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EXPLANATION OF SIGNIFICANT DIFFERENCES

FOR THE

BOOMSNUB/AIRCO SUPERFUND SITE
HAZEL DELL, WASHINGTON

CLARK COUNTY

August 2006

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EXPLANATION OF SIGNIFICANT DIFFERENCES

Boomsnub/Airco
Hazel Dell, Washington
CERCLIS ID # WAD009624453.

INTRODUCTION AND STATEMENT OF PURPOSE

The U.S. Environmental Protection Agency (EPA) is issuing this Explanation of Significant Differences (ESD) to document several modifications to EPA's February 2000 Record of Decision, which selected the final remedial actions for the Boomsnub/Airco NPL site. The Washington Department of Ecology (WDOE) supports the need for this ESD.

Because the site-wide ground water remediation has been operating for eleven years, EPA and the BOC Group, Inc. ("BOC"), the performing responsible party, now have much greater understanding of how best to implement the ground water cleanup and achieve cleanup objectives and cleanup levels. This ESD makes the following changes to the final remedy:

1. Revises the required pumping rate capacity for the ground water extraction and treatment system from a minimum capacity of 200 gallons per minute (GPM) to a maximum capacity of 160 GPM.

2. Upgrades both the ion-exchange system and the air-stripping unit at the ground water treatment plant to improve contaminant removal, rather than upgrading the units for increased treatment volume.

3. Allows treated ground water to be discharged either to the newly constructed infiltration gallery on the BOC property or to the Vancouver municipal wastewater treatment facility. Discharge of treated ground water to the existing gallery on the Boomsnub property, as described in the ROD, may still occur after further reduction in VOCs in the source area and after approval by EPA.

4. Enhance institutional control requirements to protect the remedy constructed at the Site.

This ESD also clarifies the status of the in-well stripping treatment test. The expanded treatability testing of the in-situ ground water treatment via modified in-well stripping was discontinued for the site-wide ground water operable unit. In-well stripping has, however, been adopted by BOC as part of the source control actions for the Soil OU.

STATUTORY AUTHORITY

EPA is issuing this ESD in accordance with the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), Section 117(c), and the National Oil and Hazardous Substances Pollution Contingency Plan (NCP), Section 300.435(c)(2)(i), which authorize changes to the selected remedial action after the issuance of a Record of Decision (ROD). This ESD is supported by an Administrative Record.

The Administrative Record for this ESD is available for review at the Superfund Records Center, EPA Region 10, 1200 Sixth Avenue, 7th floor, Seattle Washington.

SITE HISTORY, CONTAMINATION, AND SELECTED REMEDY

Background

The Boomsnub/Airco Superfund Site (Site) consists primarily of two properties (the former Boomsnub chrome-plating facility and the active BOC gas separation facility) and a plume of contaminated ground water in the alluvial aquifer that at one time extended approximately 4,400 feet west/northwest from the properties. The Site is bordered by a mixture of residential, commercial, and light industrial properties. Ground water in the deeper Troutdale aquifer is used for drinking water. The nearest downgradient production well is located one mile west of the Boomsnub/BOC properties.

The Boomsnub Corporation and its predecessor company, Pioneer Plating, conducted chrome-plating operations on the Boomsnub property from 1967 until 1994, when Boomsnub moved its business to a new site. Leaks and spills from plating activities contaminated ground water and soil on the Boomsnub property and three adjacent properties. BOC, formerly known as Airco, owns and operates an 11-acre facility that manufactures compressed and liquefied gas products including nitrogen, oxygen, and argon. The BOC plant has been in operation since 1964. Volatile organic compounds (VOCs) leaked or spilled onto the ground or into dry wells on BOC property and have contaminated ground water.

Extraction and treatment of contaminated ground water began in May 1990. The Site was placed on the National Priorities List (NPL) in April 1995 at the request of WDOE. In 1994, BOC assumed responsibility for the VOC portion of the ground water treatment system. BOC assumed lead responsibility for operation and maintenance of the entire ground water extraction and treatment system in April 2002.

Operable Units

EPA divided the Site into three operable units (OUs) to manage cleanup activities:

- Boomsnub Soil - OU-1
- BOC Soil - OU-2
- Site-Wide Ground water - OU-3

These OUs have been addressed through time-critical and non-time critical removal actions, the September 1997 Interim ROD, the February 2000 final ROD, and the September 2000 Action Memorandum. The remedial construction at OU-1 is largely completed, except for a thin layer of contaminated soil beneath the treatment plant. This layer of soil will be excavated when the ground water treatment system is removed upon completion of the remedial action for ground water. OU-2 focused on *in situ* remediation of the OU-2 VOC source area. The in-well stripping/soil vapor extraction system became operational in February 2004. Since startup, the ground water monitoring indicates a reduction in the amount of TCE in the source area. OU-3 includes an extensive site-wide ground water pump and treat system that began as part of removal actions at the Site and that was included in both the interim and final RODs. Currently this system includes 24 extraction wells and approximately two miles of piping to bring the untreated extracted ground water to the water treatment plant that is located on the Boomsnub property. Treated ground water has been discharged to the Vancouver municipal wastewater treatment facility. There are approximately 103 wells for monitoring these remedial actions.

This ESD documents changes to certain remedial actions selected in the 2000 final ROD for OU-3. The current extraction and treatment system has significantly reduced plume contaminant concentrations and the areal extent of contamination. (See attached figures.) As a result, the continued operation of the ground water extraction and treatment system, as optimized and as modified by this ESD, combined with source control actions, is expected to meet the Remedial Action Objectives (RAOs) and cleanup levels identified in the 2000 ROD.

Remedial Action Objectives and Selected Remedy for Site-Wide Ground Water (OU - 3) in the 2000 ROD

In the ROD, EPA established the following RAOs for ground water:

- Prevent further impacts to the alluvial aquifer

- Restore impacted ground water to drinking water standards (Maximum Contaminant Levels (MCLs) or MTCA Method B standards)

- Prevent ingestion of contaminated ground water above federal and state drinking water standards

- Prevent impacts to the Upper Troutdale Aquifer and the public drinking water supply by reducing contamination in the alluvial aquifer

These RAOs were to be accomplished through completion of the following actions as established in the ROD:

1. Upgrade the existing ion-exchange and air stripper for *ex situ* ground water treatment by increasing the capacity of the ground water treatment system, including increasing the capacity of the conveyance pipe and discharge pipeline from 100 gallons per minute (gpm) to a minimum 200 gpm capacity.

2. Improve the treatment building and other structural facilities to prevent wear and tear on the treatment system and allow for necessary expansion.

3. Continue pumping from the existing 21 extraction wells or some combination of these wells, adding new wells as needed to optimize the removal and treatment of contaminants.

4. Conduct long-term compliance monitoring biannually in the alluvial and Upper Troutdale aquifers using existing monitoring wells, and new wells as necessary, to determine the effectiveness of the selected remedy in achieving the remedial action objectives. The frequency of compliance monitoring for the area of attainment and points of compliance may be modified by EPA as appropriate. Cleanup levels for VOCs and metals were established in the ROD.

5. Provide institutional controls in the form of public notice during operation of the ground water pump and treat system, accomplished by providing affected property owners a copy of biannual ground water quality sampling data for their property for all contaminants exceeding cleanup standards.

6. Discharge treated water to the City of Vancouver POTW in compliance with a permit. EPA may evaluate discharging treated ground water to the infiltration gallery on the Boomsnub property after source control actions upgradient at the BOC property are in place.

7. Wastes from ion exchange resin will be disposed at an appropriate RCRA Subtitle D or C landfill, and wastes from the granular activated carbon will be sent off-site for treatment/regeneration.

8. Evaluate the effectiveness of the *ex situ* ground water treatment system no less than every five years until monitoring demonstrates that remedial action objectives have been achieved. At each five-year review, EPA will reevaluate available literature on the permeable reactive barrier technology to see if it has proven to be a reliable long-term technology at other similar sites.

9. Develop as part of remedial design, an extended in-well stripping treatability test for a 12- to 18-month duration for potential use throughout the plume, either for VOCs alone or for VOCs and chromium, as appropriate depending on treatability results.

The remedy includes ground water treatment for an estimated 30 years from the time the ROD was signed, during which time the system's performance is to be carefully monitored and optimized on a regular basis and adjusted as warranted by the performance data collected during operation. Modifications are to be implemented in a way that accommodates changing land uses and other types of activity.

BASIS FOR THE SIGNFICANT DIFFERENCES

The ground water extraction and treatment system has been operating for eleven years. Information from monitoring both the interim and full-scale extraction and treatment system has demonstrated the success of this system in reducing the size of the plumes and in extracting significant masses of contaminants from the ground water. The changes to the remedy documented in this ESD will allow continued successful remediation of the ground water while reducing the cost of the cleanup. The clarifications to the institutional control requirements have been incorporated into the Consent Decree with BOC and will support the long-term protectiveness of the remedy.

DESCRIPTION OF THE SIGNIFICANT DIFFERENCES

This ESD modifies four elements of the selected remedy for OU-3, as described below. No other elements of the remedy are being changed, nor are the RAOs and cleanup levels identified in the 2000 ROD being changed. Some of these changes are already being implemented.

A. *Description of the change:* Revise the required pumping rate capacity for the extraction and treatment system from a minimum capacity of 200 gpm to a maximum capacity of 160 gpm. The ROD required upgrading the existing ion-exchange and air stripper for ex-situ ground-water treatment, thus increasing the capacity of the interim action ground water treatment system from 100 gpm to a minimum of 200 gpm. This ESD is changing the purpose of the upgrading of the ion-exchange and air strippers and modifying the ex-situ treatment capacity requirement from a minimum of 200 gpm to a maximum capacity of 160 gpm.

Basis for and explanation of the change: The ex-situ ground water treatment plant has been expanded and modified since the 2000 ROD to the current capacity of 160 gpm. Although the ROD specified the plant's minimum capacity to be 200 gpm, post-ROD monitoring data indicates significant reduction in the plumes' contaminant concentrations and areal extent at the current capacity of 160 gpm. For example, Figures 1 and 2 show significant decreases in the concentration of both TCE and chromium from 1995 to 2006. Similarly, a comparison of the projected remediation results from the ground water model in the 1999 RI to the October 2004 conditions indicates that significant mass removal has

already been achieved and that the ground water extraction and treatment system has exceeded expectations for mass removal. The current plume configuration is roughly equivalent to conditions that the RI ground water model predicted would have occurred after pumping at 200 gpm for 30 years. This model was used in development of the 2000 ROD.

In 2004, EPA accepted a new flow and transport model developed by BOC specifically for this Site. The ground water modeling report concluded that at 160 gpm the Site could be remediated in a time frame considerably less than the 30 years predicted by the ROD. Further, additional model updates and data confirm that the actual monitored results are consistent with the new model predictions.

The new model has also been used to help optimize the pumping rates in the existing extraction well network and to locate new extraction wells in an effort to further optimize mass contaminant removal. As a result of this effort, new extraction wells are currently projected to come online in 2006.

EPA now believes that the current pumping rate capacity of 160 gpm at the treatment plant is sufficient to remediate the ground water plume in a reasonable time frame of 15 years from the date of this ESD or less.

B. *Description of the change:* Upgrade both the ion-exchange system and air-stripping units at the ground water treatment plant to improve contaminant removal, instead of upgrading the units for increased treatment volume.

Basis for and explanation of the change: Changes to the ground water treatment system in 2004 and 2005 included upgrades to the ion-exchange system and to the air stripper. Those system upgrades were completed in December 2005. The upgrades to the air stripper include new packing and a larger air blower system to increase removal efficiencies and upgrades to the granular activated carbon canisters. The ion-exchange system has been redesigned, and the existing tanks have been replaced with three new larger resin canisters and a revised, more efficient piping system.

These upgrades have improved contaminant removal. The pre-2005 ground water treatment system averaged 24 μg/l chromium and 3 μg/l in the discharge going to the municipal waste water treatment facility. As a result of these upgrades, the treatment plant is now producing treated groundwater with contaminant concentrations 70 to 50 percent below the pre-2005 ground-water treatment system.

These upgrades have been determined by EPA and WDOE to comply with all known available and reasonable technologies (AKART), an important element of Washington water discharge regulations. To ensure AKART is achieved, the discharge standards for the plant are being established based on actual plant data, rather than other standards, such as MCLs or MTCA Method A or B for ground water, which would allow less stringent discharge levels from the treatment plant. The process for establishing operating discharge standards is set forth in the EPA conditionally-approved August 2005 Final

Design Report. This process set initial discharge standards of 24 μg/L for chromium and 3 μg/L for TCE. Based on information available at the time of this ESD, the operating discharge standards are expected to be approximately 8 μg/L for chromium and 2 μg/L for TCE.

C. *Description of the change:* Allow treated ground water to be discharged to either the newly constructed infiltration gallery on the BOC property or to the Vancouver municipal wastewater treatment facility. Discharge of treated ground water to the existing gallery on the Boomsnub property, as described in the ROD, may still occur after further reduction in VOCs in the source area and after approval by EPA.

Basis for and explanation of the change: The 2000 ROD stated that all treated ground water would be discharged to the Vancouver municipal wastewater treatment facility in compliance with a discharge permit. It also envisioned the possible use of an infiltration gallery on the Boomsnub property after source controls were in place on the BOC property. In 2004, BOC prepared a plan to construct an infiltration gallery on the east side of BOC property. In 2005, EPA and WDOE approved the plan, which includes use of the BOC infiltration gallery, possible future use of the Boomsnub infiltration gallery, and the municipal wastewater treatment facility. A contingency allows treated water to be discharged to the municipal facility in compliance with the existing permit if the new gallery discharge performance standards cannot be achieved.

In approving the plan, EPA and WDOE determined that the use of the infiltration galleries would not adversely impact the ongoing remedial activities nor the alluvial aquifer. A monitoring system to protect the alluvial aquifer was incorporated into the plan.

Use of the infiltrat l ion gallery on the BOC property reduces the burden on the municipal wastewater treatment facility, recharges the alluvial aquifer, and reduces the cost associated with discharging effluent to the sanitary sewer.

The 2000 ROD stated that if EPA determined that it would be appropriate to use the infiltration gallery, the additional ARARs associated with that use would be documented at that time. Chapter 173-218 WAC, Underground Injection Control (UIC) Program, as updated on January 2, 2006, is applicable to the operation and maintenance and decommissioning of the infiltration galleries. This regulation requires fulfillment of the AKART requirement as one of the criteria for achieving a nonendangerment standard for the movement of fluids through a UIC well. In addition, both the initial and operating discharge standards are or will be more stringent than MCLs or MTCA Method A and B ground water cleanup standards. Although no determination has been made whether the receiving ground water contains listed hazardous or dangerous wastes, the treated ground water meets "contained-in criteria" and thus does not contain listed hazardous or dangerous waste.

D. *Description of the change:* Enhance the institutional control requirements to protect the remedy constructed at this Site. The ROD required institutional controls in the form

of public notice during operation of the ground water extraction and treatment system, which was to be accomplished by providing affected property owners a copy of biannual ground water quality sampling data for their property for all contaminants exceeding cleanup standards. As part of its obligations to implement the remedy, BOC will be obtaining easements from property owners whose properties are affected by remedy implementation. These easements will grant access to the affected properties for BOC, EPA, and WDOE. The easements will also require property owners to ensure that their actions do not harm the implementation, integrity, or protectiveness of the remedy and that they do not use the ground water beneath their property until it has achieved clean-up levels. These easements will provide greater protection than the institutional controls described in the ROD and will provide an enforceable mechanism for further minimizing human health exposure to contaminants at the Site while cleanup is ongoing.

Basis for and explanation of the change: EPA's knowledge and awareness of institutional controls issues and mechanisms has increased over the past few years. This remedy relies on an extensive system that includes extraction and monitoring wells, piping, and pumps on many properties, as well as source control systems and treatment elements on both the Boomsnub and BOC properties. Ensuring the integrity of this system is a crucial part of the remedy. In addition, as long as contaminants at the Site remain at concentrations above levels that allow for unrestricted use and unlimited exposure, institutional controls will be required to restrict certain land and water uses at the Site. These additional institutional controls will be implemented by BOC.

E. Clarification: In addition to the four changes described above, this ESD clarifies the status of the in-well stripping treatment test described in the ROD. The ROD required, as part of remedial design, an extended in-well stripping treatability test. The test was expected to be for a 12- to 18-month duration and to evaluate in-well stripping for potential use throughout the plume, either for VOCs alone or for VOCs and chromium.

The expanded treatability testing of the in-situ ground-water treatment was conducted for approximately six months in 1999. The testing site was located just north of NE 78th Street and west of NE St. Johns Road. Although the technology was successful for reducing VOCs within the plume, its success on the chromium plume was uncertain and so the treatability testing was discontinued for the site-wide ground water OU. This technology has been adopted by BOC as part of the source control actions for the BOC Soil OU in an area upgradient of the chromium plume.

This ESD clarifies that the treatment test conducted in 1999, combined with the overall success of the rest of the remedy in improving groundwater conditions, satisfies the ROD requirement for a treatability test.

ESTIMATED COSTS

These changes to the OU-3 remedy are expected to reduce the estimated cost of the remedy by $335,000 annually over the next 15 years, or approximately $5 million

dollars.

SUPPORT AGENCY COMMENTS

The Washington Department of Ecology has had an opportunity to review this ESD and supports these changes to the remedy.

PUBLIC PARTICIPATION

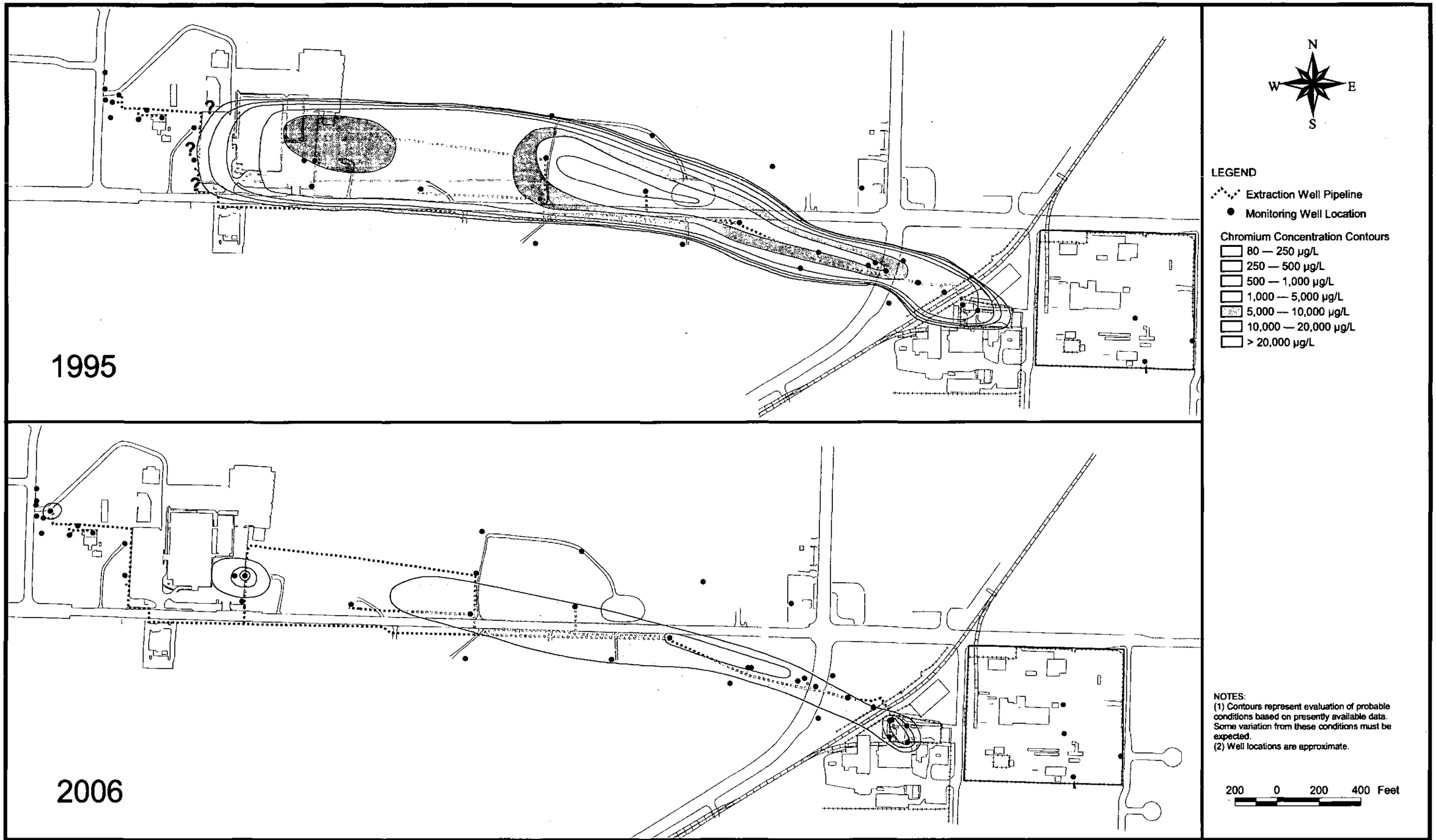
CERCLA's public participation requirements, which are described at 40 CFR 300.435(c)(2)(i), will be met through issuance of this ESD, making this ESD and supporting information available to the public in the administrative record, and publishing a notice of this ESD and the availability of the Administrative Record in a local newspaper. Notice of this ESD will be published simultaneously with the public notice issued for the Consent Decree between the United States and BOC for implementation of the remedy and recovery of past costs.

STATUTORY DETERMINATIONS

The selected remedy, as modified by this ESD, remains protective of human health and the environment, complies with federal and state requirements as identified in the ROD and as modified by this ESD that are applicable or relevant and appropriate to the remedial action, is cost effective, and uses permanent solutions and alternative treatment technologies to the maximum extent practicable. This remedy continues to satisfy the statutory preference for treatment as a principal element of the remedy. Because this remedy will continue to result in hazardous substances remaining on-site above levels that allow for unlimited use and unrestricted exposure, a review will be conducted every five years to ensure that the remedy continues to provide adequate protection of human health and the environment.

Daniel D. Opalski, Director
Office of Environmental Cleanup
EPA Region 10

8/21/06
Date



EA®	PROJECT MGR: JE	DESIGNED BY: JG	DATE: JUNE 2006	FILE No.: INDUSTRIAL\BOC\1204077\APR	BOOMSNUB/AIRCO SUPERFUND SITE HAZEL DELL, WASHINGTON	FIGURE 1 CHROMIUM PLUME MAP 1995 vs. 2006
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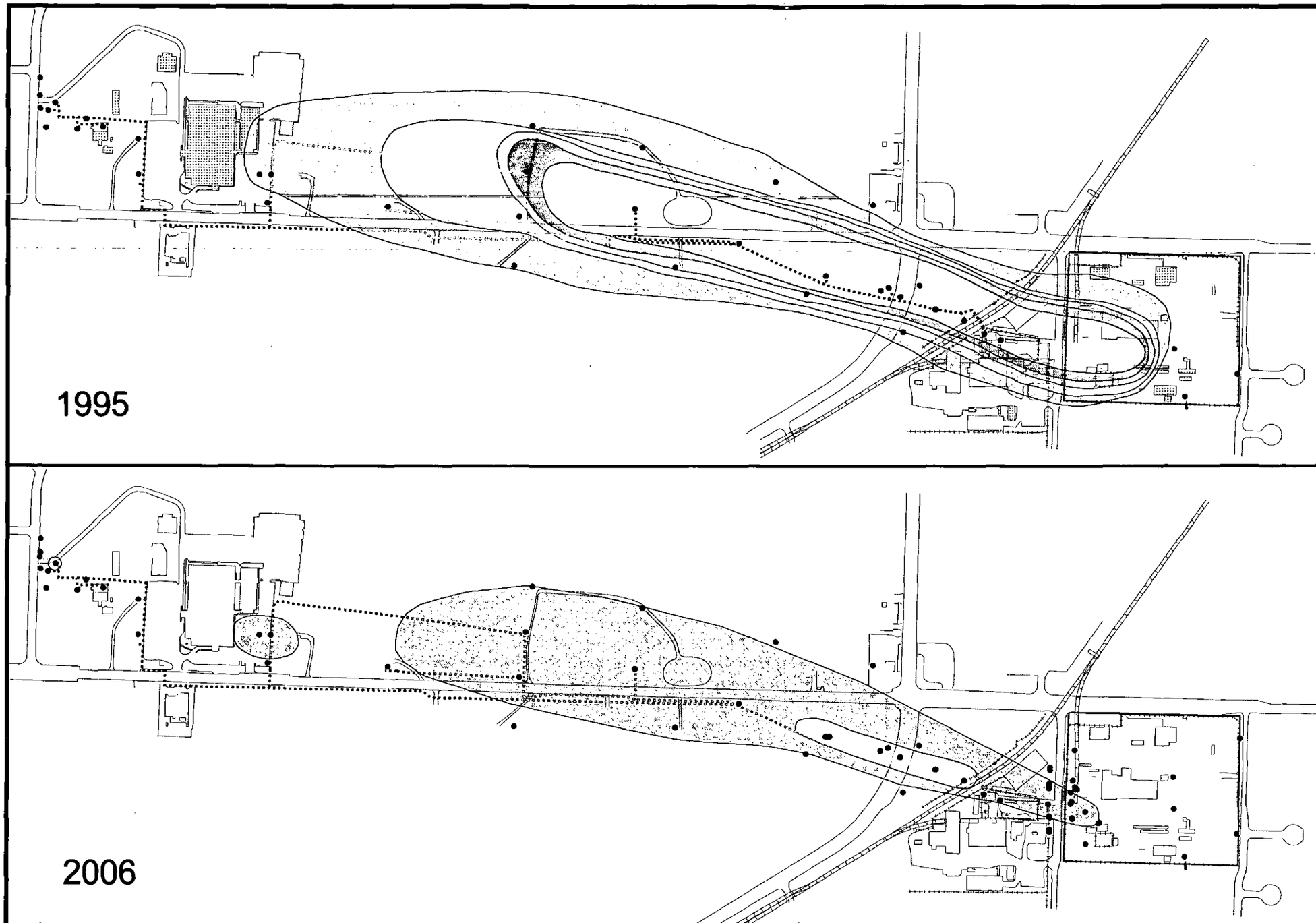

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FIGURE 2
TCE PLUME MAP
1995 vs. 2006

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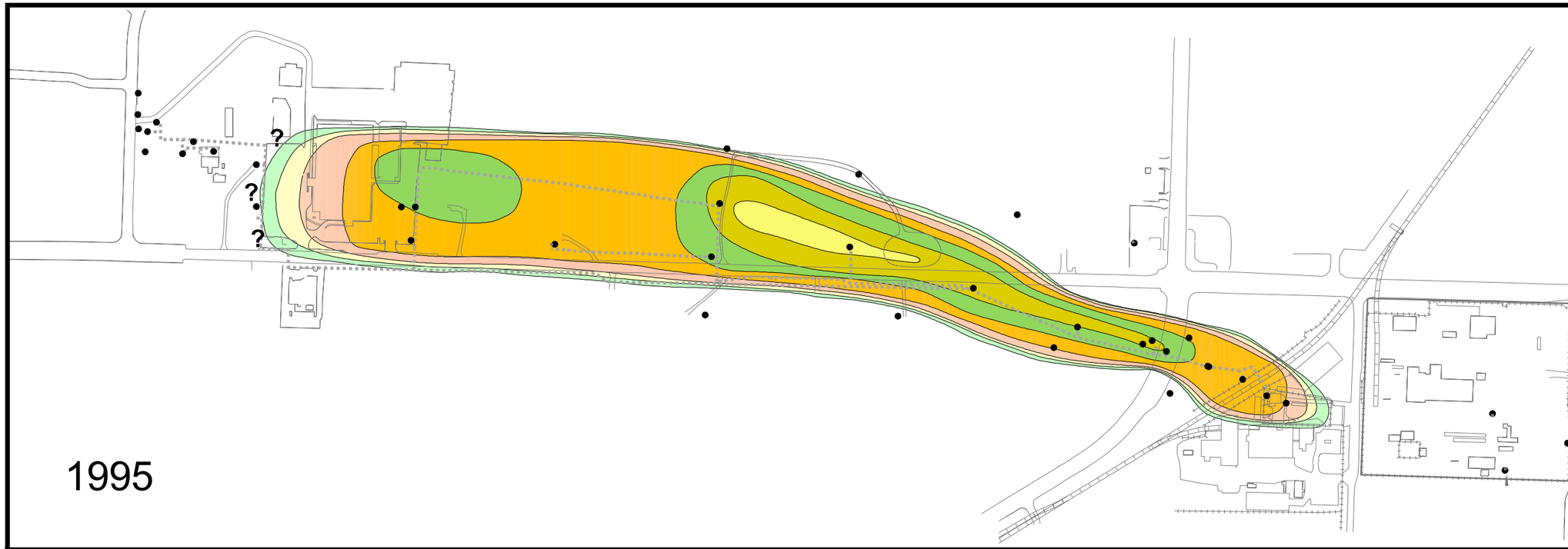

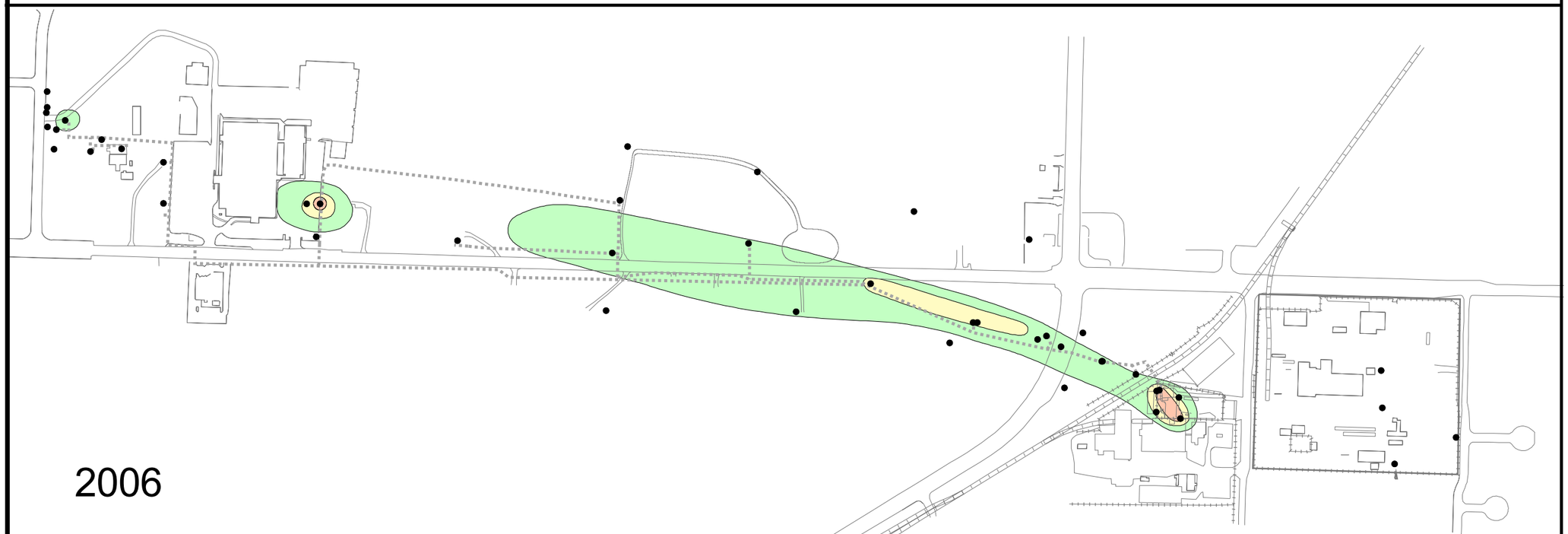

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Extraction Well Pipeline

Monitoring Well Location

Chromium Concentration Contours

- 80 — 250 µg/L
- 250 — 500 µg/L
- 500 — 1,000 µg/L
- 1,000 — 5,000 µg/L
- 5,000 — 10,000 µg/L
- 10,000 — 20,000 µg/L
- > 20,000 µg/L

NOTES:
(1) Contours represent evaluation of probable conditions based on presently available data. Some variation from these conditions must be expected.
(2) Well locations are approximate.

200 0 200 400 Feet

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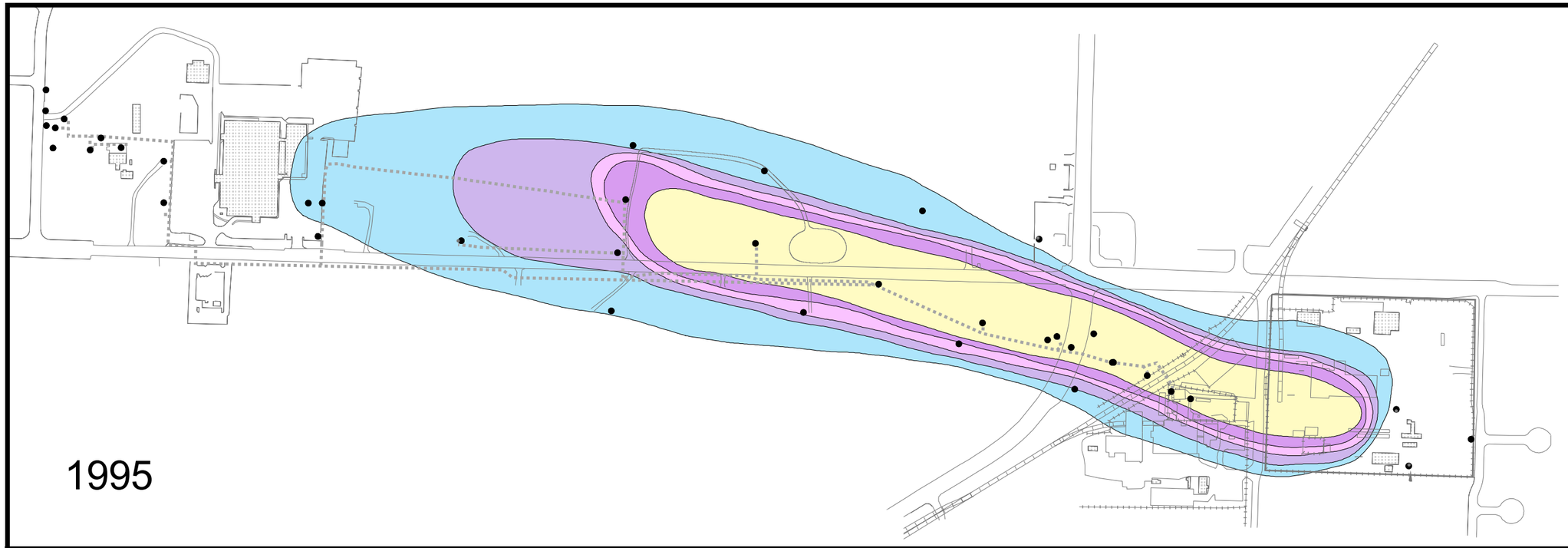
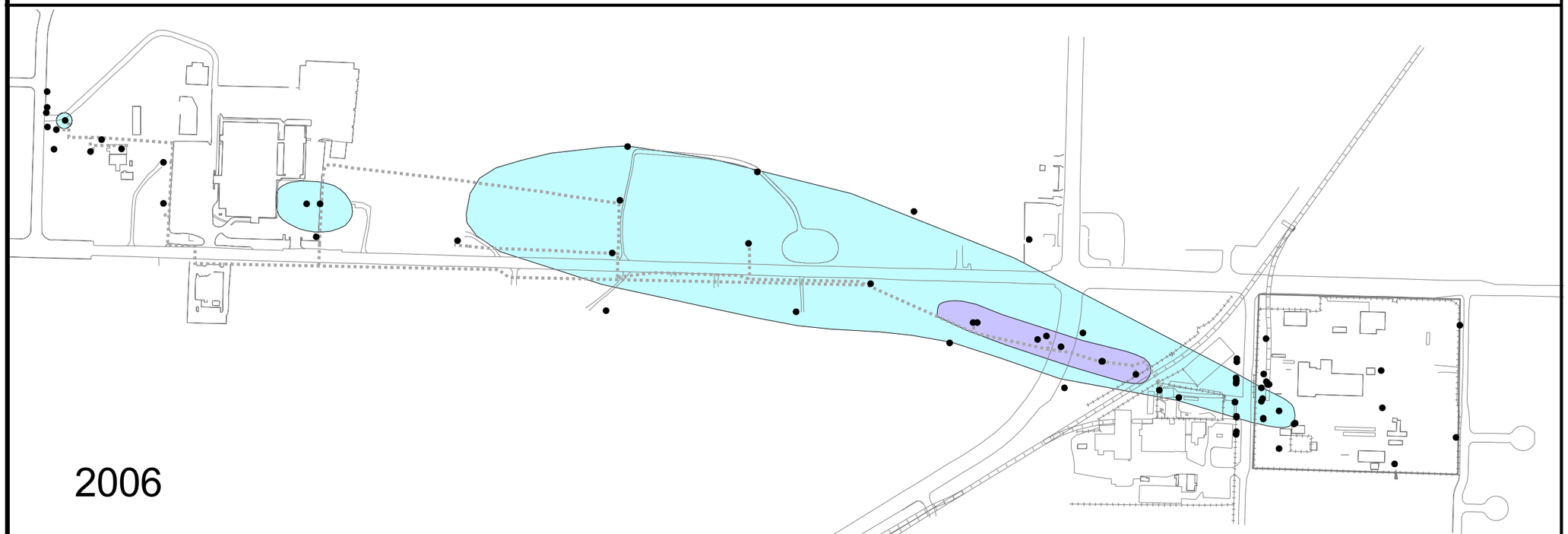
CHECKED BY: CB	DRAWN BY: BSM	PROJECT No.: 12040.77	SCALE: AS SHOWN	FIGURE 1 CHROMIUM PLUME MAP 1995 vs. 2006





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Extraction Well Pipeline

Monitoring Well Location

TCE Concentration Contours

- 5 — 100 µg/L
- 100 — 500 µg/L
- 500 — 1,000 µg/L
- 1,000 — 2,000 µg/L
- > 2,000 µg/L

NOTES:
(1) Contours represent evaluation of probable conditions based on presently available data. Some variation from these conditions must be expected.
(2) Well locations are approximate.

200 0 200 400 Feet

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CHECKED BY: CB	DRAWN BY: BSM	PROJECT No.: 12040.77	SCALE: AS SHOWN	FIGURE 2 TCE PLUME MAP 1995 vs. 2006

Cleanup Plan Modified for Boomsnub/Airco Superfund Site
Hazel Dell (Vancouver), Washington

The U.S. Environmental Protection Agency (EPA) has issued an Explanation of Significant Differences (ESD) to the 2000 Record of Decision (ROD) for the Boomsnub/Airco Superfund site in Hazel Dell, Washington. The ROD selected a remedy to clean up contaminated groundwater at the site. EPA has made these changes to improve the cleanup efficiency. Changes in the ESD include:

- Revising the required pumping capacity for groundwater
- Upgrading two processes for removing contaminants
- Providing for discharge of treated groundwater to a new on-site infiltration gallery
- Enhancing requirements for controlling site use to ensure the remedy remains protective

EPA has also finished an in-well stripping treatment test. The in-well stripping process has been adopted by BOC Gases as a source control action for contaminated soils at the site.

The Boomsnub/Airco Superfund Site includes a former chrome-plating facility and the currently operating BOC Gases plant located at 7608 NE 47th Street in Vancouver, WA. The Washington Department of Ecology began cleaning up contamination at the site in 1990. EPA added the site to its National Priorities List in 1995 and issued the Record of Decision for soil and groundwater cleanup in 2000.

For information about the Explanation of Significant Differences or cleanup activity at the site, please visit: http://yosemite.epa.gov/R10/CLEANUP.NSF/sites/Boomsnub or contact Project Manager Claire Hong: 206-553-1813.