

Second Five-Year Review
for
QUEEN CITY FARMS SUPERFUND SITE
Maple Valley, King County, Washington

September 2003

Prepared by:
United States Environmental Protection Agency
Region 10
Seattle, Washington

Approved by:

/s/ Michael F. Gearheard

Michael F. Gearheard, Director
Office of Environmental Cleanup

Date:

September 29, 2003

Executive Summary

The Queen City Farms (QCF) Superfund site is located east of Renton, Washington in Maple Valley. The 320-acre property has two separate areas of contamination; the old waste pond area in the eastern portion of the property, and the former 4-Tek processing area in the center of the property. Both of these areas have undergone remedial actions that have cleaned up the surface soils and have established long-term groundwater monitoring for each area. The eastern portion, old waste pond area, has had extensive cleanup actions consisting of removal of the waste ponds containing the contaminated soil and sludge. The groundwater and soil beneath the old pond area has been contained with a Vertical Barrier Wall (slurry wall) and a surface cap. This area is now known as the Containment Area. The groundwater impacts were also greater from the waste ponds area and a larger groundwater monitoring program currently is being implemented by the PRPs. The 4-Tek area had a surface soil removal to prevent contact with contaminated soil. The remaining activities consist of operation and maintenance (O&M) of the Containment Area and long-term groundwater monitoring.

The construction of the Vertical Barrier Wall and cap over the old waste pond area was completed in 1996. The Second Five-Year Review revealed that the O&M of the cap/cover system is functioning well. The Vertical Barrier Wall sufficiently controls the residual contamination in the soil and groundwater from the source area that EPA made the decision in 2001 not to invoke a ROD contingency that required additional remedial actions to control the groundwater plume source. Monitoring done during the last five years indicates that the performance of the Vertical Barrier Wall is still working as designed.

O&M actions taken at the Site are expected to be sufficient to address the normal activities that are occurring at the Site. Basically groundwater monitoring at both areas is the ongoing activity at this time.

Five-Year Review Summary Form

Site Identification

Site Name: Queen City Farms
EPA ID Number: WAD098511745
EPA Region: Region 10
State: Washington
City/County: Maple Valley/King County

Site Status

NPL Status: Final, September 21, 1984
Remediation Status: Operating, under O&M
Number of OUs: One, Entire site is a single OU
Construction Completion Date: September 9, 1997

Review Status

Lead Agency: EPA, Enforcement Lead
Author Name: Neil Thompson
Author Title: Project Manager
Author Affiliation: EPA, Region 10
Review Period: March 2003 through September 2003
Date of Site Inspection: September 18, 2003
Type of Review: Statutory, Post-SARA
Five-Year Review Number: Second
Triggering Action: Previous Five-Year Review Report
Triggering Action Date (WasteLan): September 29, 1998
Due Date: September 29, 2003

Issues

The site inspection identified a potential problem with the O&M of the cap over the Containment Area. The growth of woody plants is occurring, especially scotch broom. EPA is evaluating whether this is a concern to the cap integrity at QCF. Sampling an analysis of 1,4-Dioxane needs to be done because TCE is a major

contaminant of concern.

Recommendations and Follow-up Actions

The recommended and follow-up actions identified for this site during this Second Five-Year Review is the growth of woody plants on the capped Containment Area and the need to sample for 1,4-Dioxane. An evaluation of the growth of cover crops and the use of woody plants on engineered cover systems should be done. This should be done by March 2004, before the next growing season gets fully underway. If scotch broom and other woody brush is identified as a problem, the plants can be mowed and the grass cover crop allowed to continue to provide the surface soil stabilization over the cap. Sampling and analysis for 1,4-Dioxane can be incorporated into the next semi-annual sampling event, but no later than October 2004.

Protectiveness Statement

Because the remedial action at all areas of the site are protective, the site is protective of human health and the environment.

Second Five-Year Review

Queen City Farms Superfund Site Maple Valley, Washington

I. Introduction

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

The U.S. Environmental Protection Agency (EPA) is preparing this Second Five-Year Review report pursuant to CERCLA §121 and the National Contingency Plan (NCP). CERCLA §121 states:

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

The Agency interpreted this requirement further in the NCP; 40 CFR § 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 action no less often than every five years after the initiation of the selected remedial action.

The US Environmental Protection Agency (EPA), Region 10 conducted the

Second Five-Year Review of the remedy implemented at the Queen City Farms (QCF) site. This review was conducted by the EPA Remedial Project Manager (RPM) from March 2003 through September 2003. A site inspection was done on September 15, 2003, by Neil Thompson, RPM; Marcia Knadle, Regional Hydrogeologist; and Brian Anderson, Project Manager, the Boeing Company (potentially responsible party [PRP]). This report documents the results of this review.

This is the Second Five-Year Review for the QCF site. The triggering action for this statutory review is the completion of the First Five-Year Review Report, dated September 29, 1998. The five-year review is required because hazardous substances, pollutants, or contaminants remain in the soil and groundwater above levels that allow for unlimited use and unrestricted exposure.

II. Site Chronology

Table 1: Chronology of Site Events

Event	Date
Initial Site Discovery	November 23, 1979
Preliminary Assessment/Site Investigation	June 27, 1983
AOC for Groundwater Investigation	August 17, 1983
NPL Listing	September 21, 1984
Focused Feasibility Study - Waste Ponds Area	June 1985
ROD for Initial Remedial Measure (IRM) - Waste Ponds	October 24, 1985
AOC for IRM	October 28, 1985
Completion of IRM	October 31, 1986
AOC for RIFS - Waste Ponds Area	May 6, 1988
AOC (Removal) for 4-Tek Area	May 14, 1990
ROD for Vertical Barrier - Waste Ponds Area	December 31, 1992
AOC for Groundwater Monitoring by King Co.	May 1, 1992
Consent Decree for Vertical Barrier	September 9, 1994
Design (RD) Start for Vertical Barrier	September 20, 1994

Design (RD) Complete for 4-Tek Area	August 28, 1995
Construction (RA) Start for Vertical Barrier*	July 27, 1995
Design (RD) Complete for Vertical Barrier	April 26, 1996
Preliminary Construction Close-Out Report (PCOR)**	September 9, 1997
First Five-Year Review	September 29, 1998
Construction (RA) Complete for Vertical Barrier**	September 26, 2001

* This was a design/construction project which including construction elements occurring prior to design.

** PCOR and RA Complete are special terms. The wall was constructed and completed in 1996, but the project was not completed until 1997 and the ROD required a five year evaluation to determine whether it was functioning as designed.

III. Background

The 320-acre Queen City Farms site (Site, or QCF) is located adjacent to Cedar Grove Road, approximately three miles northwest of Maple Valley, King County, Washington, Figure 1-1. It is located in a rural setting that has industrial activity on two sides. The Site itself was previously used as a pig farm, an airport, a chemical mixing operation, for a gravel source, and for waste disposal ponds. It is currently the location of a 26-acre regional composting operation. The Site is bounded on the north by a 960-acre municipal landfill (Cedar Hills) operated by King County, to the west is undeveloped land owned by Plum Creek Timber Company, the southern boundary is adjoins the Stoneway Sand and Gravel mining and sorting operation, and the south eastern boundary is effectively Cedar Grove Road. However, the property extends south easterly into a wetlands area beyond the road. Two private residences adjoin the Site along Cedar Grove Road.

The Site was listed on the NPL as a result of the contamination found in the waste disposal ponds and in the vicinity of that portion of the property used by a chemical formulator.

Site History and Enforcement Activities

A. Past Disposal Activities

Industrial waste liquids, including paint and petroleum products, organic solvents, and oils were disposed in three, unlined, one-acre ponds located in the northeastern portion of the Site. Disposal occurred from approximately 1955 through the late 1960's.

The removal of the three waste ponds and their contents was the focus of an Interim Remedial Measure (IRM) in 1986. The cleaned up old waste pond area is now called the Containment Area, see Figure 1-1 for location)

Wastes were transported to the ponds in tanker trucks or drums and discharged directly to the ponds. Occasionally the drums themselves were placed in the ponds. The ponds were periodically burned to reduce the volume and lower the accidental fire hazard posed by floating flammable products in these ponds.

4-Tek Industries (4-Tek) leased a vacant building on the western portion of the Site for the purpose of recycling and reformulating solvents. The plant operated for several years and closed in 1986. Surface water runoff from chemical storage and mixing areas drained to a sump with a discharge pipe. Samples taken of the soil in the vicinity of the 4-Tek drainage contained detectable levels of volatile organic compounds that were probably due to spillage.

A Buried Drum Area (BDA) was also identified near the ponds. The source of this material was never documented, but soil samples contained polyaromatic hydrocarbons (PAHs) and trichloroethylene which contributed to Site contamination problems.

B. Past Remedial and Removal Activities

Remedial and removal activities have addressed the three contaminated areas of the Site: (1) the three waste ponds, (2) the BDA, and (3) the area around the 4-Tek operations.

1. Waste Ponds

In 1980, the waste ponds were first sampled by EPA. The analyses of water, sludge, and sediment samples identified 44 contaminants including metals, volatile and semi-volatile organics, and polychlorinated biphenyls (PCBs). In 1983, monitoring wells were constructed to investigate the extent of soil and groundwater contamination. In 1983, the owners of the Site signed a Consent Order to complete the groundwater monitoring program. The analyses of soil and groundwater samples taken during these field investigations confirmed the presence of 24 of the original 44 contaminants.

In 1984, an additional field investigation was done to determine the volume of the industrial waste sludge in the ponds, and the volume of contaminated soil adjacent and beneath these ponds. Samples taken from the sludge and soil confirmed the presence of significant concentrations of heavy metals, volatile organics, semi-volatile organics, PAHs and PCBs.

In June 1985, a Focused Feasibility Study (FFS) was completed to examine

initial remedial measures for the removal and/or containment of the waste in the ponds. Then in October 1985, a Consent Order with the property owner was signed implementing an Initial Remedial Measure (IRM). The IRM called for:

- separation of chemical sludge into liquid and solid phases;
- stabilization of the liquid;
- disposal of the stabilized sludge at an off-site hazardous waste landfill;
- installation of surface and groundwater diversion systems to prevent surface water and near-surface groundwater from migrating through the contaminated soil left behind after the pond cleanup;
- installation of a multi-layered cap over the contaminated soils; and
- installation of a groundwater monitoring system.

2. Buried Drum Area

A Buried Drum Area (BDA) was discovered in 1988 near the waste ponds. Samples taken from soil and drum contents included PAHs, pentachlorophenol (PCP), toluene, ethylbenzene, tetrachloroethene (PCE), xylene, and heavy metals. Thirty-two over-pack drums and three roll-off truck boxes were used to transport the heavily contaminated soils and recovered drums to an acceptable off-site disposal facility. Slightly contaminated soil (estimated at 7500 cu. yd.) was stockpiled for disposal after the Remedial Investigation and Feasibility Study (RIFS) was complete.

3. 4-Tek Industries

Soil sampling in 1985 and 1987 confirmed the presence of volatile organics including PCE, trichloroethene (TCE), toluene, and methylene chloride. In 1990, approximately 170 cubic yards of contaminated soil and 40 cubic yards of contaminated concrete were excavated and removed to clean up the old sump area.

4. Off-Site Studies

In addition to the three areas on the Site where removal actions were taken, the Cedar Hills Landfill, adjacent on the northern boundary, and 12 nearby residential wells were sampled. It was determined from the sampling that the landfill was not contributing contamination to the QCF Site nor was the Site impacting any of the residential wells.

C. Enforcement Activities

There is a history of enforcement actions beginning with the initial Site Discovery in 1980. The first Consent Order was signed in August, 1983, to conduct a shallow groundwater investigation. The Site was listed on the NPL in September 1984. A series of request and notice letters were sent to Potentially Responsible Parties (PRPs)

ultimately resulting in a Consent Order in May 1988, which required two PRPs, QCF Inc. and the Boeing Company, to undertake an RIFS. Additional rounds of notice letters were sent which resulted in RIFS work being initiated on the Cedar Hills Landfill and work exclusion zones for Stoneway Sand and Gravel. In May 1990, a Consent Order was signed requiring QCF Inc. to undertake removal activities at 4-Tek. In May 1992, King County (owners of the Cedar Hills Landfill) signed a Consent Order to undertake a long-term surface water and groundwater monitoring program. Pursuant to a Record of Decision (ROD) signed on December 31, 1992, a Consent Decree was signed on September 9, 1994, which implemented the ROD.

IV. Remedial Actions

A. Record of Decision

The remedial actions described below are the final response actions for the Site. The IRM was performed at the Site in 1986 and included removal and containment measures which addressed sludge and liquid contamination at the Site. The IRM only partially addressed soil contamination, and did not deal with groundwater contamination. The cleanup actions described in the ROD address the threats to groundwater and soils posed by TCE and other contaminants at the Site. Long-term management controls are necessary to maintain the integrity of the cleanup.

The Site is divided into three on-site areas: the IRM and groundwater contamination, the BDA, and 4-Tek. The ROD also addresses Site-wide issues and some off-site areas.

The major elements of the selected remedy as stated in the ROD are:

1. IRM pond (liquid and sludge) and associated groundwater source removal.
- Isolation of contaminated soils by construction of a vertical barrier system/slurry wall around the IRM area.
- Dewatering, treatment, and off-site discharge of the groundwater within the IRM.
- Contingent extraction and treatment of Aquifer 1 groundwater outside the IRM. On-site discharge of treated groundwater to the Main Gravel Pit Lake or equivalent surface water.
- Removal and off-site incineration of liquid non-aqueous phase liquid (LNAPL) from within, and adjacent to, the IRM.

- Contingent venting of IRM soils. The effectiveness of venting will be determined by treatability studies to be conducted during the remedial design.
 - Contingent extraction and treatment of contaminated Aquifer 2 groundwater. Discharge of extracted groundwater to the Main Gravel Pit Lake or equivalent surface water body.
2. Buried Drum Area
- Excavation of approximately 10,000 cubic yards of soil and debris from the BDA. Off-site treatment and disposal of the soil with high levels of contamination at a permitted hazardous waste landfill. Placement of soil with low levels of contamination below an extension of the existing IRM cap. Backfilling with uncontaminated soil.
 - Construction of a surface water diversion system to prevent infiltration of water into the IRM/BDA cap.
3. 4-Tek Industries
- Sampling and analysis of the shallow groundwater zone, and Aquifer 2, at the 4-Tek facility at least twice per year for five years. Should contamination be found above cleanup levels, the groundwater would be extracted and, if necessary, treated on-site. Treated groundwater would be discharged to the Main Gravel Pit Lake or equivalent on-site surface water body.
4. Site-wide Actions
- Deed restrictions and institutional controls on land and groundwater use.
 - Long-term groundwater and surface water monitoring.
5. Off-Site Areas
- Long-term monitoring of private drinking water wells, with a contingency for providing an alternative water supply, should Site-related contaminants exceed cleanup levels.
 - Continued long-term monitoring of surface water and groundwater

in the southern portion of the Cedar Hills Landfill.

B. Remedial Action Objectives

Remedial Action Objectives (RAOs) were developed to control and mitigate risks to human health and the environment. Risks due to the QCF Site are managed or mitigated through a number of source control, removal, and treatment methods. In addition, long-term monitoring and institutional controls have been implemented to prevent exposure to on-site contaminated media.

The RAOs for the Site are:

For soil:

- Prevention of exposure to contaminated surface and subsurface soil.
- Prevention of migration of contaminants in subsurface IRM and BDA soil to groundwater.
- Reduction of contaminant concentrations in subsurface IRM and BDA soil.

For groundwater:

- Prevention of exposure to contaminated groundwater.
- Prevention of migration of the contaminant plume.
- Restoration of groundwater for future use.

C. Established Cleanup Levels

The cleanup levels were established in the ROD. Table 2 below identifies the cleanup levels for Aquifer 1 groundwater outside the vertical barrier system. Aquifer 1 is not a drinking water source, however these established concentrations will be protective of Aquifer 2. These cleanup levels also apply to the shallow groundwater zone at the 4-Tek facility.

Table 3 has the established cleanup levels for Aquifer 2. Aquifer 2 is used as a drinking water source off-site.

<u>Hazardous Substance</u>	<u>Concentration (ug/l)</u>	<u>Risk Level</u> (Calculated at time of ROD)
Chromium (total)	80	HI = 1.0 (non-cancer)
PCBs (total)	0.01	1 x 10 ⁻⁶ (cancer)
Carcinogenic PAHs	0.01	1 x 10 ⁻⁶
Tetrachloroethylene (PCE, PERC)	1.0	1 x 10 ⁻⁶ (cancer)
1,1,1-Trichloroethene (TCE)	5.0	1 x 10 ⁻⁶ (cancer)
1,2-Dichloroethene (<i>cis</i>) (DCE)	70	HI = 0.2 (non-cancer)
1,2-Dichloroethene (<i>trans</i>) (DCE)	100	HI = 0.1 (non-cancer)
Vinyl Chloride	0.02	1 x 10 ⁻⁶ (cancer)

Table 3
Cleanup Level for Aquifer 2

Hazardous Substance	Concentration (ug/l)	Risk Level (Calculated at time of ROD)
Tetrachloroethene (PERC, PCE)	1.0	1 x 10 ⁻⁶
Trichloroethene (TCE)	5.0	2 x 10 ⁻⁶
1,2-Dichloroethene (<i>cis</i>)	70	HI = 0.2
1,2-Dichloroethene (<i>trans</i>)	100	HI = 0.1
Vinyl Chloride	0.02	1 x 10 ⁻⁶

D. Remedy Implementation

The remedial actions for the QCF Site have progressed towards implementation of the ROD requirements. A Vertical Barrier Wall was constructed in 1996 to contain the contaminants in the soil and Aquifer 1 within the perimeter of the wall. Groundwater monitoring has been used to assess the effectiveness of the wall and the response in Aquifers 2 and 3.

The following is a short summary of the implementation of the ROD requirements:

For the Containment Area

- A Vertical Barrier Wall was constructed around the IRM area in 1996. Its purpose is to contain the hazardous substances within the Contamination Area (includes the entire IRM area and Buried Drum Disposal Area) and to divert groundwater from contacting the contaminated soil and groundwater within the Containment Area and causing any further migration of the contaminants into Aquifer 2.
- The trapped water within the barrier wall proved not to be pumpable after the wall was constructed because of the slurry entering into Aquifer 1. In addition, the water levels within the Contamination Area have been steadily dropping since the wall was completed on September 11, 1996.

Dewatering did not seem practicable soon after the wall was constructed and an evaluation in 1997 suggested that it would not be necessary as the water levels inside the wall dropped below the seasonal low water table that occurred outside the wall.

- The LNAPL within the Containment Area has been immobilized in a bentonite slurry that saturated most of Aquifer 1 within the Containment Area. There is no practical way to pump the trapped LNAPL from the contained part of Aquifer 1.
- Without any dewatering action, there is no need for a treated discharge.
- The contingent extraction of Aquifer 1 groundwater outside of the Containment Area was evaluated after the fifth year of monitoring (2001).
- Monitoring data has provided the basis for the EPA decision in 2001 not to proceed with the contingent remedial actions. The groundwater monitoring data demonstrated a continued decline in the water levels inside of the vertical barrier indicating that the barrier is functioning as designed and constructed. The contamination in the groundwater outside of the barrier is steadily decreasing except for one monitoring well in the northeast corner of the site. This was also a basis for not requiring contingent remedial actions for treatment of groundwater from Aquifer 1 to be required at this time. The construction of the vertical barrier wall has controlled the source of groundwater contamination. Ongoing groundwater monitoring is continuing to show decreasing trends of contamination in aquifers 1 and 2.
- A Soil Bioventing Study was completed in 1999 which concluded that the off-gassing of VOCs from the contaminated soil in the Containment Area was not a problem. The results concluded that there was no detectable increase of VOCs from the Containment Area compared with background samples.

For the BDA Area

- The excavation of the BDA area produced material that either went off-site for disposal as a hazardous waste or was suitable for onsite disposal in the new Containment Area. Over 12,000 cubic yards of soil were placed in a new waste containment unit within the Containment Area.
- Surface and groundwater diversions were constructed to prevent infiltration of water into the Contained Area.

For 4-Tek Industries

- Sampling the monitoring wells at 4-Tek is continuing once per year. Concentrations of contaminants in the lower aquifer remain below the cleanup levels. The upper aquifer shows no changes over the last several years.

For Site-Wide Actions

- The deed restrictions have been put into place. This action was required by the Consent Decree.
- Groundwater monitoring is continuing. Modifications to the monitoring plan have been made as conditions around the Site have changed. Monitoring will occur until contamination in Aquifers 1, 2 and 3 have reached cleanup levels.

For Off-Site Areas

- Private domestic well monitoring is occurring at two residences which use Aquifer 2 as a source. Both of these residences adjoin the QCF property. Monitoring wells are positioned between the source and these wells. Should either of these wells become contaminated, alternate water will be provided under the conditions of the Consent Decree. To date, no contamination from QCF above MCLs has been documented at these residences.
- A Consent Order with King County assures that long-term monitoring of surface and groundwater at the adjacent Cedar Hills Landfill will continue for at least 30 years.

E. Progress Towards Remedial Objectives

The required remedial action, the construction of a vertical barrier system, has been completed. The Vertical Barrier Wall was built in 1996 and completed by planting the cover crop in spring of 1997. It has been continuously monitored since construction began. Immediately after the completion of the wall, the water levels within the wall began to drop even as the water table outside of the wall increased. This same phenomenon has continued throughout the long-term monitoring. The groundwater elevation within the Containment Area has continued to drop while the water elevation outside of the Containment Area fluxuates with the seasons. Groundwater quality monitoring is demonstrating a decrease in the contaminant concentrations in Aquifer 2 and 3 on the Site.

This Site had a contingent remedy which required an assessment of the Vertical Barrier Wall system in 2001, five years after completion of the wall construction. If the contaminant sources, Aquifer 1 and contaminated soil, were adequately controlled, then the contingent groundwater extraction and treatment systems would not be required. If the wall did not prevent contaminant migration, then groundwater extraction of either Aquifer 1 or 2 may be implemented.

Based on the monitoring data, EPA made the decision in 2001 not to require additional remedial actions to control the contamination from the old waste pond areas. The Vertical Barrier Wall appears to be functioning as designed and has controlled the release of contaminants in the soil from entering the groundwater. A long-term monitoring plan is being implemented which provides data on a regular basis (quarterly) which is used to evaluate the contamination in the groundwater.

V. Progress Since the Last Review

The site was determined to be protective of human health and the environment during the [First] Five-Year Review. There were no issues that required actions to maintain this protectiveness.

During the previous First Five-Year Review (1998) the evaluation of the Vertical Barrier Wall had not been made. The evaluation has since been made (2001), and it was determined by EPA that the barrier wall is functioning as designed and the results demonstrated good containment and control of the contaminants that were impacting the groundwater. So the ROD requirement to review the data to determine if additional remedial actions were necessary to protect the groundwater from site contaminants was done and the determination made that no contingency remedial actions were warranted.

It was recommended during the First Five-Year Review site inspection that an O&M check list or field list be assembled to make the O&M requirements that are found in several different documents be available in one place. This would be especially helpful if there were a change in the O&M personnel performing sampling and cap maintenance. The O&M activities are now consolidated in one place and the sample team has a checklist of wells and actions that get performed for each event.

Groundwater monitoring has continued since the [First] Five-Year Review. (Groundwater monitoring actually began in 1983). Initially monitoring was done quarterly, but in 2001, groundwater monitoring was reduced to twice per year. The PRPs submit semi-annual and annual reports which contain all of the reportable data on the contaminants in the groundwater wells. This information continues to provide EPA with sufficient data to evaluate the remedy's protectiveness.

VI. Five-Year Review Process

The Five-Year Policy Review was conducted according to procedures in OSWER Directive 9355.7-03B-P, Structure and Components of Five-Year Reviews. Members of the EPA review team and PRP were notified in March that a Five-Year Review would be conducted at this site in 2003. Activities in this review consisted of:

Review of site-related documents and agreements.

Primary documents reviewed for this report include:

- Record of Decision, EPA, December 31, 1992,
- Construction Quality Assurance Report, Queen City Farms, Vertical Barrier Wall System, Boeing, February 25, 1997,
- Final Project Closure Report, Queen City Farms, Vertical Barrier Wall System, Boeing, January 1998,
- 2002 Annual Monitoring Data Report, Queen City Farms, King County, Washington, The Boeing Company, June 31, 2003,
- Various data reports and summaries from QCF and 4-Tek.

Review of monitoring data from both QCF and 4-Tek.

Community Notification

Site visit and inspection.

PRP Interviews

A. Document Review

The RAOs, ARARs, and cleanup levels for Aquifers 1 and 2 are all found in the EPA Record of Decision (see Tables 2 and 3 above). The RAOs have not changed since the ROD was signed in 1992. There have been no changes in any cleanup criteria for any of the contaminants of concern which would necessitate an evaluation of those changes and effect on the remedy. The cleanup goals have not been met in either aquifer but there has been a general decrease in the concentrations closer to the original source area (waste ponds).

All of the required document deliverables during the past five years were received by EPA as required by the Consent Decrees with the PRPs. The deliverables

consist primarily of data reports generated from the groundwater monitoring events.

B. Data Review

Groundwater monitoring data is generated semi-annually from the QCF waste ponds source area. Data has also been generated on an annual basis from the 4-Tek area. The data is reviewed by the EPA hydrogeologist for any unusual changes in the concentrations or trends for each monitoring well sampled. Not every monitoring well is sampled on a semi-annual basis, but its schedule is determined by rate of changes in groundwater contamination concentrations and whether its purpose is a sentinel well positioned to alert EPA and the PRP of contamination movement towards a residential well or other receptor.

There have been changes in the monitoring schedule for QCF to coordinate with sampling periods used at the King County Landfill located on the adjacent property to the north of QCF. There was an plan to do monthly water level measurement synoptically for the year 2001 to compare data between these two sites. The changes have not changed the number of sampling events per year, but were to gather more data.

The results of the sampling data review indicates an effect by the installation of the Vertical Barrier Wall around the old waste ponds contamination source area. The concentration of contaminants of concern in Lower and Upper Aquifer 2, show a general decrease over time except in northeastern monitoring wells. New data from QCF suggests the plume may extend more northwest that previously recognized. More data is needed to identify any plume characteristics and if the plume is moving in this area. The areal extent of the overall contamination plume has remained constant, not increasing in size. The natural attenuation processes that were allowed to work on the contaminant plume outside of the barrier wall seem to be working since the concentrations of contaminants of concern are decreasing throughout the plume not just near the source. However, the decrease in the contaminant concentration near the source area is greater since the source area was isolated by the slurry wall.

The 2002 Average Annual Concentrations for TCE in Lower Aquifer 2, and Upper Aquifer 2, are shown on Figures 2-8 and 2-9, respectfully. The historical highest concentrations outside of the Containment Area are near monitoring wells E(2) and E(2a) (Figures C-10 and C-11), west of the Containment Area.

The general conclusion from the monitoring data review is that the concentrations of the contaminants of concern have a decreasing trend (see Figures C-6, C-8, C-10, C-11, C-20, C-33, C-34, and C-38). This is not true for all wells, because the concentration of TCE has increased for monitoring Well C(2) from about 40 ug/l to about 50 ug/l since 1994, Figure C-7. Currently there is no explanation why Well C(2) is showing an increase in TCE concentration.

Of the eight contaminants of concern identified in the ROD, only TCE and DCE, total (both cis and trans), are consistently found in the groundwater in all of the aquifers. Chromium and vinyl chloride are present in wells near the source area. All of the monitoring data for 2002 is attached as Appendix B.

The monitoring data also continues to show a groundwater mound beneath the site, Figure 2-4. The groundwater tends to have a radial flow from the Containment Area. This mound and flow pattern was identified in the Remedial Investigation and does explain why the contaminants have migrated in all directions from the original source, the old waste ponds area (removed). The source was further contained by the Vertical Barrier Wall which has isolated the area even more.

The groundwater elevation within the Containment Area has dropped below any of the internal monitoring wells which were in Aquifer 1. This is confirmation that the Vertical Barrier Wall is reducing the driving force, groundwater movement, that was causing the contaminants to migrate from the source area.

C. Community Notification

A notice was placed in *Voice of the Valley*, a local newspaper, on May 7, 2003. The notice gave the opportunity to provide feedback or comments to EPA about the site and the proposed review. Although the site had an involved public during the RIFS study phase, there has not been significant local interest since the ROD was signed. EPA did not receive any comments from anyone in the community.

D. Site Visit

A site visit and inspection was conducted on September 18, 2003. The inspection team consisted of Neil Thompson, EPA Project Manager; Marcia Knadle, EPA hydrogeologist; and Brian Anderson, Project Manager, The Boeing Company. The only ongoing activities at the site are the periodic groundwater sampling and O&M inspections done by the PRPs. There are two areas on the site with long-term monitoring requirements; the eastern portion which had the old waste ponds and now the Containment Area, and the 4-Tek area which is being used by Cedar Grove, a composting company. The more actively monitored area is the eastern portion of the site which has the large plume of TCE and DCE in the groundwater. The sampling and O&M for the larger eastern area is performed by The Boeing Company, one of the PRPs. The 4-Tek area is monitored by Queen City Farms, Inc., another PRP.

During the last five years, all of the offices and buildings used by the PRPs to manage the implementation of the remedial actions have been removed from the site. There is no longer a facility to keep records on-site. The site O&M records are kept in PRP offices in the Seattle area. These are readily available and are the basis for reports submitted regularly to EPA.

The site inspection focused on the Containment Area, and monitoring wells associated with monitoring the contaminated groundwater in the eastern part of the site. The review of the 4-Tek area was limited to a drive-by inspection since the impacts in this area are all groundwater related and have no surface activity involvement. All of the 4-Tek monitoring wells are accessible.

A Five-Year Review Site Inspection Checklist for the site inspection is included as Attachment A. The only issue that was brought up during the inspection was the growth of a few woody plants and scotch broom, a prolific non-native species, over the Containment Area. There is no immediate concern about the protection of the low permeable PVC layer of the cap because there is at least three feet, and often more, of cobbles placed over at least a one foot sand layer above the PVC liner. Also new data on alternative cover systems have shown that root systems typically do not penetrate into plastic and clay layers that are a part of cover system like this one. However, this is an issue that should be reviewed to determine if cover maintenance is required to protect the cap.

E. PRP Interviews

Discussions with Brian Anderson, Boeing's Project Manager for the eastern portion of the site; and Steve Banchemo and Kurt Easthouse, representing Queen City Farms, took place in September 2003. The discussions focused on routine groundwater sampling and data developed from the monitoring. No O&M issues were identified during these discussions.

VII. Technical Assessment

The technical assessment of a site is directed towards the responses to three questions. Each question is stated and its response follows.

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

Yes. The remedy is still functioning as designed and constructed. The cleanup levels stated in the ROD are still valid and the natural attenuation processes are working in the contaminated plume. No problems were identified during the Five-Year Review that could lead to the remedy not continuing to be protective. The site is fenced and access is restricted. Sufficient maintenance is being done to provide access to the monitoring wells and verify that drainage systems are properly working.

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

Yes. There have been no changes in the regulations forming the basis of the ARARs that call into question the protectiveness of the remedy or RAOs for this site. The site conditions and uses have not changed. There have not been any changes in the exposure pathways from the site contaminants. The toxicity of TCE is under EPA review. Any change in the TCE slope factor for its toxicity would require a review at this site. There is also an EPA national evaluation of the chemical, 1,4-Dioxane. Analysis for this chemical needs to be added to the QCF monitoring program. Any changes to the toxicity of any of the contaminants of concern will have to be evaluated for the next Five-Year Review.

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

No. Human health and ecological risks have been adequately addressed by the remedy. No new information has been identified that questions the protectiveness or the function of the remedy. Early discussions about the redevelopment and/or reuse of some of the Queen City Farms property are occurring between the PRPs and EPA. Any discussions to date are not related to construction of buildings over any of the contaminated groundwater plume areas. Most of the reuse interest is for portions of the site not affected by the plume.

Technical Assessment Summary

Based on the this Second Five-Year Review, the site remains protective to human health and the environment. Groundwater monitoring continues to map the contamination plume which is not growing in size. The contaminant concentrations in the plume are slowly decreasing. There were no changes to the site conditions or cleanup parameters during the last five years which may have affected the remedy's protectiveness. The exposure pathway is through the contaminated groundwater which is monitored and not impacting any additional area or receptors. No one is currently using contaminated groundwater for any purpose. No residences are over the plume.

VIII. Issues

The issues that was identified during this review of the site were the growth of some bushes on the Containment Area which has an engineered cover system and the need to sample for 1,4-Dioxane. The cover system is robust because of the three feet plus of cobbles that are placed between the PVC liner and its protective sand layer and the surface soil layer. The single biggest problem is the spread of scotch broom across the cover. This is not a particularly deep rooted plant. An alternative cover crop which

includes woody plants, including trees, is a possibility for this site. This issue should be evaluated. The results of the 1,4-Dioxane analysis will determine if further actions are appropriate.

<u>Issue</u>	<u>Protectiveness</u>
Woody plants on Containment Area	Future protectiveness issue
1,4-Dioxane sampling/analysis	Future protectiveness issue

IX. Recommendations and Follow-up Actions

The question about the woody plants getting established on the cover of the Containment Area needs to be addressed. If there is a future threat to the integrity of the cap, the problem species needs to be removed or controlled. It is recommended that a review of the cover plants be done with a plant specialist to determine if the current plant species could pose a problem to the cap integrity. The analysis for 1,4-Dioxane needs to be added to a sampling event.

Recommendations/ Follow-up Actions	Responsible Party	Oversight Agency	Milestone Date	Follow-up Actions: Affects Protectiveness (Y/N)	
				Current	Future
O&M of Cover Plants	PRP	EPA	May 2004	N	Y
1,4-Dioxane analysis	PRP	EPA	Oct 2004	N	Y

X. Protectiveness Statement

Because the remedial actions for the entire site are protective, the site is protective of human health and the environment.

XI. Next Review

The next Five-Year Review is due within five calendar years of this report, before September 29, 2008.

Attachment A

Five-Year Review Site Inspection Checklist

Second Five-Year Review

Queen City Farms
Maple Valley, Washington

Figures

