Fourth Five-Year Review Report

Beckman Instruments Superfund Site

Porterville, California

PREPARED BY

U.S. Army Corps of Engineers
Seattle District
Seattle, Washington

Approved by:

Michael Montgomery, Assistant Director
Federal Facilities and Site Cleanup Branch
Superfund Division
U.S. EPA, Region 9

Date: 9/20/13

Executive Summary

This is the fourth five-year review (FYR) of the Beckman Instruments Superfund Site, located in Porterville, California. The purpose of this FYR is to review information to determine if the remedy is, and will continue to be, protective of human health and the environment. The triggering action for this FYR was the signing of the previous FYR on September 18th, 2008.

Beckman Instruments (Beckman) has manufactured electronic equipment assemblies and printed circuit boards since 1967. Past industrial processes and materials handling at the plant were responsible for lead contamination in soils on the Beckman property, and groundwater contamination with volatile organic compounds that had migrated beyond the boundaries of the property. The areas of impacted soils and groundwater eventually became the Beckman Instruments Superfund Site in 1986.

The remedy in the 1989 Record of Decision (ROD) prescribed excavation and off-site disposal of contaminated soils and extraction and treatment of contaminated groundwater. After successfully removing the contaminated soil and cleaning up the majority of contaminated groundwater via pump and treat, in 2005 the U.S. Environmental Protection Agency (EPA) amended the remedy to monitored natural attenuation for the two small areas with 1,1-DCE contamination that had not yet met cleanup levels, i.e., drinking water standards.

This FYR finds that both the original remedy and amended remedy have been implemented in accordance with the requirements of the ROD and the 2005 ROD Amendment.

The remedy at the Beckman Instruments Superfund Site is protective of human health and the environment. The elements of the remedy that protect human health and the environment include institutional controls in place to prevent Site groundwater from consumptive use, prohibition on new groundwater wells within the Site boundaries, and groundwater monitoring to track the plumes associated with the remaining contaminant, 1,1-DCE.

Five-Year Review Summary Form

SITE IDENTIFICATION		
Site Name: Beckman Instruments Superfund Site		
EPA ID: **CAD048645444**		
Region: 9	**State:** CA	**City/County:** Porterville, Tulare County

SITE STATUS	
NPL Status: Final	
Multiple OUs? No	**Has the site achieved construction completion?** Yes

REVIEW STATUS
Lead agency: EPA
Author name (Federal or State Project Manager): Holly Hadlock
Author affiliation: U.S. EPA Region 9
Review period: 9/2008 – 3/2013
Date of site inspection: 1 November, 2012
Type of review: Policy
Review number: 4
Triggering action date: 09/18/2008
Due date *(five years after triggering action date)*: 09/2013

Issues/Recommendations				
Operable Unit(s) without Issues/Recommendations Identified in the Five-Year Review:				
Issues and Recommendations Identified in the Five-Year Review:				
OU(s): Sitewide	**Issue Category: Monitoring**			
	Issue: Hydraulic gradient not included in annual groundwater monitoring report in order to verify magnitude and direction of groundwater flow			
	Recommendation: Groundwater measurements should be collected			
Affect Current Protectiveness	**Affect Future Protectiveness**	**Implementing Party**	**Oversight Party**	**Milestone Date**
No	Yes	PRP	EPA	04/30/14
OU(s): Sitewide	**Issue Category: Remedy Performance**			
	Issue: Cleanup level of lead has changed; site might not be safe for residential use			
	Recommendation: Re-evaluate soil confirmation sampling; determine land use			
Affect Current Protectiveness	**Affect Future Protectiveness**	**Implementing Party**	**Oversight Party**	**Milestone Date**
No	Yes	PRP	EPA	04/30/14

Protectiveness Statement(s)		
Include each individual OU protectiveness determination and statement. If you need to add more protectiveness determinations and statements for additional OUs, copy and paste the table below as many times as necessary to complete for each OU evaluated in the FYR report.		
Operable Unit: **Site as whole**	***Protectiveness Determination:*** **Protective**	***Addendum Due Date (if applicable):*** **Click here to enter date.**
Protectiveness Statement: The remedy at the Beckman Instruments Superfund Site is protective of human health and the environment. The elements of the remedy that protect human health and the environment include institutional controls in place to prevent Site groundwater from consumptive use, a moratorium on new groundwater wells within the Site boundaries, and groundwater monitoring to track the plumes associated with the remaining contaminant, 1,1-DCE. In the short-term the soil remedy remains protective for industrial use of the Beckman property.		

Sitewide Protectiveness Statement (if applicable)	
For sites that have achieved construction completion, enter a sitewide protectiveness determination and statement.	
Protectiveness Determination: Protective	*Addendum Due Date (if applicable):* Click here to enter date.
Protectiveness Statement: The remedy at the Beckman Instruments Superfund Site is protective of human health and the environment. The elements of the remedy that protect human health and the environment include institutional controls in place to prevent Site groundwater from consumptive use, a moratorium on new groundwater wells within the Site boundaries, and groundwater monitoring to track the plumes associated with the remaining contaminant, 1,1-DCE. In the short-term the soil remedy remains protective for industrial use of the Beckman property.	

Contents

List of Figures

List of Tables

Appendices

List of Acronyms and Abbreviations

1,1-DCA	1,1-Dichloroethane
1,1-DCE	1,1-Dichloroethylene
1,1,1-TCA	1,1,1-Trichloroethane
ARAR	applicable or relevant and appropriate requirements
bgs	below ground surface
CA	California
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
COC	contaminant of concern
EA	Endangerment Assessment
EPA	Environmental Protection Agency
ESD	Explanation of Significant Differences
FYR	Five Year Review
HHSA	Health and Human Services Agency
IRIS	Integrated Risk Information System
IUR	inhalation unit risk
MCL	Maximum Contaminant Level
MNA	monitored natural attenuation
NCP	National Contingency Plan
NPL	National Priorities List
O&M	operation and maintenance
OU	operable unit
ppm	parts per million
PRG	preliminary remediation goal
RfCi	reference inhalation
RfDo	reference dose - oral
ROD	Record of Decision
RPM	Remedial Project Manager
RSL	regional screening level
RWQCB	Regional Water Quality Control Board
SFo	slope factor
TCE	trichloroethylene
µg/L	micrograms per liter
U.S.	United States
USACE	U.S. Army Corps of Engineers, Seattle District
VOC	volatile organic compound

Fourth Five-Year Review Report

for

Beckman Instruments Superfund Site

1. Introduction

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

The U.S. Environmental Protection Agency (EPA) prepares FYRs pursuant to the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) Section 121 and the National Contingency Plan (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 judgment of the President that action is appropriate at such site in accordance with section [104] or [106], the President shall take or require such action. The President shall report to the Congress a list of facilities for which such review is required, the results of all such reviews, and any actions taken as a result of such reviews."*

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

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

U.S. Army Corps of Engineers (USACE) has conducted the FYR and prepared this report regarding the remedy implemented at the Beckman Instruments Superfund Site in Porterville, Tulare County, California. EPA is the lead agency for developing and implementing the remedy for the Site.

This is the fourth FYR for the Beckman Instruments Superfund Site (the Site). The triggering action for this policy review is the third FYR dated 18 September, 2008. The FYR is required due to the fact that hazardous substances, pollutants, or contaminants remain at the site above levels that allow for unlimited use and unrestricted exposure.

As stated in the ROD (USEPA 1989), EPA elected not to separate the Site or it's impacted media into separate Operable Units (OUs). This was because of the short timeframe anticipated to complete the remedial action for soil, and because of the similarity in treatment options between upper aquifer and lower aquifer/aquitard, and utilization of the same treatment unit for extracted groundwater. The impacted media evaluated in the Remedial Investigation addressed in the ROD were as follows:

- Upper aquifer, contaminated with volatile organic compounds (VOCs),
- Lower aquifer and upper aquitard, also contaminated with VOCs,
- Soils, contaminated with lead.

As explained in Section 4 of this report, the only remaining portion of the Site not meeting cleanup criteria at this time is lower aquifer groundwater. The lower aquifer groundwater is the focus of this FYR.

2. Site Chronology

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

Table 1. Chronology of Site Events

Event	Date
Industrial wastes disposed on-site	1967-1983
Leak detected in on-site evaporation pond	1978
California Regional Water Quality Control Board issued order to Beckman to investigate groundwater contamination	1982
Discharge to pond discontinued	1983
Beckman begins operation of groundwater pump and treat system for upper aquifer, western portion of site	July 1985
National Priorities List (NPL) Listing	June 10, 1986
Beckman expands upper aquifer pump and treat system to include eastern portion of site	July 1987

Event	Date
ROD signed (pump and treat groundwater remedy, excavation soils 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
EPA approved Beckman proposal to change remedy to monitored natural attenuation (MNA)	2001
Second Five-Year Review	2003
EPA approved Beckman MNA Plan	June 2005
ROD Amendment (changing groundwater remedy from pump and treat to MNA)	September 2005
Interim Remedial Action Report	March 2007
First of annually submitted performance monitoring reports for MNA remedy	February 2008
Third Five-Year Review	September 2008
Latest (2012) annual performance monitoring report for MNA remedy, including statistical evaluation	June 2012

3. Background

3.1. Physical Characteristics

The Site, which includes the Beckman industrial plant and surrounding study area containing impacted groundwater, 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 (Figures 1 and 2, Site Location Map and Study Boundary). The Site is approximately 160 acres and consists of the plant property and other privately owned commercial, agricultural, and residential property located to the west of the plant.

The Site's source of contamination originated at the plant, physically located at 167 West Poplar Avenue in Porterville. The plant occupies approximately 12 acres. The boundary of the Site generally extends to the Tule River to the north, plant property limits to the east, the Poplar

ditch to the south, and Newcomb Street to the west (Figure 3, Groundwater Monitoring Locations).

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 immediate vicinity of the river.

According to the 2010 Census, Porterville had a population of 54,165; however, the Site impacts only a small fraction of residents since only the southernmost tip of the city overlaps the Site boundaries. At the time of the ROD (1989), 473 residents reportedly lived within the Site boundaries. Currently the property impacted by the Site appears to be zoned residential, commercial, and agricultural. Currently there are approximately 850 residential properties within the boundaries of the Site based on a comparison of property parcel boundaries and Site boundaries.

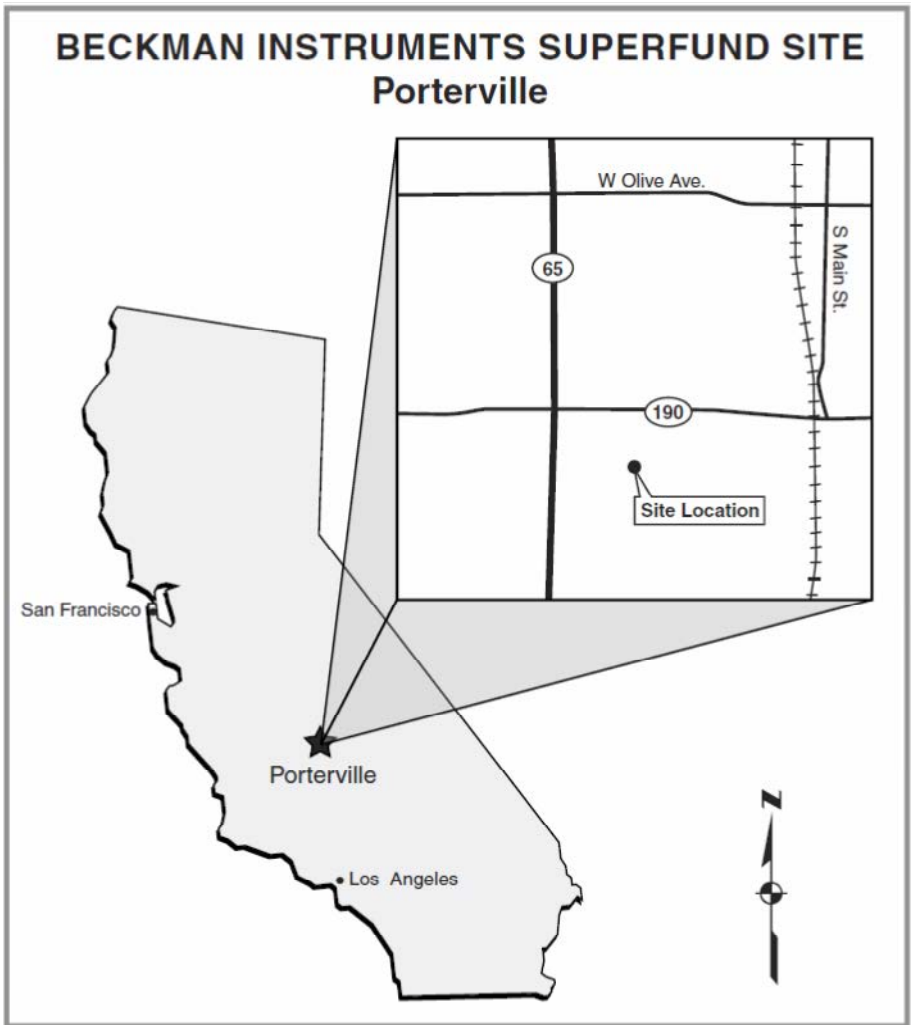


Figure 1. Site Location Map for Beckman Instruments Superfund Site

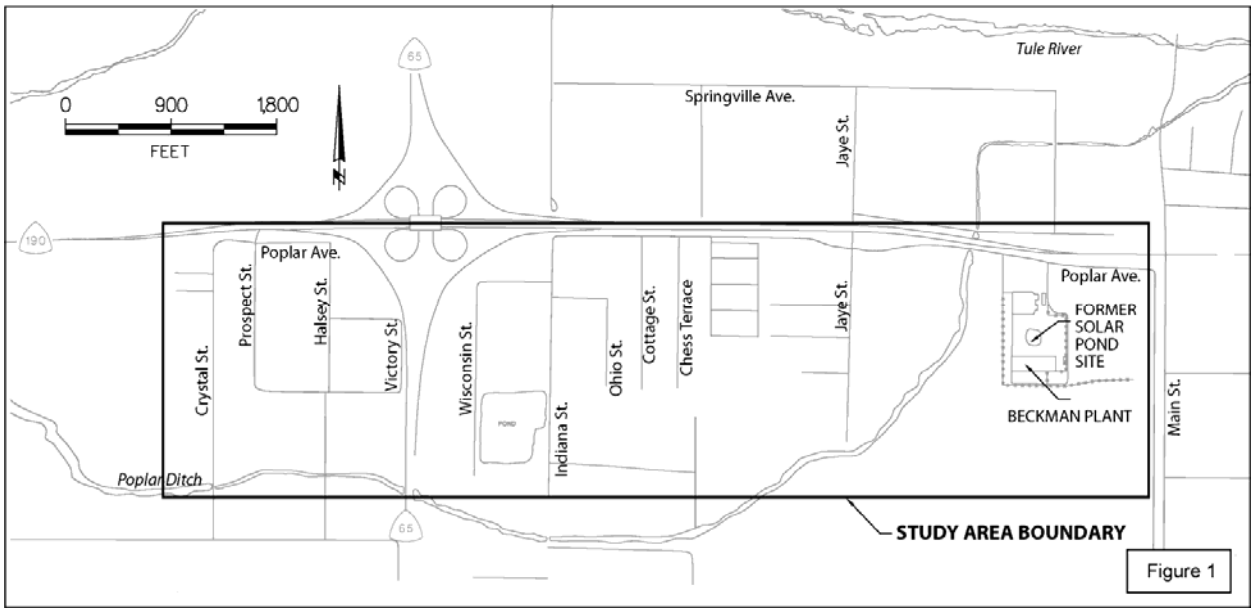


Figure 2. Study Area Boundary

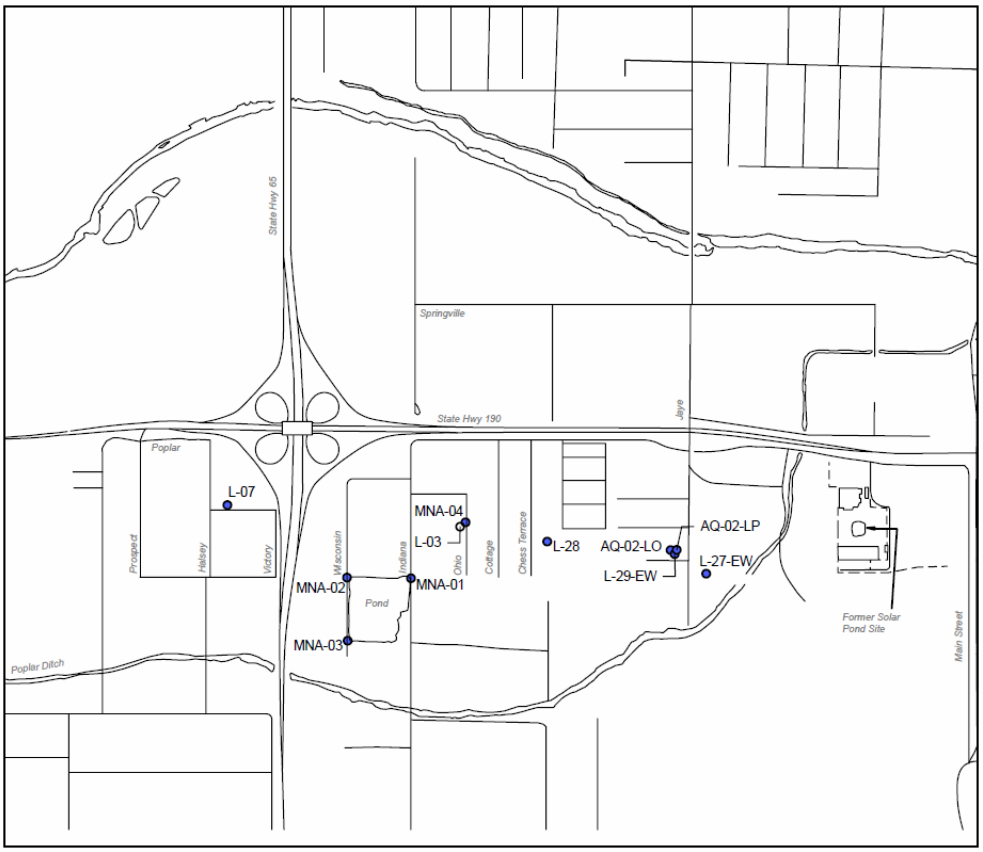


Figure 3. Current Groundwater Monitoring Locations

3.2. Hydrology

The Site aquifer system consists of an upper aquifer, upper aquitard, and lower aquifer. These units are the uppermost portions of a westward thickening wedge of sediments of continental origin. In general, aquifers are water-bearing geologic units capable of yielding groundwater, while aquitards are not appreciably water-bearing and act as barriers to groundwater flow.

The upper aquifer is comprised of silt, sand, gravel, and cobbles. These sediments merge with the sediments of the upper aquitard at depths of approximately 50 to 75 feet below ground surface (bgs) across the Site. Groundwater 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 of the site and then shifts northwest near Highway 65.

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

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 and the vertical hydraulic gradient between upper and lower aquifers is downward. The City of Porterville has several municipal wells within relatively close proximity to the Site which draw water from the lower aquifer, as explained in Section 3.3, below. Groundwater is confined in the lower aquifer and flow is generally to the south-southwest near the plant and west-southwest in the remainder of the Site.

3.3. Land and Resource Use

Land use within the limits of the Site includes residential, commercial, industrial, agricultural (field crops, orchards, grazing), and vacant land, with no projected changes to land use in the near future with the possible exception of the vacant land. Due to the city's desire to prevent suburban sprawl and to limit development of agricultural land, and because property around the Site has been annexed and is now within city limits, the vacant land around the Beckman plant is of interest for development when the Site is deleted from the NPL according to city officials.

The Beckman plant consists of seven buildings used to manufacture and repair electronic equipment, along with ancillary waste storage, handling, and treatment areas. The plant is currently an active facility.

The City of Porterville uses groundwater wells throughout the city for its drinking water supply. Most city wells, including those in closest proximity to the Site, draw water from the lower aquifer. The aquifers underlying the historical area of Site-related contamination are not currently used as a drinking water source, pursuant to a December 2, 1983, Tulare County memorandum to all District Sanitarians that imposes a moratorium on well drilling in areas downgradient of the Site (Appendix A). This moratorium prohibits the approval of building permits for property owners proposing to obtain water from wells in the Site area.

3.4. History of Contamination

Beckman Instruments, now operating as Beckman Coulter, Inc., has manufactured electronic equipment assemblies and printed circuit boards at their plant 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 solar evaporation pond (Figure 3, Groundwater Monitoring Locations). The leak detection system detected a leak in the waste pond in July 1978 and then detected intermittent leaks until 1981. The evaporation pond was considered the main source area for the groundwater contamination associated with the Site. Additionally, an above-ground pipe which transferred electroplating wastes to the pond also leaked, contaminating soil near the plant with lead.

3.5. Initial Response

In 1983, Beckman closed the evaporation pond after leaks were reported and groundwater monitoring activities in late 1982 and early 1983 revealed the presence of volatile organic compounds (VOCs) in the groundwater below the pond. VOCs were also found to be 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 (RWQCB), Central Valley Region, 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.

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 groundwater extraction and treatment system to contain westward migration of the plume and to control hydraulic gradients and treat impacted groundwater. The system treated contaminated groundwater through air stripping, whereby a blower aerated the water to remove volatile

contaminants. The system was expanded in July 1987 to contain and treat upper aquifer groundwater from the eastern portion of the Site. The treated groundwater from the air-stripping treatment system was used for agricultural irrigation or discharged to infiltration basins located near the Tule River.

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

3.6. Basis for Taking Action

The primary contaminants of concern for the Site were VOCs, found at levels above state and federal primary drinking water standards. The VOCs found are mobile in groundwater and are considered probable and/or potential human 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 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 up to 9,000 feet downgradient of the source area. Exceedances of these constituents were also detected in the upper aquitard and lower aquifer. The presence of these contaminants in groundwater provided the basis for taking action under CERCLA. According to the Risk Assessment, the highest threats to human health were posed by direct consumption of contaminated groundwater and inhalation of contaminants volatilized from water while showering (USEPA 1989).

Additionally, unacceptable adverse non-carcinogenic health effects were determined to be present for lead in Site soils, as lead concentrations were found to be over six times the cleanup level of 200 mg/kg. This finding formed the basis for the soils excavation and off-site disposal remedial action.

4. Remedial Actions

4.1. Remedy Selection

EPA issued the ROD for the Beckman Instruments Superfund Site on September 26, 1989. For remedial purposes, the Site was separated into three areas: 1) upper aquifer (contaminated with VOCs), 2) upper aquitard and lower aquifer (contaminated with VOCs), and 3) lead-contaminated soils. The remedial action objectives were to restore VOC-contaminated groundwater to beneficial use and to remove lead-contaminated soil until levels acceptable for residential use were achieved. The cleanup goal for each contaminant in the groundwater was the more stringent level among the State or Federal Maximum Contaminant Levels (MCLs) and the State Action Level. Table 2 lists cleanup standards prescribed in the ROD.

Table 2. 1989 ROD Cleanup Standards

Media	Contaminant	Cleanup Standard
Groundwater	1,1,1-TCA	200 µg/L[(1)]
	1,1-DCE	6 µg/L[(2)]
	Freon 113	1,200 µg/L[(3)]
	1,1-DCA	5 µg/L[(3)]
	TCE	5 µg/L[(1)]
Soil	Lead	200 ppm

Notes: [(1)]Federal and State MCLs are equivalent
[(2)]State MCL
[(3)]State Action Level

The following remedies were selected:

- Upper aquifer: Continuation of the existing upper aquifer extraction, treatment, and discharge (e.g., pump and treat) systems.
- Upper aquitard and lower aquifer: Concurrent upper aquitard and lower aquifer extraction, treatment, and discharge; installation of extraction wells, and treatment of extracted water using existing treatment facilities.
- Soils: Excavation of lead-contaminated soils and off-site disposal of the excavated soils.

4.1.1. 1991 Explanation of Significant Differences

A 1991 ESD clarified that the contaminant-specific numerical levels characterized as "goals" in the ROD were actually established as final cleanup levels to be achieved by the selected remedy.

4.1.2. 2005 ROD Amendment

By 1999, 1,1-DCE was the only contaminant present on Site above its cleanup level of 6 µg/L. It was located 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 timeframe and at a 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).

4.2. Remedy Implementation

4.2.1. 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, California. Confirmation samples indicated that all soils with lead above 200 ppm 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 extraction and treatment system.

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

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

4.2.2. 2005 ROD Amendment Implementation

The MNA remedy included installation of new monitoring wells and the use of existing monitoring wells to evaluate groundwater cleanup. Beckman installed three sentinel monitoring wells (MNA-01, MNA-02, and MNA-03) (Figure 3, Monitoring Locations) downgradient of the two areas with 1,1-DCE above 6µg/L to evaluate plume migration and attenuation over time. Beckman prepared an MNA plan that calls for annual groundwater monitoring and submittal of an annual monitoring report to EPA. Monitoring well L-03, which had the highest 1,1-DCE concentration, was abandoned in 2007 and replaced with MNA-04 due to the new property owner's pending development. All of the newly installed MNA wells are in appropriate locations for evaluating the groundwater cleanup and are in public rights-of-way to avoid complications of private site access and the necessity to maintain long-term lease agreements with private land owners.

4.3. Operation and Maintenance (O&M)

4.3.1. 1989 ROD

The upper aquifer pump and treat system operated from 1985 to 1990. Monitoring continued until 1997, after which all upper aquifer wells were abandoned. The upper aquitard/lower aquifer extraction and treatment 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 had contaminants at levels that 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 diffusion-limiting upper aquitard.

4.3.2. 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 originally required quarterly sampling of the four newly installed lower aquifer monitor wells (MNA-01 through MNA-04) through 2007. In May 2007 Beckman sampled the sixteen monitor wells, all available at the time, in the MNA program and submitted to EPA the first annual MNA report (Figure 4, 2007 MNA Wells). As of 2012, Beckman conducts annual monitoring of nine lower aquifer wells: AQ-02-LO, L-07, L-27-EW, L-28, L-29-EW, MNA-01, MNA-02, MNA-03, and MNA-04. In the 2012 O&M report, Beckman recommended reducing monitoring to just five wells: L-28, MNA-01, MNA-02, MNA-03, and MNA-04. EPA is evaluating this recommendation.

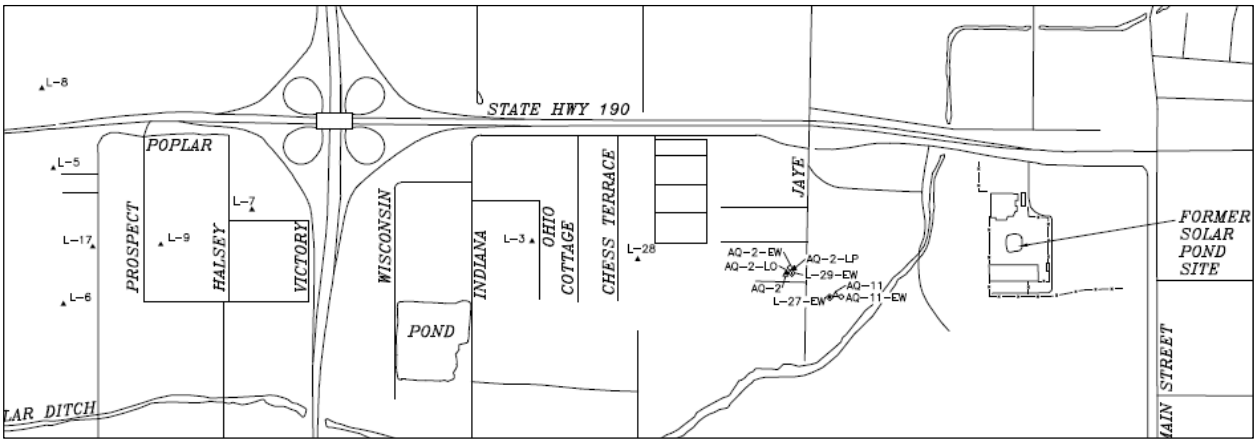


Figure 4. 2007 MNA Wells

In 2009, 1,1-DCE at well L-28 was detected at a level above the cleanup standard. Currently, this is the only well where 1,1-DCE is above the cleanup standard of 6 µg/L. In the reduced monitoring recommended by Beckman, the remaining wells proposed for continued annual monitoring (MNA-01 through MNA-04) would serve as sentinel wells downgradient of L-28 to monitor the dissipation of higher 1,1-DCE levels at L-28.

4.3.3. Annual O&M Costs

Because of the minimal O&M activities associated with the MNA remedy (annual groundwater sampling, analysis, and reporting), annual O&M costs were not investigated or evaluated as part of this FYR.

5. Progress Since the Last Five-Year Review

5.1. Previous Five-Year Review Protectiveness Statement and Issues

The protectiveness statement from the third FYR in 2008 for the Beckman Instruments Superfund Site stated the following:

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

There were no issues or recommendations for follow-up actions listed in the 2008 FYR. The Site remedy had previously been changed to MNA and groundwater contamination was attenuating favorably.

5.2. Work Completed at the Site during this Five Year Review Period

The work completed at the Site since the last FYR has been limited to annual groundwater monitoring of nine lower aquifer wells related to the ongoing MNA groundwater remedy. Wells AQ-02-LO, L-07, L-27-EW, L-28, L-29-EW, MNA-01, MNA-02, MNA-03, and MNA-04 have been sampled for VOCs via EPA Method 8260B in spring 2008, 2009, 2010, 2011, and 2012 since the last FYR, with results reported by Beckman. In 2012 a statistical evaluation of water quality data at the nine wells remaining in the monitoring network was conducted and included as an appendix to the 2012 Annual Performance Monitoring Report.

The statistical analysis by Beckman's remedial contractor, Hargis and Associates, Inc. (Hargis), concludes that except for monitoring well L-28, the cleanup goal for 1,1-DCE has been achieved and sustained for the last 2 years. This conclusion was made from implementing a zero slope and a regression analysis to perform a termination analysis for determining fate of contaminants.

6. Five-Year Review Process

6.1. Administrative Components

EPA Region 9 initiated the FYR in October 2012 and scheduled its completion for August 2013. The FYR team was led by Holly Hadlock of EPA, Remedial Project Manager (RPM) for the Beckman Instruments Superfund Site, and contractor support provided by the U.S. Army Corps of Engineers, Seattle District (USACE). The USACE team included Edward Wilson (physical scientist), Jefferey Powers (hydrogeologist), and Dianne Jordan (realty specialist). In October 2012 EPA held a scoping call with the review team to discuss the Site and items of interest as they related to the protectiveness of the remedy currently in place. A review schedule was established that consisted of the following:

- Document review;

- Data collection and review;
- Community notification;
- Site inspection;
- Local interviews; and
- Five-Year Review Report development and review.

6.2. Community Involvement

On April 3, 2013, a public notice was published in the Porterville Recorder announcing the commencement of the five-year review process for the Beckman Instruments Superfund Site, providing EPA contact information and inviting community participation. A notice was also published in Spanish in the April 5-11, 2013, Noticiero Semanal (Appendix B, Press Notices). No one contacted EPA as a result of these advertisements.

The five-year review report will be made available to the public once it has been finalized. Copies of this document will be placed in the designated public repository: Porterville Public Library, 41 West Thurman Avenue in the City of Porterville. A copy will also be available at the EPA website *epa.gov/region9/beckmaninstruments*. Upon completion of the FYR, a public notice will be placed in the Porterville Recorder and the Noticiero Semanal to announce the availability of the final FYR report in the Site document repository.

6.3. Document Review

This FYR included a review of relevant, site-related documents including the ROD, ESD, ROD Amendment, Monitored Natural Attenuation Plan, previous three FYR reports, and recent annual performance monitoring reports for the MNA remedy. A complete list of the documents reviewed can be found in Appendix C.

6.3.1. Applicable or Relevant and Appropriate Requirements (ARARs) Review

Section 121 (d)(2)(A) of CERCLA specifies that Superfund remedial actions must meet any applicable or relevant and appropriate requirements (ARARs). ARARs are those standards, criteria, or limitations promulgated under federal or state law that specifically address a hazardous substance, pollutant, contaminant, remedial action, location, or other circumstance at a CERCLA site.

Chemical-specific ARARs identified in the selected remedy within the ROD, ESD, and ROD Amendment for the groundwater at this Site, and those considered for this FYR for continued groundwater monitoring, are listed in Table 3. State primary drinking water standards are the same as federal primary drinking water standards except for the state standard for 1,1-DCE, which is more stringent than the federal standard. The federal drinking water MCL for 1,1-DCE is 7 µg/L, while the State standard is 6 µg/L. Also, there are no current federal standards for 1,1-DCA and Freon 113. State standards for 1,1-DCA and Freon 113 are 5 µg/L and 1,200 µg/L,

respectively. 1,1-DCE is the only Site related chemical currently present at a level above its cleanup standard of 6 µg/L.

Table 3. Summary of Groundwater ARARs

Contaminants of Concern	1989 ROD ARARs (µg/L)	Current Regulations (µg/L)	ARARs Changed?
1,1-DCE	6	6	No
1,1,1-TCA	200	200	No
1,1-DCA	5	5	No
TCE	5	5	No
Freon 113	1,200	1,200	No

Federal and state laws and regulations, other than the chemical-specific ARARs that have been promulgated or changed over the past five years, are described in Table 4. ARARs identified in the ROD that are no longer pertinent to the current remedy phase are not included in the table. There have been no revisions to laws and regulations that affect the protectiveness of the remedy.

Table 4. Applicable or Relevant and Appropriate Requirements Evaluation

Requirement	Citation	Document	Description	Effect on Protectiveness	Comments	Amendment Date
Federal - Safe Drinking Water Act	40 CFR 141.11 -141.6	1989 ROD	The ROD stated requirement to follow the most stringent MCL between state and federal regulations.	Relevant and Appropriate	The cited Federal standards are unchanged from the date the ROD was finalized.	Not Amended
State – Safe Drinking Water Act	Health and Safety Code, Div 5	1989 ROD	The ROD stated requirement to follow the most stringent MCL between state and federal regulations.	Relevant and Appropriate	State standards for 1,1-dichloroethane and Freon 113 promulgated.	September 2003

The state's lead screening level was revised in 2009 to a screening level of 320 ppm for industrial and commercial sites and 80 ppm for residential sites. The revision was due to a new approach to the risk assessment for lead. The revised approach takes into account lead soil levels with a potential to increase blood lead up to 1 µg/dl, irrespective of background exposures. This new residential screening level is below the 1989 selected remedy of 200 ppm;

however this does not affect the protectiveness of the remedy for the soil for the short-term as long as the site use remains industrial.

6.3.2. Human Health Risk Assessment Review

A qualitative human health risk assessment, indentified as an Endangerment Assessment (EA) in the original document, was completed as part of the ROD. Table 5 summarizes the site risks and exposure pathways qualitatively and quantitatively identified in the ROD.

Table 5. Risks and Exposure Pathways

Source	Exposure Scenario & Pathway	Risk Driver(s)	Risk Estimate
Lead-contaminated soil	Dermal contact	Not defined	Quantitative evaluation not performed
VOCs in upper aquifer	Inhalation from contaminants volatilized from the water while showering	Individual showering with, and drinking, groundwater	Cancer: 6E-6
	Ingestion of groundwater		
VOCs in lower aquifer	Inhalation from contaminants volatilized from the water while showering	Individual showering with, and drinking, groundwater	Cancer: 1.6E-3
	Ingestion of groundwater		

The EA identified shallow soil as the first source to be remediated in 1990 by excavations and removal off-site. The cleanup levels in the upper aquifer were met shortly afterward by using pump and treat technology. Since the cleanup levels outlined in the ROD are still effective today, and both the upper aquifer and soil operable unit (OU) have been cleaned up, this leaves only the VOCs in the lower aquifer as a concern.

Groundwater. The groundwater exposure pathways for the lower aquifer identified in the ROD are still valid. The ROD described the lower aquifer below the site as "productive." Therefore, the institutional controls that are outlined in the ROD are critical to the protectiveness of the remedy. Two primary institutional controls exist (USEPA, 2007); (1) Tulare County has a ban on private well installations within the study area since 1983 (Appendix A), and (2) the City of Porterville has annexed the study area and extended municipal water lines throughout the area. Current groundwater data (as of December 2012) show that 1,1-DCE concentrations at one of the nine active monitoring wells in the study area are greater than the cleanup standard of 6µg/L (Hargis & Associates, 2012). The presence of 1,1-DCE in the groundwater in relation to its cleanup standard is discussed in more detail in Section 6.4, Data Review.

Soil. The exposure pathways considered in the ROD is dermal contact. The pathway assumptions remain valid and were mitigated when the soil was excavated and removed from the site (USEPA, 2007).

Vapor Intrusion[1]. EPA's understanding of contaminant migration from soil, gas, and/or groundwater into buildings has evolved over the past few years leading to the conclusion that vapor intrusion may have a greater potential for posing risk to human health than assumed when the ROD was prepared. In September 2002, EPA released an external review draft version of its vapor intrusion guidance titled "Evaluating the Vapor Intrusion to Indoor Air Pathway from Groundwater and Soils" (USEPA 2002).

The only monitoring well showing 1,1-DCE at levels above the MCL is lower aquifer well L-28 at 44 µg/L, according to the sampling that took place on April 5, 2012. The lower aquifer is a confined aquifer with a thick layer of silt and clays directly above it. This type of strata has a decreased permeability for both groundwater and vapor, greatly reducing the rate that these two mediums can be transported through this layer. Taking into account the depth of the lower aquifer in this area—where monitoring wells are screened between 99 and 129 feet bgs—and the clay and silt layer that is confining the aquifer above it, vapor intrusion does not pose a risk to the residences in the vicinity. The shallow aquifer is considered clean and poses no health risks.

Toxicity values. EPA's Integrated Risk Information System (IRIS) has a program to update toxicity values used in risk assessment when newer scientific information becomes available. In the past five years, there have been a number of changes to the toxicity values for certain contaminants of concern (COCs) at the Site. Table 6 presents the COCs identified in the ROD with data from the last FYR compared to current available data.

[1] The California EPA released guidance on vapor intrusion in October 2011 ("Guidance for the Evaluation and Mitigation of Subsurface Vapor Intrusion to Indoor Air-Vapor Intrusion Guidance" Department of Toxic Substances Control, October, 2011).

Table 6. Toxicity Data

Contaminant of Concern		Toxicity Value				Change in Risk
		Cancer		Non-Cancer		
		Sfo (mg/kg-day)$^{-1}$	IUR (µg/m^3)$^{-1}$	RfDo (mg/kg-day)	RfCi (mg/m^3)	
1,1-DCE	Old	0.6	1.2	0.009	0.057*	Cancer: Less Stringent Non-Cancer: Less Stringent
	Current	-	-	0.05	0.2	
TCE	Old	1.1E-3	1.3E-3(mg/kg-day)$^{-1}$	3.0E-4*	1.0E-2(mg/kg-D)*	Cancer: More Stringent Non-Cancer: Less Stringent
	Current	4.6E-2	4.1E-6	5.0E-4	2.0E-3	
1,1-DCA	Old	-	-	5.0E-2*	1.4E-1(mg/kg-D)*	Cancer: More Stringent Non-Cancer: More Stringent
	Current	5.7E-3	1.6E-6	2.0E-1	-	
Freon 113	Old	-	-	3.0E+1*	8.6(mg/kg-D)*	Cancer: NA Non-Cancer: No Change
	Current	-	-	3.0E+1	3.0E+1	
1,1,1-TCA	Old	-	-	2.8E-1*	6.3E-1*	Cancer: NA Non-Cancer: Less Stringent
	Current	-	-	2.0	5.0	

Definitions: SFo = Slope Factor; IUR = Inhalation Unit Risk; RfDo = Reference Dose Oral; RfCi = Reference Inhalation.
* This symbol means the quantitative values were not available from the 1988 EA and were supplemented with the 2004 PRG summary tables.

For **1,1-DCE**, EPA has not revised the toxicity values since the 2008 five-year review. Both the cancer and non-cancer toxicity values reported resulted in an increase of regional screening levels (RSLs). In summary, the EPA concluded that 1,1-DCE did not show conclusive evidence of carcinogenicity for humans. The non-cancer risk is less stringent than that determined in the 1988 EA. The current RSL is 7 µg/L (based on a non-cancer value); the clean up goal outlined in the ROD was 6 µg/L and is still protective of human health.

For **TCE**, in September 2011 EPA revised the toxicity values. The review resulted in lower RSLs for TCE for both cancer and non-cancer toxicity values. The screening level for chronic exposure for cancer excess risk level of 1.0E-6 is 0.44 µg/L. EPA uses an excess cancer risk range between 1.0E-4 and 1.0E-6 for assessing potential exposures, which translates to a TCE concentration between 0.44 and 44 µg/L. The current MCL for TCE of 5 µg/L is within the revised protective carcinogenic risk range. EPA's 2011 Toxicological Review for TCE also developed safer levels that include at least a 10-fold margin of safety for health effects other than cancer. Any concentration below the non-cancer RSL indicates that no adverse health effect from exposure is expected. Concentrations significantly above the RSL may indicate an increased potential of non-cancer effects. The non-cancer screening level for TCE is 2.6 µg/L. EPA considers the TCE MCL of 5 µg/L to be protective for both cancer and non-cancer effects.

For **1,1-DCA,** EPA has not revised the toxicity values since the 2008 five-year review. The current cancer and non-cancer values were obtained from the 2012 Regional Screenings Levels

(RSL) spreadsheet posted on EPA's website. Using the information provided, an excess cancer risk range for 1,1-DCA is between 2.4 µg/L and 240 µg/L. The ROD identified cleanup level for 1,1-DCA is 5 µg/L and is within the revised protective carcinogenic risk range.

For **Freon 113**, EPA has not revised the toxicity values since the 2008 five-year review. However, most of the research for this COC was completed in the mid 1990s and there were no findings of carcinogenic implications in humans. In the IRIS database, Freon 113 is listed as 1,1,2-trichloro-1,2,2-trifluoroethane. There has been no change since the 2004 Preliminary Remediation Goals (PRG) summary tables were produced and there was no quantitative analysis performed as part of the original 1988 EA for this particular COC. The non-cancer screening level is listed as 5,300 µg/L. The current ROD recommended cleanup level is 1,200 µg/L and is protective of human health.

For **1,1,1-TCA**, EPA has not revised the toxicity values since the 2008 five-year review. The Toxicological Review developed safer levels when compared to the 2004 PRG tables but remain the same MCL of 200 µg/L as was prescribed in the ROD. Any concentration below the non-cancer RSL indicates that no adverse health effect from exposure is expected.

6.3.3. Ecological Review

Groundwater in the lower aquifer remains the only source of contamination. However, the groundwater reports indicate there is no ecological risk to the Site(Hargis, 2012). This is due to the depth of the aquifer and that it is not predicted that groundwater will pose an impact to any surface water.

6.4. Data Review

The only COC remaining above its cleanup level is 1,1-DCE in the lower aquifer. At the time of the third FYR, 1,1-DCE was present in two small areas west of the Beckman Plant in the lower aquifer. These areas are distinguished by concentrations above 6 µg/L detected in monitoring wells L-27-EW and L-29-EW comprising the first area, and L-03 comprising the second area with the highest detection level in L-03 of 31µg/L.

Table 7 lists the latest results from the Beckman MNA program and was acquired from the annual report (Hargis, 2012). It shows that the contaminated plume detected in wells L-27-EW and L-29-EW has migrated west and is now being detected in well L-28 (**Error! Reference source not found.**). This is the only 1,1-DCE detection reported at a level above its cleanup goal. For this report this plume will be referred to as the rear plume.

The plume that was detected in well L-03, which was abandoned and replaced by well MNA-04 in September 2007, will be referred to as the forward plume for this report. 2009 was the last time the forward plume was detected at concentrations above clean up levels, as detected in MNA-04 at a level of 6.3 µg/L. Well L-07 is the next well the plume should be detected in; however, this well has not been monitored for the past two years due to a malfunctioning pump.

Table 7. 2012 COC reporting levels

↓Well Goal→	1,1,1-TCA	1,1-DCE	FREON 113	1,1-DCA	TCE
	200µg/L	***6µg/L***	***1,200µg/L***	***5µg/L***	***5µg/L***
L-27-EW	<0.5	2.3	1.2	<1	<0.5
L-29-EW	<0.5	0.86	<0.5	<1	<0.5
AQ-02-LO	<0.5	<0.5	<0.5	<1	<0.5
L-28	<0.5	**44**	22	2.6	1.2
MNA-04	<0.5	0.66	<0.5	<1	<0.5
MNA-01	<0.5	<0.5	<0.5	<0.5	<0.5
MNA-02	<0.5	<0.5	<0.5	<0.5	<0.5
MNA-03	<0.5	<0.5	<0.5	<0.5	<0.5
L-07	unable to monitor				

Definitions: reporting levels that are shown in **bold** indicate that the reported concentration is above minimum cleanup levels.

As modeled for the 2005 ROD Amendment, the trend of these two moving plumes is westward. In the near future MNA-04 should start detecting the rear plume with 1,1-DCE levels above cleanup goals. The forward plume was detected in well MNA-01 in 2005 through 2007, and well MNA-02 in 2006 through 2009 as it moved westward but in neither well were any concentrations above the detection limit (Figure 3). Well L-07 is the next westward monitoring well and is northwest of well MNA-02 about 1,200 feet. The last detection of DCE in this well was 1.2 µg/L in 2010. Concentrations in the forward plume are expected to continue to decline due to dispersion. Based on the 2005 modeling, concentrations in the rear plume are also expected to decline as it moves west.

The City of Porterville installed two municipal water supply wells screened within the lower aquifer (Wells 27 and 28) in 2003 and 2005. The wells are close to but outside the historical limits of the Site. These wells reportedly operated up to eight hours per day and in 2012 produced 48.2 and 10.5 million gallons per year, respectively (equivalent to continuous averages of 90 gallons per minute and 20 gallons per minute for Wells 27 and 28)[2]. Well 28 is primarily used during summer months to augment increased demand. Well 27 is located off Jaye Street, south of the Poplar Ditch, and Well 28 is located on F Street. Both wells are approximately 3,000 feet south of the former source area evaporation pond at the Beckman plant and southeast of monitoring well L-28, the lone Site well with 1,1-DCE contamination above its cleanup level. Since the groundwater flow direction in this area of the lower aquifer is west-southwest, these wells are cross gradient to upgradient of the remaining dissolved phase contaminant plume and the production rates are too low to appreciably reverse flow gradients at the Site.

[2] Information based on personal communication with Mr. Mike Reed, Porterville City Engineer, January 29, 2013.

6.5. Site Inspection

A site inspection was conducted on November 1, 2012, to observe site conditions (Appendix D, Site Inspection Checklist). The site inspection was led by the EPA RPM, Ms. Holly Hadlock. Robert Keeley, Manager of Environmental Affairs with Beckman Coulter, accompanied Ms. Hadlock during the inspection. The site inspection included the review of on-site project-related operations and maintenance (O&M) documents and records, and observation of all monitoring wells including verification that they were properly secured/locked and in good condition. Some of the wells are on private property and fenced off so access was limited. The condition and functionality of the wells could not be ascertained during the site inspection.

6.6. Interviews

During the FYR process, EPA conducted interviews with two City of Porterville officials. The purpose of the interviews was to document the perceived status of the Site and any perceived problems or successes with the phases of the remedy that have been implemented to date. One interview was conducted in person on November 1, 2012, before the site inspection, while the other was conducted via telephone on January 14, 2013. EPA also conducted a telephone interview on June 18, 2013, with a Tulare County official in order to confirm that the county moratorium on new private wells within the Site is still in effect. Interviews are summarized below and complete interview documentation is included in Appendix E.

Interview with Brad Dunlap, Community Development Director, City of Porterville
Mr. Dunlap indicated that the Site has not received much public attention recently. Since it is within city limits, the city is interested in property development on vacant and other land within the footprint of the Site. The city wishes to limit development to within city limits to minimize sprawl and reduce the loss of prime agricultural lands. Mr. Dunlap stated the City Council supports reducing the Site boundaries (reflecting the historical, larger plume footprint) to the current limits of the groundwater contamination plume.

Interview with Mike Reed, City Engineer, City of Porterville
When asked about any wells used for groundwater withdrawal within city limits and near the Site, Mr. Reed indicated that the city installed Municipal Wells 27 and 28 in 2004 and 2009[3], respectively. He stated that installation of these wells did not violate the Tulare County moratorium on wells related to the Site because 1) the moratorium does not cover city wells, only private wells, 2) the city complied with all permitting requirements, and 3) the city wells are constructed to more stringent standards than private wells.

[3] These dates conflict with dates on well records as discussed in Section 6.4. Well installation records indicate Well 27 was installed in 2003 and Well 28 in 2005. Mr. Reed likely is referring not to installation dates, but dates the wells were plumbed into the city water distribution system, or when the wells began operating.

Interview with Paul Charpentier, Staff Services Analyst, Tulare County

Mr. Charpentier is aware of the December 2, 1983, memorandum that restricts installation of private water wells within the Beckman Site area. He confirmed that the moratorium is still in effect and that no private wells within the Site area have been installed.

6.7. Institutional Controls

On December 2, 1983, the County of Tulare Health and Human Services Agency (HHSA), Environmental Health Services Section issued a memorandum to all District Sanitarians that imposed a moratorium on well drilling in areas downgradient of the Site. This moratorium was considered to be, and remains, a governmental Institutional Control (IC) for the site. It prohibits the approval of building permits for property owners proposing to obtain water from wells in the Site area. The moratorium remains in effect and was verified in a June 18, 2013, letter from Tulare County (Appendix F).

The ROD contained no definitive ICs, nor did it reference the IC already in place prohibiting approval of building permits tied to well drilling. Regarding ICs and the selected remedy of pumping and treating groundwater in the upper aquifer, upper aquitard, and lower aquifer, the ROD stated:

> *It is recognized that cleanup goals may not be able to be achieved in the more impermeable zones of the aquitard and that some combination of ICs may need to be implemented in the future. This decision will be reviewed after the remedy has been in place five years to determine the feasibility of cleaning up the aquitard to MCLs.*

The 2005 ROD Amendment selecting MNA as the revised groundwater remedy incorporated the IC pertaining to well drilling as part of the remedy. Furthermore, the ROD Amendment stated that as part of the revised MNA groundwater remedy reporting process, Beckman is required annually to contact Tulare County HHSA to verify that the ICs against well drilling within the Site area remain in effect, and will note the status of the controls in the annual reports. The 2012 performance monitoring report indicated that both a letter and verbal confirmation were received from Tulare County that the well drilling moratorium is still in force. The report also noted a second IC describing how the City of Porterville maintains city water mains throughout the Site, and how the city remains committed to providing residents with potable water from their system.

Although the City of Porterville applied for well permits and in 2003 and 2005 installed two production wells (Wells 27 and 28) near the historical limits of the Site, the wells were south and east of the Poplar Ditch defining the southern lateral limits of the Site; therefore, this was not in violation of the IC prohibition on new wells.

7. Technical Assessment

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

The remedy is functioning as intended by the ROD, ESD, and ROD Amendment based on review of project-related documents and data, ARARS, risk assumptions, and the site inspection and interviews. The remedy has achieved the remedial objective of protecting human health and the environment by continuing to eliminate exposure to contaminated groundwater.

The current MNA remedy continues to operate and function as designed via annual groundwater monitoring, with progress evaluation in an annual performance monitoring report. Progress continues to be made toward meeting the second remedial objective to reduce contamination in groundwater to concentrations that meet cleanup levels and return groundwater to beneficial use. Contaminant trends either continue to decline or to behave as predicted in the case of one well, L-28. Cleanup levels have been achieved in all Site monitoring wells except one (L-28).

System operations consist only of limited groundwater monitoring and reporting. As such, O&M costs are relatively minor. A recommendation in the last performance monitoring report was to reduce the number of monitored wells by four, from nine to five, based on a recent statistical evaluation. This recommendation is under review.

The IC of a moratorium on well drilling and city-supplied water throughout the Site appears to be effective in not allowing wells to be drilled for consumptive use of groundwater within the boundaries of the Site. This IC is adequate for the current Site conditions, as no private wells have been installed in the Site area.

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

There have been no changes to the exposure assumptions, cleanup levels, remedial action objectives, ARARS, or in the physical conditions of the Site that would affect the protectiveness of the remedy.

For 1,1-DCE in June 2002, updated toxicity information indicated this chemical may be less toxic than originally assumed. In 2011, TCE toxicity information was updated and TCE is now considered to be more toxic than originally assumed; however, EPA considers the TCE MCL of 5 µg/L to be protective for both cancer and non-cancer effects, and no Site groundwater is in excess of 5 µg/L.

Although the lone remaining VOC (1,1-DCE) is present in groundwater in the vicinity of a residential portion of the Site, the relatively low concentration and limited lateral extent, depth,

and isolation via a clay and silt aquitard eliminate vapor intrusion from being a concern at the Site.

There has been a change in the California cleanup level for lead. The current state screening level for lead in soil is 80 ppm for residential exposure, which is lower than the cleanup level of 200 ppm used in 1989.

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

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

7.4. Technical Assessment Summary

The remedy is functioning as intended by the ROD, ESD, and ROD Amendment. There have been no changes to the exposure assumptions, remedial action objectives, ARARS, or in the physical conditions of the Site that would affect the protectiveness of the remedy. Toxicity factors have been updated for 1,1-DCE and TCE, but do not ultimately affect protectiveness. While the residential RSL for lead has been lowered to 80 ppm, the industrial RSL is 320 ppm, which is higher than the ROD cleanup level of 200 ppm. The site use has been, and continues to be, industrial, so the remedy is protective in the short-term. No other information has come to light that calls into question the remedy's protectiveness.

8. Issues

Although not a substantive issue which would affect Site protectiveness, well L-07 is not able to be sampled at this time due to a malfunctioning pump and it is recommended that the pump and anything else that is prohibiting the well from being sampled be corrected.

A second issue is the lack of recent groundwater flow gradient (magnitude and direction) evaluation and reporting in the annual performance monitoring reports. In addition to sampling and analysis of wells for COCs, another important component of any groundwater monitoring program is determining hydraulic gradient, including flow direction and magnitude. Such an evaluation is important for Beckman due to the recent installation and operation of city production wells in the lower aquifer to the south of the Site.

A third issue is the change in the cleanup level for lead in soil. The residential RSL for lead has been reduced from 200 ppm to 80 ppm and the industrial RSL is now 320 ppm. While the soil remedy remains protective for industrial use of the property, the remedy might not be protective for residential use.

9. Recommendations and Follow-up Actions

In the 2012 O&M report, Beckman recommended reducing monitoring to just five wells: L-28, MNA-01, MNA-02, MNA-03, and MNA-04. Since L-07 is also down-gradient it is recommended to include this in the monitoring program as well. The inclusion of L-07 into the monitoring network is a recommendation that would improve evaluation of the remedy's effectiveness; however, it does not affect current protectiveness.

The 2012 monitoring report from Hargis, Beckman's contractor, does not have a lower aquifer potentiometric map supporting the reported west-southwest flow direction. EPA recommends that the contractor should collect groundwater measurements at all existing, viable Site monitoring wells, interpret the data, and include such a map in the monitoring report to verify flow direction, and monitor the presumed plume axis.

For Beckman property soil, EPA recommends that confirmation samples taken during the soil cleanup be re-evaluated to determine if the current state lead standard (for residential) has been met. Once EPA receives and evaluates these results, EPA will determine if the cleanup levels should be changed since future land use could include residential development.

10. Protectiveness Statement

The remedy at the Beckman Instruments Superfund Site is protective of human health and the environment. The elements of the remedy that protect human health and the environment include institutional controls in place to prevent Site groundwater from consumptive use, a moratorium on new groundwater wells within the Site boundaries, and groundwater monitoring to track the plumes associated with the remaining contaminant, 1,1-DCE. In the short-term the soil remedy remains protective for industrial use of the Beckman property.

11. Next Review

The next FYR will be due within five years of the signature date of this FYR in 2018.

APPENDICES

Office Memorandum ☆ TULARE COUNTY

file

TO : All District Sanitarians

DATE: December 2, 1983

FROM : Tony Maniscalco

SUBJECT: How to View Building Permits in the Area Affected by Beckman Instruments Company Groundwater Contamination

The area described roughly as - South of Hwy 190, East of Hwy 65, West of the Beckman Plant and North of the Ditch (map attached).

This area is in the process of being provided domestic water from the City of Porterville. Residents are being encouraged to abandon and destroy their private wells. Building permits for new dwellings, major additions, relocations and mobile home installations are not to be signed if the property owner proposes to obtain water from individual wells in that area. FHA and other loan certifications are not to be approved in that area, nor are Authority to Construct for new individual wells to be approved, without approval of the director.

Tulare County
Health & Human Services Agency
John Davis, Agency Director
Ray Bullick, Director - Health Services Department

Health Services Department ▪ Larry Dwoskin, Director ▪ Environmental Health Services

December 10, 2007

Edward A. Nemecek RG, CPG
Principal Hydrogeologist
Hargis + Associates, Inc.
1640 S. Stapley Drive, Suite 124
Mesa, AZ 85204

Re: Update of Well Drilling Policy, Beckman Instruments Superfund Site, Porterville, CA

Dear Mr. Nemecek,

This letter is to acknowledge that the policy established in the Memo dated December 2, 1983 from Tony Maniscalco, Tulare County Environmental Health Supervisor, to All District Sanitarians (copy attached) is still in effect.

If you have any questions you can phone me at 559-733-6441.

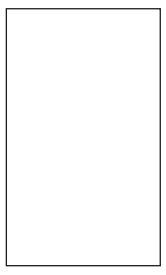
Sincerely,

Mark Bairstow
Environmental Health Supervisor

HERITAGE

Appendix B

Beginning of the end for grass-growing season



Brent Gill
Daunt to Dillonwood

Several things have happened to our hillsides over the past few days. Areas with no trees and slopes facing in a southerly direction have begun to turn away from the brilliant green to a light tan-yellow. The green chlorophyll in the blades and stalks of the grasses have begun to fade. This allows the yellow carotene also present in the grass to show through.

But, any grass shaded by a tree or growing on a northerly-facing slope remains a rich green. Even the grasses growing on any surface not facing directly south or southwest will retain their green a while longer.

When the grass begins to mature, there is another subtle change you may not notice. Without producing a seed, the grass would not be able to sprout next year, so the final act of a plant is to create a seed to preserve the species next year or season.

Many seeds created on grass have tiny barbs on small straight hair-like "feathers" that stick up vertically. As the seed matures and loosens, animals coming near the waiting seed may have the barbs hook onto the hair on the animal. The attachment may be very tight, or rather loose. Either way, when the seed-barbs allow it to fall, the seed will have moved away from the parent plant, thereby spreading the seeds further.

As these barbed feathers begin to mature, a green grassy pasture will begin to take on a "silver" tint, revealing the "beginning of the end" of the growing season for grasses. Over last weekend, I noticed the field in my back pasture has begun to take on the lighter tint. Even though we got a little additional moisture last weekend, the growing season in near an end.

And, speaking of additional moisture, on Sunday I was more than a bit surprised to pour 0.19 inches of rain from my gauge. The next day, we got another sprinkle, and an additional 0.02 inches. This brings our seasonal total up to 9.23 inches in this location, which is almost 77 percent of our average season total of 12 inches. That is far from ample, but well within the range of reasonable moisture and enough to make a decent grass crop.

Some years when we receive late-spring rains, the water falls on grass that has already dried and matured, causing leaching of the nutrients from the dry cured grasses. Sometimes it also causes mold and deterioration of the grass. This greatly reduces the ability of the dry grass to provide usable nutrition to the animals. When the rain hits tall standing grass, accompanied by the often-associated wind, the grass sometimes blows over, called lodging. When wet, dry grasses lodge, the incidence of black mold rises precipitously. When black mold covers the grass, it becomes worthless for nutrition. The cattle won't eat it, and I suspect it doesn't taste good.

Sometimes a late-season rain will fall on cured grass, followed quickly by warm spring sunshine, minimizing the damage. However, no amount of rain on dry grass does it any good, nor fails to reduce the nutritional worth no matter how quickly it dries.

This time of year, even if some of the southern slopes are dry or drying, a light rain won't do that grass any good, and it will decrease the nutritional value some. However, grass on northern slopes or shaded by trees may still be helped by a small amount of moisture.

In the late summer, usually coming to our foothills during the last two weeks of August and the first two weeks of September, we get what is often called our "Monsoon Season" or sometimes the "Dog Days of Summer." The summer weather pattern is changing, allowing the tropical moisture of Mexico to rush north, bringing high humidity and often precipitating late-summer rains.

With the humid air and unsettled weather, it is also not unusual to get thunder and summer lightning. And even though it is summer and the grass is dry, except for a relatively small amount of rain from the thunderstorms, a lightning strike on or near the grass is almost certainly going to start a wildland fire. And, since lightning usually hits the top of a hill or ridge, or sometimes a tall tree, the fire is not readily accessible to the trucks and firefighters. Sometimes, if luck is really on our side, there will be sufficient rain after the strike to put out the fire before it gets away, or even prevent it from getting started, but that doesn't happen very often.

Late-summer range fires are obviously much harder on the grazing than the rain leaching out the nutritional good. And, there is not nearly the amount of work involved in letting the grass dry as there is in putting out the fire. Either way the grazing animals are the losers.

▶ Brent Gill lives in Springville. His "Daunt to Dillonwood" column appears regularly in The Porterville Recorder. If you enjoyed this column, follow my blog at: http://foothillwriter.blogspot.com.

Of Service

Eric R. Lucio

Air Force Airman Eric R. Lucio graduated from basic military training at Lackland Air Force Base, San Antonio, Texas.

The airman completed an intensive, eight-week program that included training in military discipline and studies, Air Force core values, physical fitness, and basic warfare principles and skills.

Airmen who complete basic training earn four credits toward an associate in applied science degree through the Community College of the Air Force.

Lucio is the son of Lisa and David Lucio of Ducor.

He is a 2012 graduate of Porterville High School.

Jacob Vallejo

Air Force Airman Jacob Vallejo graduated from basic military training at Lackland Air Force Base, San Antonio, Texas.

The airman completed an intensive, eight-week program that included training in military discipline and studies, Air Force core values, physical fitness, and basic warfare principles and skills.

Airmen who complete basic training earn four credits toward an associate in applied science degree through the Community College of the Air Force.

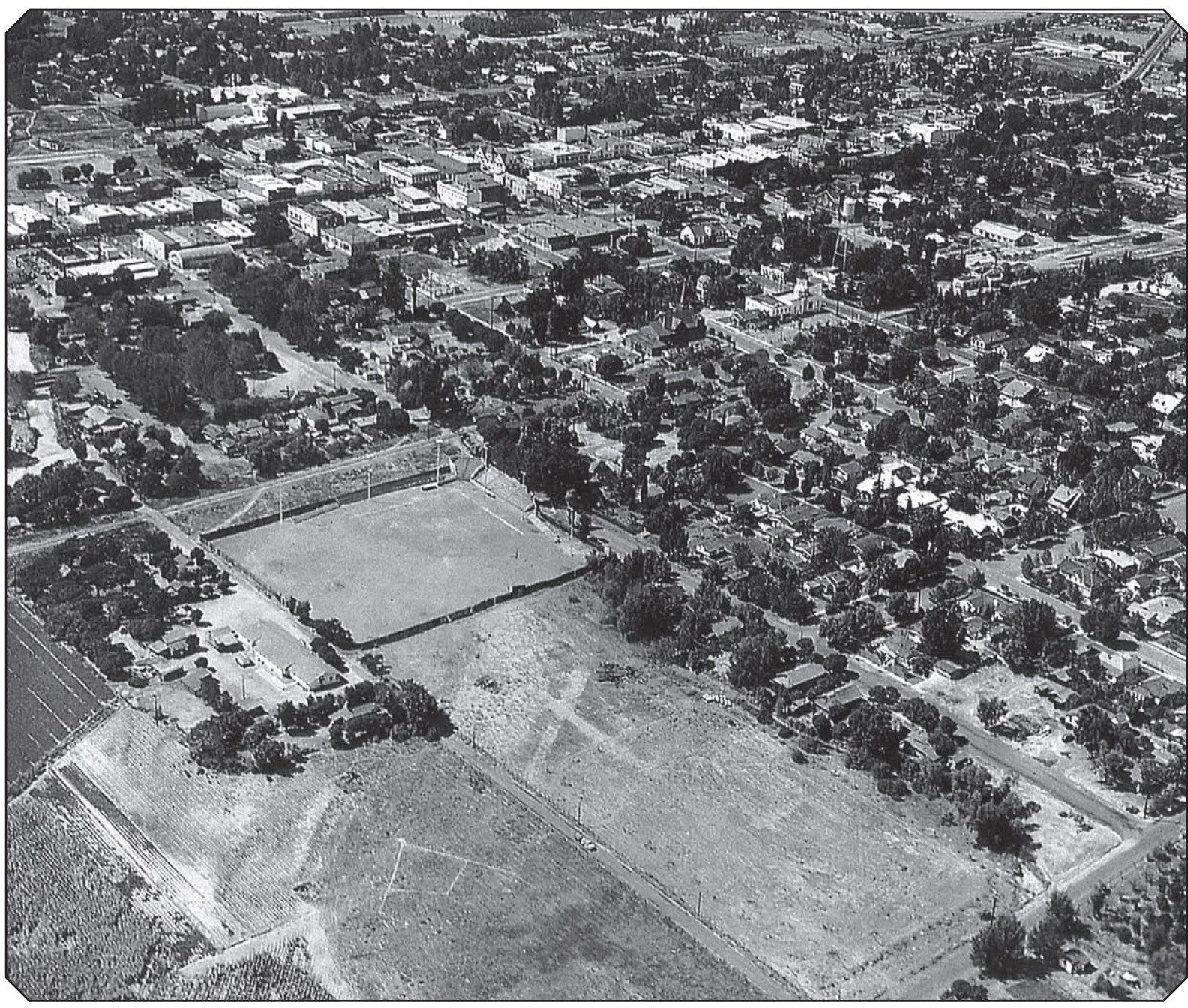
Vallejo earned distinction as an honor graduate.

He is the son of Jodie Soto and Robert Vallejo of Porterville.

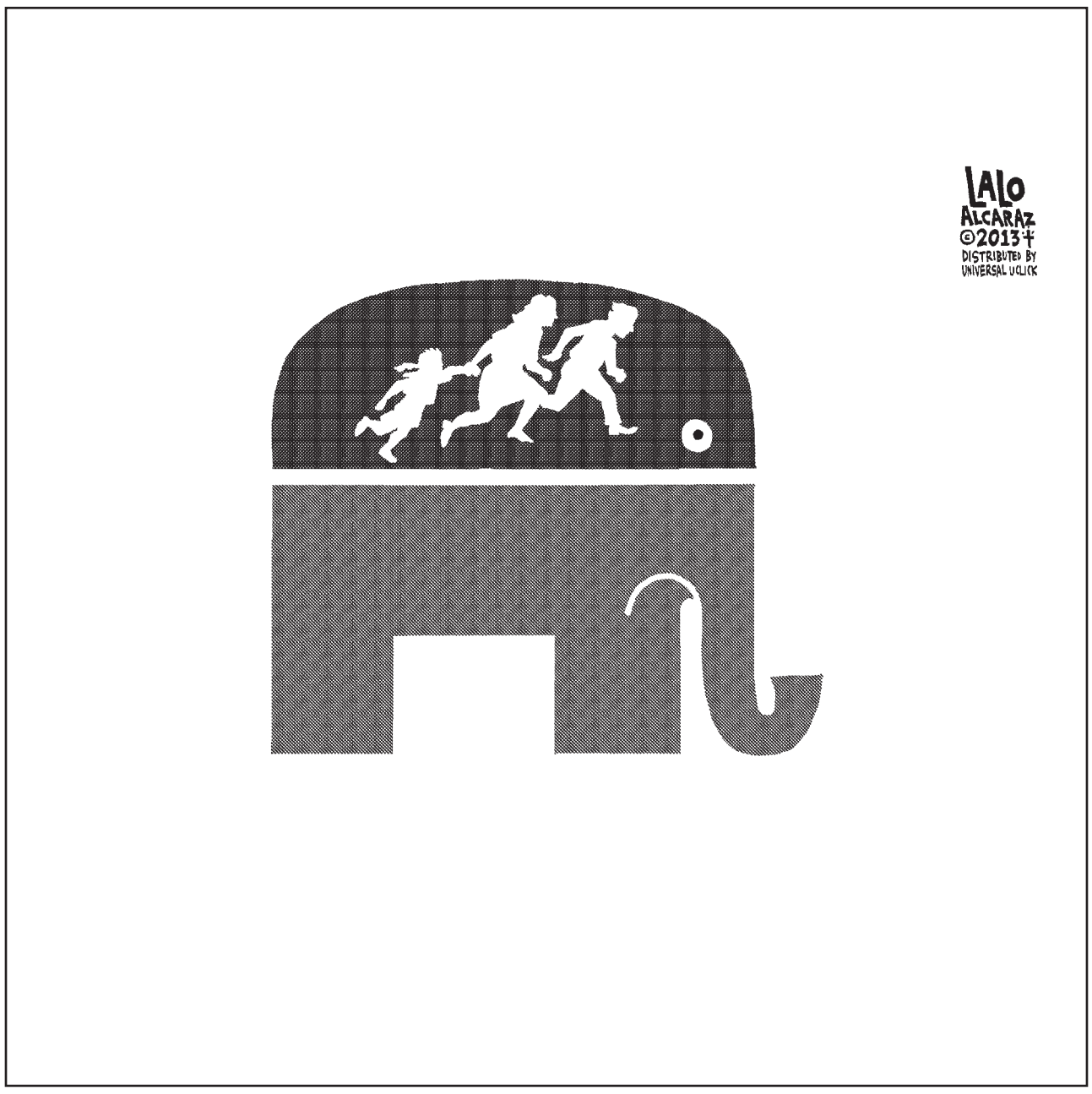
The airman earned an associate degree in 2012 from Porterville College.

▶ THE RECORDER

Bit of History



This photo of Porterville comes from the Recorder files circa 1950's. Can you figure out what area of town the photo encompasses? Check out The Recorder's Facebook page in the next couple of days to find out. The photo was taken by Jeff Edwards.



NOTICIERO SEMANAL

Appendix C: List of Documents Reviewed

USEPA, Region 9. Superfund Record of Decision: Beckman Instruments (Porterville Plant), CA. September 26, 1989.

USEPA, Region 9. Explanation of Significant Differences, Beckman Instruments Superfund Site. March 6, 1991.

USEPA, Region 9. (First) Five-Year Review Report, Beckman Instruments Site, Porterville, California. April 3, 1998.

USEPA. Comprehensive Five-Year Review Guidance, EPA 540-R-01-007, OSWER No. 9355.7-03B-P. June 2001.

USEPA, Region 9. Second Five-Year Review Report for Beckman Instruments Superfund Site, Porterville, California. September 29, 2003.

USEPA. 2004 Preliminary Remediation Goals. http://www.epa.gov/region9/superfund/prg/files/04prgtable.pdf . Retrieved February 2, 2013

Hargis + Associates, Inc. Monitored Natural Attenuation Plan, Beckman Instruments, Inc. Site, Porterville, California. June 30, 2005.

USEPA, Region 9. Record of Decision Amendment for Beckman Instruments Superfund Site, Porterville, California. September 2005.

Hargis + Associates, Inc. Interim Remedial Action Report for Beckman Instruments Superfund Site, Porterville, CA. March 30, 2007.

U.S. Environmental Protection Agency (USEPA), Region 9. Third Five-Year Review Report for Beckman Instruments Superfund Site, Porterville, California. September 18, 2008.

Hargis + Associates, Inc. Annual Performance Monitoring Report for Monitored Natural Attenuation 2009-2010; Beckman Instruments, Inc. Site, Porterville, California. April 7, 2011.

USEPA. 2012 Preliminary Remediation Goals for Residential Tap water. http://www.epa.gov/region9/superfund/prg/ . Retrieved February 2, 2013.

Hargis + Associates, Inc. Annual Performance Monitoring Report for Monitored Natural Attenuation 2012; Beckman Instruments, Inc. Site, Porterville, California. June 21, 2012.

Site Inspection Checklist

I. SITE INFORMATION	
Site name: Beckman Instruments	**Date of inspection:** Nov. 1, 2012
Location and Region:	**EPA ID:** CAD048645444
Agency, office, or company leading the five-year review: EPA Region 9	**Weather/temperature:** 73°, overcast

Remedy Includes: (Check all that apply)

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

Attachments: G Inspection team roster attached G Site map attached

II. INTERVIEWS (Check all that apply)

1. **O&M site manager** Robert Keeley (Name) Mgr., Env. Affairs (Title) 11/1/12 (Date)
   Interviewed G at site G at office G by phone Phone no. cell 559-782-5250
   Problems, suggestions; G Report attached no problems, gw is monitored only once a year

2. **O&M staff** _____ (Name) _____ (Title) _____ (Date)
   Interviewed G at site G at office G by phone Phone no. _____
   Problems, suggestions; G 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.

	Name	Title	Date	Phone no.
Agency City of Porterville Contact Brad Dunlap		Community Development Dir.	11/1/12	559-782-7460

Problems; suggestions; G Report attached
Interview record attached

	Name	Title	Date	Phone no.
Agency City of Porterville Contact Mike Reed		City Engineer	1/14/13	559-782-7462

Problems; suggestions; G Report attached
Interview record attached

	Name	Title	Date	Phone no.
Agency Tulare County Contact Paul Charpentier		Staff Services Analyst	6/18/13	559-624-7416

Problems; suggestions; G Report attached
Interview record attached

	Name	Title	Date	Phone no.
Agency _____ Contact _____				

Problems; suggestions; G Report attached _____

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

III. ON-SITE DOCUMENTS & RECORDS VERIFIED (Check all that apply)				
1.	**O&M Documents**			
	G O&M manual	G Readily available	G Up to date	G N/A
	G As-built drawings	G Readily available	G Up to date	G N/A
	G Maintenance logs	G Readily available	G Up to date	G N/A
	Remarks			
2.	**Site-Specific Health and Safety Plan**	G Readily available	G Up to date	G N/A
	G Contingency plan/emergency response plan	G Readily available	G Up to date	G N/A
	Remarks			
3.	**O&M and OSHA Training Records**	G Readily available	G Up to date	G N/A
	Remarks			
4.	**Permits and Service Agreements** NA			
	G Air discharge permit	G Readily available	G Up to date	G N/A
	G Effluent discharge	G Readily available	G Up to date	G N/A
	G Waste disposal, POTW	G Readily available	G Up to date	G N/A
	G Other permits	G Readily available	G Up to date	G N/A
	Remarks			
5.	**Gas Generation Records**	G Readily available	G Up to date	G N/A
	Remarks			
6.	**Settlement Monument Records**	G Readily available	G Up to date	G N/A
	Remarks			
7.	**Groundwater Monitoring Records**	G Readily available	G Up to date	G N/A
	Remarks			
8.	**Leachate Extraction Records**	G Readily available	G Up to date	G N/A
	Remarks			
9.	**Discharge Compliance Records**			
	G Air	G Readily available	G Up to date	G N/A
	G Water (effluent)	G Readily available	G Up to date	G N/A
	Remarks			
10.	**Daily Access/Security Logs**	G Readily available	G Up to date	G N/A
	Remarks			

IV. O&M COSTS

1. **O&M Organization**
   G State in-house G Contractor for State
   G PRP in-house G Contractor for PRP
   G Federal Facility in-house G Contractor for Federal Facility
   G Other _____

2. **O&M Cost Records** not available
   G Readily available G Up to date
   G Funding mechanism/agreement in place
   Original O&M cost estimate _____ G Breakdown attached

   Total annual cost by year for review period if available

   From _____ To _____ _____ G Breakdown attached
   Date Date Total cost
   From _____ To _____ _____ G Breakdown attached
   Date Date Total cost
   From _____ To _____ _____ G Breakdown attached
   Date Date Total cost
   From _____ To _____ _____ G Breakdown attached
   Date Date Total cost
   From _____ To _____ _____ G Breakdown attached
   Date Date Total cost

3. **Unanticipated or Unusually High O&M Costs During Review Period**
   Describe costs and reasons: _____

V. ACCESS AND INSTITUTIONAL CONTROLS (G) Applicable G N/A

A. Fencing - around some wells, not required as IC

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

B. Other Access Restrictions

1. **Signs and other security measures** G Location shown on site map (G) N/A
   Remarks _____

C. Institutional Controls (ICs)

1. **Implementation and enforcement**
Site conditions imply ICs not properly implemented G Yes (G) No G N/A
Site conditions imply ICs not being fully enforced G Yes (G) No G 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 G Yes G No (G) N/A
Reports are verified by the lead agency G Yes G No (G) N/A

Specific requirements in deed or decision documents have been met G Yes G No (G) N/A
Violations have been reported G Yes (G) No G N/A
Other problems or suggestions: G Report attached
IC is a well moratorium; cannot be evaluated during site inspection. No reports required

2. **Adequacy** (G) ICs are adequate G ICs are inadequate G N/A
Remarks _____

D. General

1. **Vandalism/trespassing** G Location shown on site map (G) No vandalism evident
Remarks _____

2. **Land use changes on site** G N/A
Remarks no

3. **Land use changes off site** G N/A
Remarks no

VI. GENERAL SITE CONDITIONS

A. Roads G Applicable G N/A

1. **Roads damaged** G Location shown on site map (G) Roads adequate G N/A
Remarks _____

B. Other Site Conditions

Remarks _____

_____

_____

_____

_____

_____

VII. LANDFILL COVERS G Applicable (G N/A)

A. Landfill Surface

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

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

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

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

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

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

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

8.	**Wet Areas/Water Damage**	G Wet areas/water damage not evident
	G Wet areas	G Location shown on site map Areal extent_____
	G Ponding	G Location shown on site map Areal extent_____
	G Seeps	G Location shown on site map Areal extent_____
	G Soft subgrade	G Location shown on site map Areal extent_____
	Remarks_____	
9.	**Slope Instability** G Slides	G Location shown on site map G No evidence of slope instability
	Areal extent_____	
	Remarks_____	
B. Benches	G Applicable G 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**	G Location shown on site map G N/A or okay
	Remarks_____	
2.	**Bench Breached**	G Location shown on site map G N/A or okay
	Remarks_____	
3.	**Bench Overtopped**	G Location shown on site map G N/A or okay
	Remarks_____	
C. Letdown Channels	G Applicable G 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**	G Location shown on site map G No evidence of settlement
	Areal extent_____ Depth_____	
	Remarks_____	
2.	**Material Degradation**	G Location shown on site map G No evidence of degradation
	Material type_____ Areal extent_____	
	Remarks_____	
3.	**Erosion**	G Location shown on site map G No evidence of erosion
	Areal extent_____ Depth_____	
	Remarks_____	

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

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

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

D. Cover Penetrations G Applicable G N/A

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

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

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

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

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

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

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

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

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

F. Cover Drainage Layer G Applicable G N/A

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

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

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

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

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

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

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

H. Retaining Walls G Applicable G N/A

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

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

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

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

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

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

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

VIII. VERTICAL BARRIER WALLS G Applicable G N/A

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

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

IX. GROUNDWATER/SURFACE WATER REMEDIES G Applicable (G N/A)

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

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

2. **Extraction System Pipelines, Valves, Valve Boxes, and Other Appurtenances**
   G Good condition G Needs Maintenance
   Remarks _____

3. **Spare Parts and Equipment**
   G Readily available G Good condition G Requires upgrade G Needs to be provided
   Remarks _____

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

1. **Collection Structures, Pumps, and Electrical**
   G Good condition G Needs Maintenance
   Remarks _____

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

3. **Spare Parts and Equipment**
   G Readily available G Good condition G Requires upgrade G Needs to be provided
   Remarks _____

Remedy is MNA; no extraction wells and pipelines

C. Treatment System G Applicable (G N/A)

1. **Treatment Train** (Check components that apply)
   G Metals removal G Oil/water separation G Bioremediation
   G Air stripping G Carbon adsorbers
   G Filters _____
   G Additive (*e.g.*, chelation agent, flocculent) _____
   G Others _____
   G Good condition G Needs Maintenance
   G Sampling ports properly marked and functional
   G Sampling/maintenance log displayed and up to date
   G Equipment properly identified
   G Quantity of groundwater treated annually _____
   G Quantity of surface water treated annually _____
   Remarks _____

2. **Electrical Enclosures and Panels** (properly rated and functional)
   G N/A G Good condition G Needs Maintenance
   Remarks _____

3. **Tanks, Vaults, Storage Vessels**
   G N/A G Good condition G Proper secondary containment G Needs Maintenance
   Remarks _____

4. **Discharge Structure and Appurtenances**
   G N/A G Good condition G Needs Maintenance
   Remarks _____

5. **Treatment Building(s)**
   G N/A G Good condition (esp. roof and doorways) G Needs repair
   G Chemicals and equipment properly stored
   Remarks _____

6. **Monitoring Wells** (pump and treatment remedy)
   G Properly secured/locked G Functioning G Routinely sampled G Good condition
   G All required wells located G Needs Maintenance G N/A
   Remarks _____

D. Monitoring Data

1. Monitoring Data
   X Is routinely submitted on time X Is of acceptable quality

2. Monitoring data suggests:
   X Groundwater plume is effectively contained X Contaminant concentrations are declining

D. Monitored Natural Attenuation

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

X Properly secured/locked	G Functioning	X Routinely sampled	G Good condition
X All required wells located	G Needs Maintenance		G N/A

Remarks Could not assess condition, functionality of wells during site visit

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.).

The remedy is MNA. All monitoring wells were located and locked or fenced off.

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.

Wells are monitored once a year. Based on modeling + projections, the natural attenuation is proceeding as expected, contamination remains in only one well. The remedy remains protective.

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. none

INTERVIEW DOCUMENTATION FORM

The following is a list of individual interviewed for this five-year review. See the attached contact record(s) for a detailed summary of the interviews.

Name	Title/Position	Organization	Date
Brad Dunlap	Community Development Dir.	City of Porterville	11/1/12
Mike Reed	City Engineer	City of Porterville	1/14/13
Paul Charpentier	Staff Services Analyst	Tulare County	6/18/13

INTERVIEW RECORD

Site Name: Beckman Instruments		**EPA ID No.: CAD048645444**
Subject: Five-Year Review		**Time:** 2:30 **Date:** 11/1/12
Type: Telephone X Visit Other **Location of Visit:** Porterville City Hall		Incoming Outgoing
Contact Made By:		
Name: Holly Hadlock	**Title:** Remedial Project Manager	**Organization:** US EPA
Individual Contacted:		
Name: Brad Dunlap	**Title:** Community Development Dir.	**Organization:** City of Porterville
Telephone No: **Fax No:** **E-Mail Address:**	**Street Address:** **City, State, Zip:**	

Summary Of Conversation

I asked Mr. Dunlap if there are any community concerns, issues about the Beckman Superfund Site. He said the site has not been a "hot topic" in town in terms of contamination. But regarding property development, the city wants to prevent urban sprawl and limit development of prime agricultural land, so the city in interested in developing within the city. The last big parcel of land available is within the site boundary (as defined in the ROD). In order to be competitive and attract developers to Porterville, the city council supports a partial deletion of the site, reducing it from its current size to where the groundwater contamination is.

INTERVIEW RECORD

Site Name: Beckman Instruments		**EPA ID No.: CAD048645444**
Subject: Five-Year Review		**Time:** 2:00 **Date:** 1/14/13
Type: X Telephone Visit Other **Location of Visit:**		Incoming Outgoing
Contact Made By:		
Name: Holly Hadlock	**Title:** Remedial Project Manager	**Organization:** US EPA
Individual Contacted:		
Name: Mike Reed	**Title:** City Engineer	**Organization:** City of Porterville
Telephone No: 559-782-7462 **Fax No:** **E-Mail Address:**	**Street Address:** **City, State, Zip:**	

Summary Of Conversation

I asked Mr. Reed about any groundwater wells in the city near the Beckman Superfund Site and about the Tulare County moratorium on private wells within the site boundary. He said the city installed Well #27 in 2004 on Jaye Street between Gibbons Ave. and El Rancho Ave. Well #28 was installed in 2009 near Gibbons and F Street, SE of the Beckman facility. The city got a permit from Tulare County and complied with all state requirements. The water meets all drinking water standards. He said the county moratorium does not cover city public drinking water wells, which are constructed to more stringent standards than private wells.

INTERVIEW RECORD

Site Name: Beckman Instruments		**EPA ID No.: CAD048645444**
Subject: Tulare County well restriction		**Time:** 2:10 **Date:** 6/18/13
Type: X Telephone Visit Other **Location of Visit:**		Incoming Outgoing

Contact Made By:

Name: Holly Hadlock	**Title:** Remedial Project Manager	**Organization:** US EPA

Individual Contacted:

Name: Paul Charpentier	**Title:** Staff Services Analyst	**Organization:** Tulare County
Telephone No: 559-624-7416 **Fax No:** **E-Mail Address:**	**Street Address:** **City, State, Zip:**	

Summary Of Conversation

I asked Mr. Charpentier if he is familiar with a December 2, 1983, Tulare County memorandum for the Beckman Superfund Site area that states that building permits are not to be signed if the property owner plans on putting in a private well, and that the Authority to Construct new wells are not to be approved. He said he is familiar with this memo, he has a copy, and that the memo is still in effect.

He said that Tulare County regulates water delivery to entities with fewer than 200 service connections, such as trailer parks, remote homes, private wells, and that CA Dept. of Public Health regulates water delivery if more than 200 service connections.

TULARE COUNTY
HEALTH & HUMAN SERVICES AGENCY
DEPARTMENT OF ADMINISTRATION · KEVIN MARKS · DIRECTOR
ENVIRONMENTAL HEALTH SERVICES · VIVIAN NELSON, MSEE REHS · DIVISON MANAGER

Cheryl L. Duerksen, Ph.D.,
Agency Director

June 18, 2013

Edward A. Nemecek, RG, CPG
Principal Hydrogeologist
Hargis & Associates, Inc
1640 S. Stapley Drive, Suite 124
Mesa, AZ 85204

Subject: Update on Beckman Instruments Superfund Site, Porterville, CA

Dear Mr. Nemecek,

This letter is to acknowledge that the policy established in the Memo dated December 2, 1983 from Tony Maniscalco, Tulare County Environmental Health Supervisor, to all District Sanitarians (copy attached) is still in effect.

If you have any questions you can contact me at 559-624-7400.

Sincerely,

Nilsa Gonzalez
Environmental Health Supervisor

Cc: Holly Hadlock, USEPA

Office Memorandum ☆ TULARE COUNTY

file

TO : All District Sanitarians

DATE: December 2, 1983

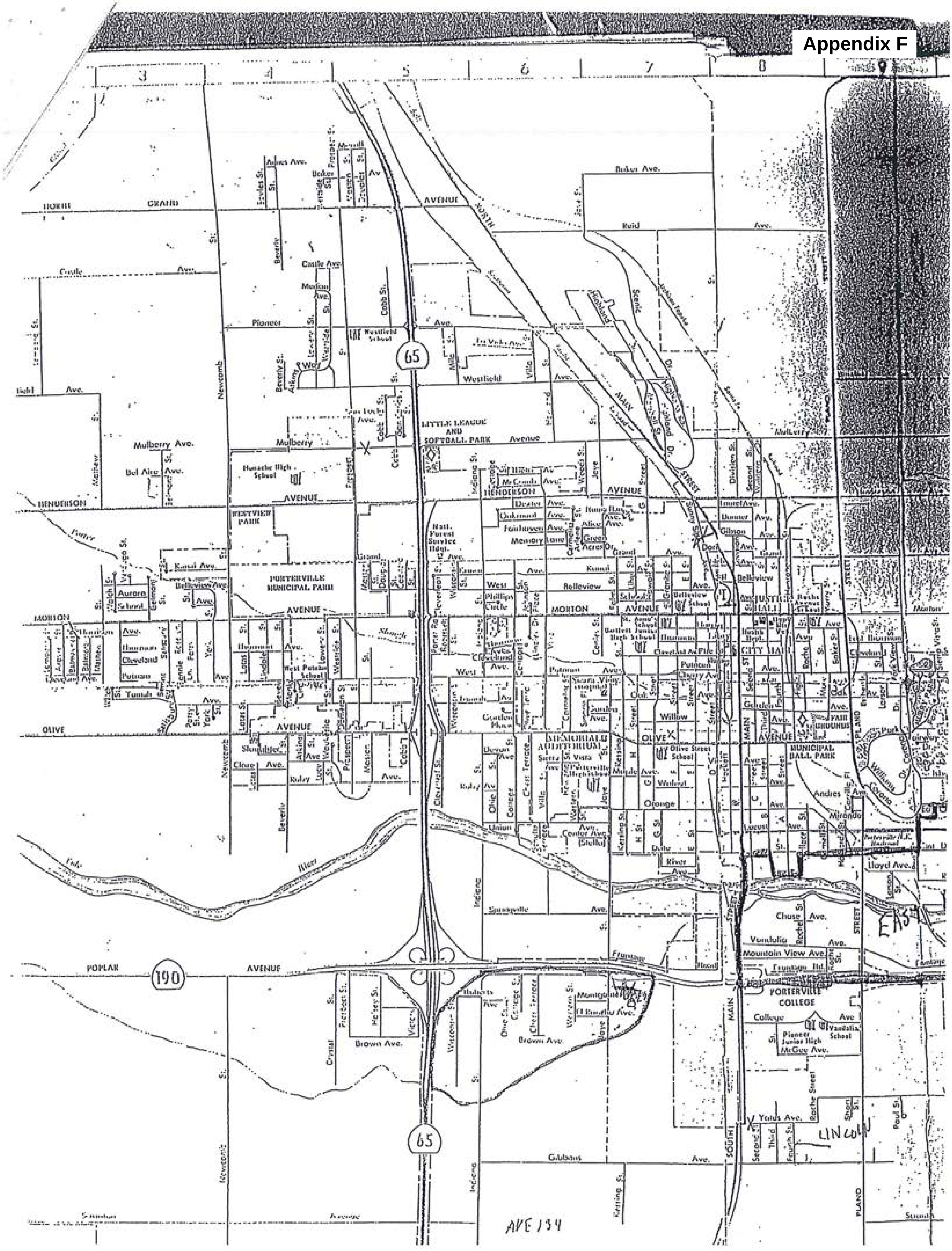
FROM : Tony Maniscalco

SUBJECT: How to View Building Permits in the Area Affected by Beckman Instruments Company Groundwater Contamination

The area described roughly as - South of Hwy 190, East of Hwy 65, West of the Beckman Plant and North of the Ditch (map attached).

This area is in the process of being provided domestic water from the City of Porterville. Residents are being encouraged to abandon and destroy their private wells. Building permits for new dwellings, major additions, relocations and mobile home installations are not to be signed if the property owner proposes to obtain water from individual wells in that area. FHA and other loan certifications are not to be approved in that area, nor are Authority to Construct for new individual wells to be approved, without approval of the director.

Appendix F



3
4
5
6
7
8
NORTH GRAND AVENUE
Castle Ave.
Pioneer Ave.
Westfield
Mulberry Ave.
HENDERSON AVENUE
MORTON AVENUE
OLIVE AVENUE
POPLAR AVENUE
190
65
Newcomb St.
LITTLE LEAGUE AND SOFTBALL PARK
PORTERVILLE MUNICIPAL PARK
WESTVIEW PARK
MEMORIAL AUDITORIUM
CITY HALL
JUSTICE HALL
MUNICIPAL BALL PARK
FAIR GROUNDS
PORTERVILLE COLLEGE
Olive Street School
Monache High School
Tule River
MAIN STREET
PLANO STREET
Gibbons Ave.
Scranton Avenue
Indiana St.
Mountain View Ave.
College Ave.
Pioneer Junior High
McGee Ave.
Baker Ave.
Reid Ave.
Willow
Orange
Putnam
Cleveland
Thurman
Belleview
Grand
Date
River Ave.
Yates Ave.
Brown Ave.
Frontage Rd.
Vandalia
Chase Ave.
LINCOLN
EAST
AVE 134