ☐ Applicable ☒ N/A

A. Landfill Surface

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

D. Cover Penetrations ☐ Applicable ☐ N/A

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

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

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

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

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

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

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

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

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

F. Cover Drainage Layer ☐ Applicable ☐ N/A

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

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

G. Detention/Sedimentation Ponds ☐ Applicable ☐ N/A

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

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

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

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

H. Retaining Walls ☐ Applicable ☐ N/A

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

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

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

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

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

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

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

VIII. VERTICAL BARRIER WALLS ☐ Applicable ☒ N/A

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

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

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

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

1. **Pumps, Wellhead Plumbing, and Electrical**
   ☐ Good condition ☐ All required wells properly operating ☐ Needs Maintenance ☐ N/A
   Remarks_____

2. **Extraction System Pipelines, Valves, Valve Boxes, and Other Appurtenances**
   ☐ Good condition ☐ Needs Maintenance
   Remarks_____

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

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

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

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

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

C. Treatment System ☐ Applicable ☒ N/A

1. **Treatment Train** (Check components that apply)
   - ☐ Metals removal ☐ Oil/water separation ☐ Bioremediation
   - ☐ Air stripping ☐ Carbon adsorbers
   - ☐ Filters_____
   - ☐ Additive (*e.g.*, chelation agent, flocculent)_____
   - ☐ 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_____

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

D. Monitored Natural Attenuation

1. **Monitoring Wells** (natural attenuation remedy) Annual

☒ Properly secured/locked ☒ Functioning ☒ Routinely sampled ☒ Good condition
☒ All required wells located ☐ Needs Maintenance ☐ N/A
Remarks

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.).

Remedy is MNA -- all wells are well maintained and appear to be in good condition.

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.

Monitoring wells are locked and in good condition.

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.

None

D. Opportunities for Optimization

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

E. Other Comments

City of Porterville has annexed entire area from County

Land at MNA-4 sold, apts. will be built. New housing developments to the south. Plume is now about 1 block (or smaller in size)

Attachment 4
Toxicity Review Summary Memorandum, Third Five-Year Review

MEMORANDUM FOR RECORD

SUBJECT: Toxicity Review Summary, Beckman Instruments Superfund Site, Five Year Review

PREPARED BY: Emile Pitre, Chemical Engineer, Seattle District, U.S. Army Corps of Engineers

DATE: 1 August 2008

Seattle District, U.S. Army Corps of Engineers is assisting the U.S. Environmental Protection Agency (EPA), Region 9, with the completion of statutorily required five-year reviews. As requested by EPA, one of the steps in evaluating the protectiveness of an implemented remedy is a review of the toxicity values for contaminants of concern (COCs). The goal of the toxicity review is to determine if changes in the toxicity values identified in the Record of Decision (ROD) impact the protectiveness of the remedy. This memorandum is the toxicity review for the Beckman Instruments Superfund Site Five-Year Review.

The toxicity values from the 1988 Endangerment Assessment (EA) were used in the 1989 ROD. At the time of the EA there was no toxicity data evaluated for two of the five COCs, 1,1-dichloroethane and Freon 113. Revisions to the toxicity values for 1,1-dichloroethylene (1,1-DCE) indicate a lower risk from exposure than previously considered. Since the EA, the oral reference dose increased from 0.009 mg/kg-day to the current 0.05 mg/kg-day signifying a lower risk from exposure. Furthermore, cancer slope factors were removed from the Integrated Risk Information System (IRIS) database because 1,1-DCE showed equivocal evidence of carcinogenicity by the oral route of exposure and the weight-of-evidence was not sufficient to justify deriving an inhalation unit risk. Lastly, 1,1-DCE was classified as a Group C carcinogen at the time of the EA, or possibly carcinogenic to humans. The alphanumerical classification system used in EPA's 1986 "Guidelines for Carcinogen Risk Assessment" has since been replaced by descriptors and narratives. Under the 1999 draft revised guidelines for carcinogen risk assessment, EPA concludes 1,1-DCE exhibits suggestive evidence of carcinogenicity but not sufficient evidence to assess human carcinogenic potential.

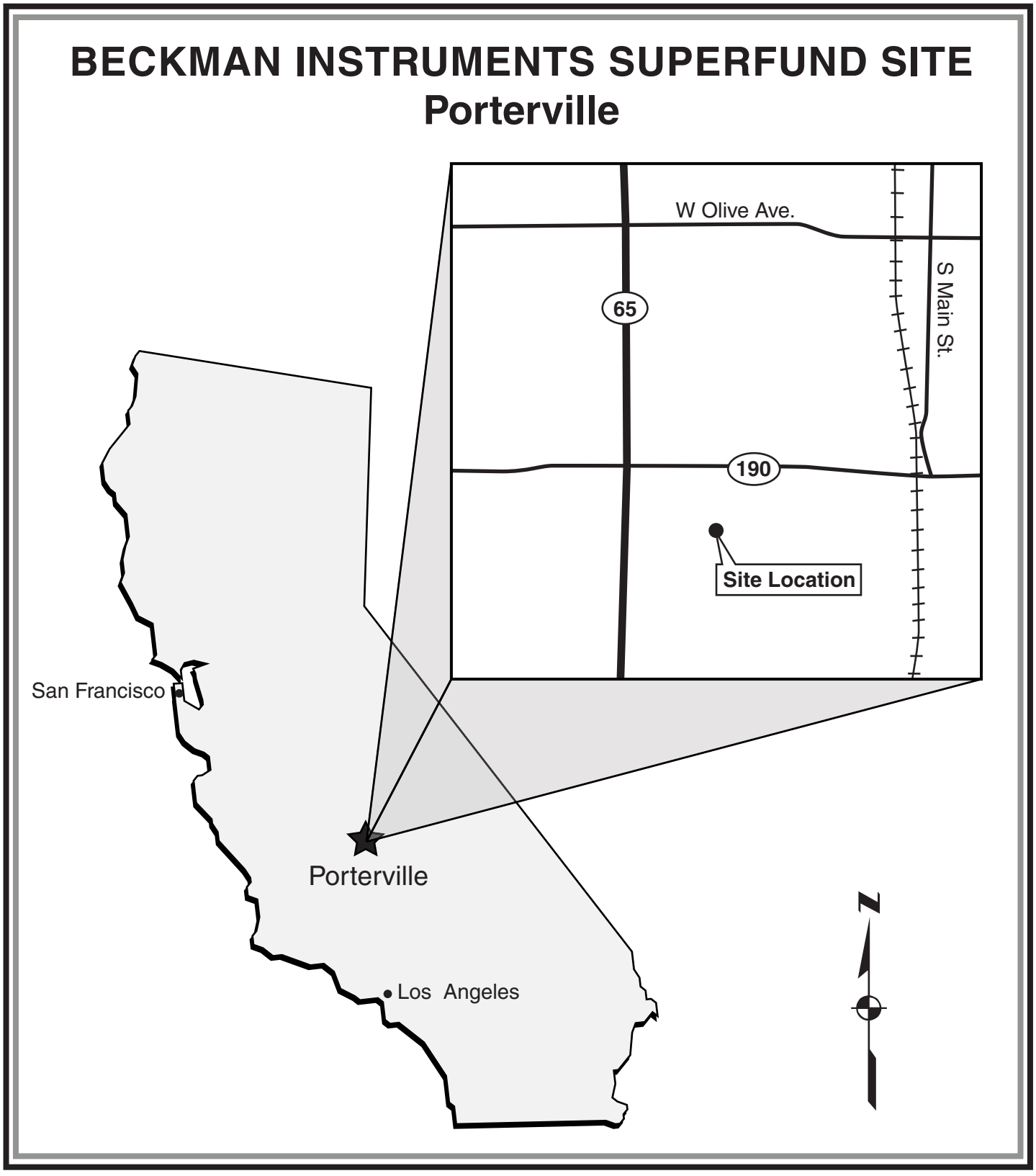
The toxicity value for trichloroethene (TCE) that was originally used in the EA has been withdrawn by EPA and a new value has yet to be included in the IRIS database. EPA has recommended that toxicity values from California EPA be used until IRIS values are available. These changes do not affect the protectiveness of the groundwater remedy since the current concentrations of TCE are below the state and federal maximum contaminant levels (MCLs).

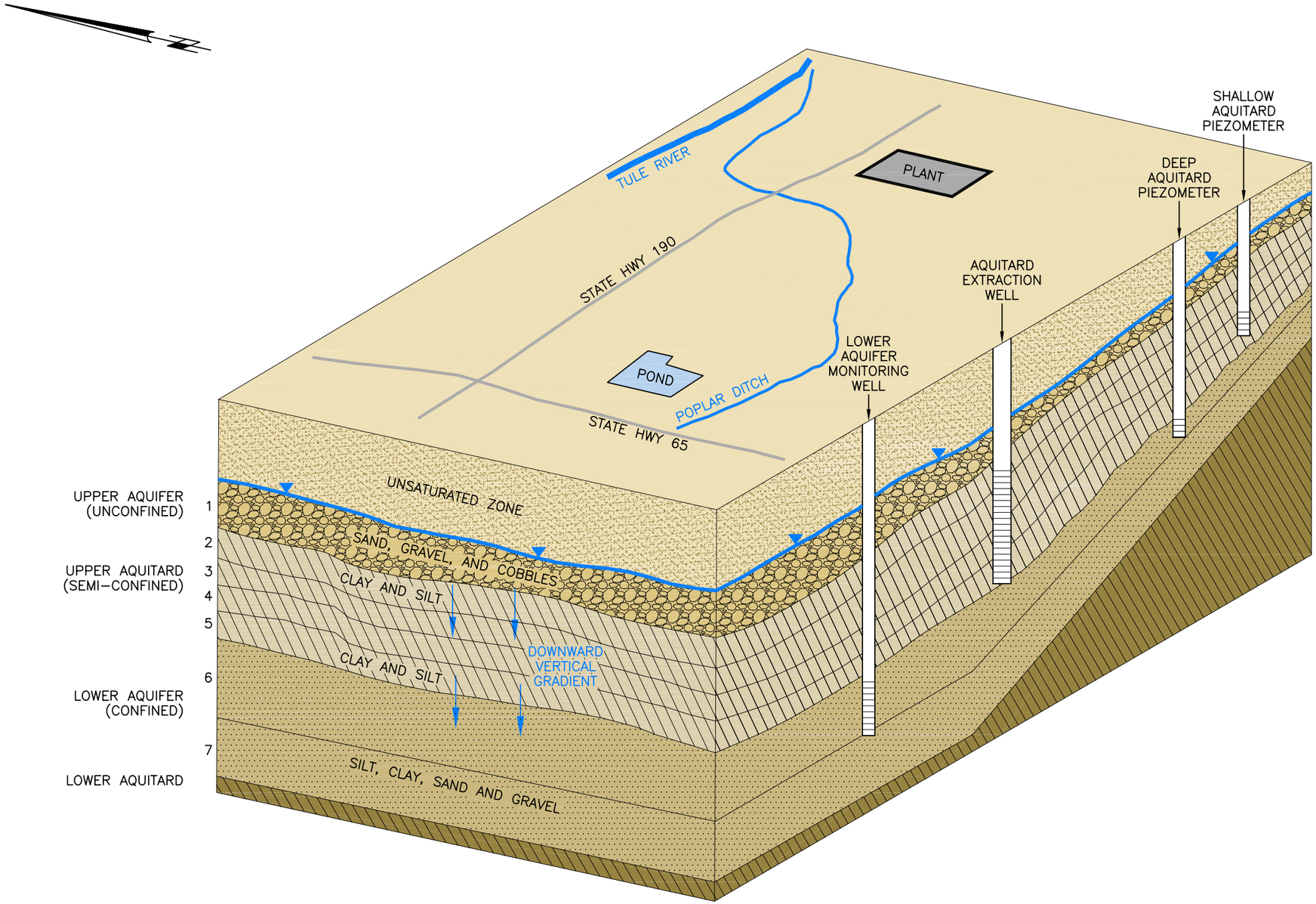
Toxicity Data

COC		Reference Dose (oral) (mg/kg-day)	Reference Dose (inhalation) (mg/kg-day)	Slope Factor (oral) $(mg/kg\text{-}day)^{-1}$	Slope Factor (Inhalation) $(mg/kg\text{-}day)^{-1}$	Source
Trichloroethene	1988 EA	-	-	0.011	0.013	IRIS
	Current Info	-	-	- / 0.013	- / 0.007	IRIS/CalEPA
1,1-Dichloroethane	No toxicity data evaluated at the time of the EA					
	Current Info	-	-	- / 0.0057	- / 0.0057	IRIS/CalEPA
1,1-Dichloroethylene	1988 EA	0.009	-	0.6	1.2	IRIS
	Current Info	0.05	0.2 mg/m^3 RfC	-	-	IRIS
1,1,1-Trichloroethane	1988 EA	0.09	-	-	-	IRIS
	Current Info	2	5 mg/m^3 RfC	-	-	IRIS
Freon 113	No toxicity data evaluated at the time of the EA					
	Current Info	30	30 mg/m^3 RfC	-	-	IRIS/HEAST

EA = Endangerment Assessment; IRIS = Integrated Risk Information System; CalEPA = California EPA; HEAST = Health Evaluation Assessment Summary Tables

Figure 1 - Site Location Map





NOTE: NOT TO SCALE

BECKMAN INSTRUMENTS, INC.
PORTERVILLE, CALIFORNIA

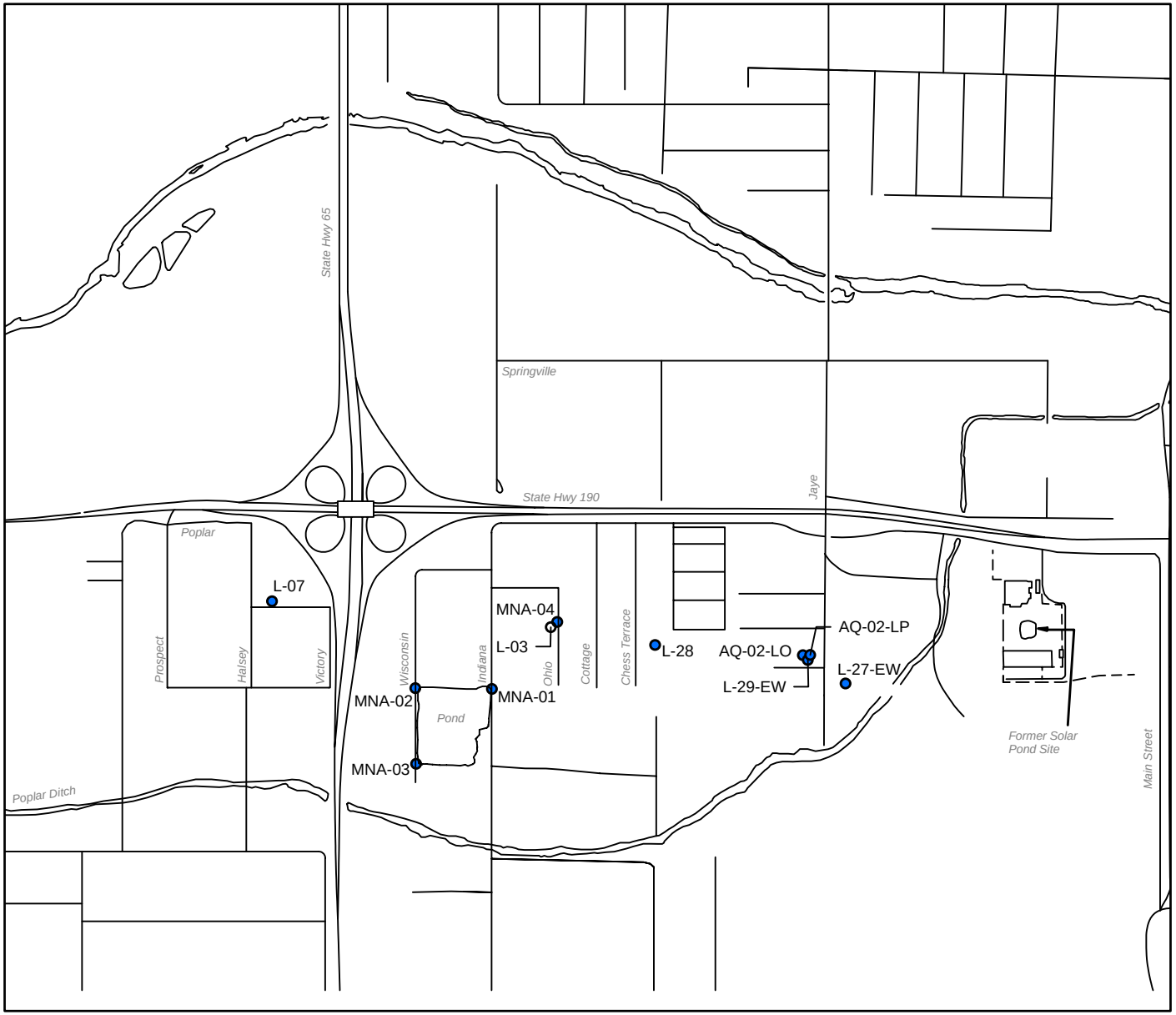
HYDROGEOLOGIC UNITS

HARGIS + ASSOCIATES, INC.
Hydrogeology/Engineering

5/05

FIGURE 2

PREP BY _____ REV BY _____ RPT NO. 278.32 | 410-0285 | A



EXPLANATION

- LOWER AQUIFER MONITOR WELL
- ABANDONED LOWER AQUIFER WELL

N

1,600 800 0 1,600 Feet

BECKMAN COULTER INC.
PORTERVILLE, CALIFORNIA

MONITORING LOCATIONS

HARGIS + ASSOCIATES, INC.
HYDROGEOLOGY · ENGINEERING

06/12/2008
FIGURE 3

PREP BY dat REV BY EAN RPT NO 278.32 Pvil-MW-locations.mxd