

UNITED STATES

ENVIRONMENTAL PROTECTION AGENCY

REGION III

STATEMENT OF BASIS

BOEING COMPANY

RIDLEY PARK, DELAWARE COUNTY, PENNSYLVANIA 17405

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ACRONYMS

Act 2	The Commonwealth of Pennsylvania Land Recycling and Environmental Remediation Standards Act
AOC	Area of Concern
AST	Aboveground Storage Tank
BNs	Base Neutrals
CFR	Code of Federal Regulations
CMS	Corrective Measures Study
COCs	Constituents of Concern
DCE	Dichloroethylene
EPA	Environmental Protection Agency
Facility	Boeing Company Ridley Plant
GPRA	Government Performance and Results Act
HSWA	Hazardous and Solid Waste Amendments
IC	Institutional Control
IM	Interim Measure
MCL	Maximum Contaminant Level
MSC	Medium-Specific Concentration
NPDES	National Pollutant Discharge Elimination System

PADEP Pennsylvania Department of Environmental Protection

PCE Tetrachloroethylene

PP Metal Priority Pollutant Metals

Permit RCRA Corrective Action Permit

RBC Risk Based Concentration

RCRA Resource Conservation and Recovery Act

RFI RCRA Facility Investigation Report

SB Statement of Basis

SVOCs Semi-Volatile Organic Compounds

SWMU Solid Waste Management Unit

TCE Trichloroethylene

U.S.C. United States Code

UST Underground Storage Tank

VC Vinyl Chloride

VCP Voluntary Cleanup Program

VOAs Volatile Organic Analytes

VOCs Volatile Organic Compounds

I. Introduction

The United States Environmental Protection Agency (“EPA”) is issuing this Statement of Basis (“SB”) to solicit public comment on EPA’s determination that the Boeing Company Ridley Plant Facility (“Boeing” or “Facility”) located adjacent to Interstate 95 and Route 291 in Ridley Township, Delaware County, Pennsylvania, has attained Corrective Action Complete with Controls. The Facility is subject to the requirement of performing corrective action activities because it is subject to the provisions of the Solid Waste Disposal Act, as amended by the Resource Conservation and Recovery Act of 1976 (“RCRA”), and the Hazardous and Solid Waste Amendments of 1984 (“HSWA”), 42 U.S.C. §§ 6901 - 6992. Section 3013 of RCRA, 42 U.S.C. § 6934, requires facilities such as Boeing to investigate and clean up releases of hazardous wastes or hazardous constituents that have occurred at their facility. This SB explains EPA’s preliminary determination that Boeing has fully investigated and properly cleaned up the Facility pursuant to the authority of the Commonwealth of Pennsylvania’s Land Recycling and Environmental Remediation Standards Act (“Act 2”).

In April 2004, EPA Region III and the Commonwealth of Pennsylvania Department of Environmental Protection (“PADEP”) entered into a One Cleanup Program Memorandum of Agreement (“MOA” or “Agreement”) to, among other things, facilitate PADEP’s implementation of Pennsylvania’s Voluntary Cleanup Program (“VCP”) under the authority of Act 2 and to promote the One Cleanup Program initiative by working together in a coordinated manner to avoid duplication of effort at properties subject to RCRA and to ensure the remediation of such properties in a timely fashion. The Agreement describes the circumstances in which EPA will use Final Reports submitted pursuant to the VCP of Act 2 to issue final decisions regarding corrective action completions at certain facilities. At the Boeing Facility, PADEP has approved four Final Reports submitted pursuant to Act 2 and has provided an Act 2 Release of Liability to Boeing for areas within the Facility which have been remediated. EPA, PADEP, and Boeing have worked together throughout this process to ensure that the corrective actions performed by Boeing under the VCP of Act 2, and the Final Reports submitted to PADEP documenting its actions, would provide the information necessary for EPA to issue a final decision regarding corrective action completion at the Facility.

EPA has reviewed the Final Reports submitted to PADEP on behalf of Boeing pursuant to Act 2, the PADEP letters of approval, the results of soil and groundwater sampling activities, past and present environmental practices at the Facility, historical investigations conducted at the Facility, and reports of remedial activities conducted at the Facility. As a result of this review, EPA has determined that Boeing has met its RCRA corrective action obligations at the Facility, and that the Facility can be designated “Corrective Action Complete with Controls.”

The proposed controls, which are also required as part of PADEP's approval of Boeing's post remedial action plan activities, include regular visual integrity inspections to ensure that concrete slabs and/or asphalt paved surfaces that prevent direct contact with contaminated materials are maintained. The proposed controls also require that deed notices, which provide notice that portions of the property comprising the Facility are restricted to non-residential use and that installation of potable wells is prohibited, be filed in the Office of the Recorder of Deeds. This proposal to designate the Facility as Corrective Action Complete with Controls is consistent with current EPA guidance entitled "Final Guidance on Completion of Corrective Action at RCRA Facilities (February 25, 2003)."

II. Facility Background

The main plant of the Facility is located adjacent to Interstate 95 and Route 291 in Ridley Township, Delaware County, Pennsylvania. The location of the Facility is shown in Attachment 1. The Facility is bisected by Route 291, with approximately 240 acres located north of Route 291 and approximately 107 acres located south of Route 291. Crum Creek, Darby Creek, and the Delaware River are the major surface waters near the Facility and their locations are also shown in Attachment 1. Crum Creek and Darby Creek are receiving waters for the Facility's National Pollution Discharge Elimination System ("NPDES") permitted outfalls. They are tributaries to the Delaware River, which borders the Facility on the south. Local industrial groundwater users have been identified and are listed in the Facility's Preparedness, Prevention, and Contingency Plan (1993). According to recent investigation reports, no private or public groundwater supplies or surface water intakes are known to exist in the vicinity of the Facility.

The direction of groundwater flow in the vicinity of the Facility has components to the south (Delaware), southeast (Darby Creek), and southwest (Crum Creek) all toward the Delaware River. The pumping test data indicate a strong hydraulic connection between the overburden and shallow bedrock aquifers.

The Facility manufactures aircraft and its manufacturing processes are divided into five major categories: 1. Assembly and Testing; 2. Fabrication; 3. Storage; 4. Laboratories; and 5. Others. The manufacturing activities include mechanical, hydraulic and electrical assembly; sheet-metal cutting, bending, punching, and stretch forming; heat treating and processing; paint operations; grit blast/shotpeening; lab testing; composite manufacturing; and metal finishing. In the manufacturing processes, various halogenated and nonhalogenated solvents, acidic and caustic chemicals, paints, fuel, and oil are used and stored.

III. Summary of the Environmental Investigation

In June 1991, in response to an EPA request, Boeing identified all Solid Waste Management Units (“SWMUs”) and Areas of Concern (“AOCs”) at the Facility. See Attachment 2 for the names and locations of all the SWMUs and AOCs. Between 1992 and 2004, Boeing closed several SWMUs and conducted a series of Remedial Investigations in accordance with PADEP-approved workplans dated June 30, 1998 (Center North Area Site), July 19, 1999 (73.5 Acre Site), October 10, 2001 (Center South Area Site), and March 10, 2004 (Old Landfill and Former Lagoon Area Site).

The Remedial Investigation activities were conducted in accordance with the approved workplans and the final provisions of Act 2, dated July 17, 1997; revisions to Act 2, dated November 24, 2001; the Land Recycling Program Technical Guidance Manual (“TGM”) final draft, dated December 1997; and revisions to the TGM, dated June 8, 2002. The objectives of the Remedial Investigation activities were to evaluate environmental conditions at the Facility, to demonstrate attainment of Remediation Standards under Act 2, to achieve Site closure and receive a No Further Action designation from EPA, and to support a petition for a Release of Liability from PADEP. To achieve these objectives, Boeing completed a series of soil and groundwater investigations which included the installation and sampling of additional monitoring wells, sampling of soil borings, and removal and remediation of storage tanks, connecting piping, and contaminated soils in order to demonstrate attainment of Site-Specific standards for soils and groundwater. Boeing also completed a soil gas survey, performed an ecological evaluation, and evaluated vapor and other potential exposure pathways. This work was documented in Final Reports submitted on behalf of Boeing, dated July 13, 1998 (Center North Area Site), February 20, 2001 (73.5 Acre Site), April 14, 2003 (Center South Area Site), and November 10, 2004 (Old Landfill and Former Lagoon Area Site). These reports were submitted to PADEP for approval pursuant to Act 2. PADEP approved the Final Reports by letters dated October 9, 1998, March 12, 2001, July 22, 2003, and February 10, 2005, respectively.

IV. Investigation Results

1. Center North Area Site

A. Soil Contamination

A Final Report dated July 13, 1998, for the Center North Area Site was submitted to PADEP on behalf of Boeing pursuant to Act 2. The Final Report indicated that soil samples from nine (9) borings in the vicinity of Building 3-07 were analyzed for volatile organic compounds (“VOCs”) in 1989. The results of the sampling revealed two (2) exceedances of the Act 2 soil medium-specific concentration (“MSC”) for trichloroethylene (“TCE”). No other exceedances of the soil MSC were detected. The 1989 soil exceedance was subsequently excavated by Boeing. In 1995, Boeing collected 79 grid cell samples from a depth of two (2) feet that showed no exceedance of the soil MSC for chlorinated organics. Approximately

thirty-nine (39) grid cell samples were collected for further analysis. These samples showed exceedances of contaminants related to sludge drying beds and a wastewater treatment plant, such as phenol, acetone, and heavy metals. The contaminated areas were excavated to bedrock or to a depth of four (4) feet in those areas where re-sampling showed no exceedances. Boeing removed 4,672 tons of contaminated soils during this process.

B. Groundwater Contamination

The July 13, 1998 Final Report provided information obtained from subsurface investigations of groundwater conducted at the Site since 1994. The July 1998 Final Report was supplemented by an Inhalation MSC Calculation for Contaminated Groundwater, dated June 30, 1998. One such investigation indicated that a TCE plume caused by releases of degreasing solvents, specifically TCE, from a vapor degreaser located in Building 3-07 was decreasing in size. The vapor degreaser was in operation from 1962 to 1980 and was removed in May 1990, along with 4,672 tons of contaminated soil.

Groundwater from 37 monitoring wells in the Center North Area Site has been sampled quarterly since 1994. A groundwater treatment system (pumping and treating by air stripping of seven (7) wells) was installed and operated intermittently from April 1994 to May 1996. Analysis of this data clearly shows that the TCE contaminated plume is decreasing in size. The impacted groundwater is completely contained within the property boundaries of the Site and therefore meets the Act 2 Statewide Health Standard at the point of compliance. Additional groundwater modeling using the Domenico model confirmed that natural attenuation will occur before contaminants reach the point of compliance. Subsequent studies indicate that natural attenuation will further reduce contaminant concentrations in groundwater at the Site.

An ecological screen was conducted pursuant to Section 250.311 of Act 2 which indicated that no complete exposure pathway exists in the AOC because the majority of the Site is paved or covered by buildings and the contaminated groundwater does not affect the closest receptors, which are Crum Creek and the Delaware River. Boeing also evaluated the potential for contaminated groundwater at the Site to volatilize through the soil profile and adversely impact workers using PADEP's Act 2 regulations, the groundwater volatilization model, PADEP Vapor Guidance Document and the American Society of Testing and Materials Risk Based Corrective Action models. The results indicate that there is no risk of exposure through the volatilization pathway.

C. Final Report

By letter dated October 9, 1998, PADEP approved the July 13, 1998 Final Report submitted on behalf of Boeing pursuant to Act 2. In the October 1998 letter, PADEP advised Boeing of its determination that groundwater at the Site currently meets the Statewide Health Standard and granted to Boeing an Act 2 Release of Liability for the Center North Area Site. Boeing has continued to voluntarily monitor groundwater conditions at the Site on an annual basis.

2. 73.5 Acre Site

A. Soil Contamination

A Final Report for the 73.5 Acre Site was submitted to PADEP on behalf of Boeing on February 20, 2001, pursuant to Act 2. The Final Report indicated that a total of 122 soil samples were collected at the 73.5 Acre Site from 1987 to 1993. These samples were collected from test borings and test pits by the use of hand augers. The majority of these samples were collected at depths greater than two (2) feet in order to determine whether soils surrounding underground transmission lines historically used to transfer heating oil (#2 fuel oil) had been impacted by petroleum constituents from previous releases. In 2000, 37 soil borings were completed for further analysis. Samples were collected at each boring location for analysis for volatile organic analytes ("VOAs"), base neutrals ("BNs"), and priority pollutant metals ("PP Metals"). In addition, samples for analysis for polychlorinated biphenyls ("PCBs") were collected at borings completed to investigate an area where electrical substations had reportedly been located. Analytical results indicated that there were no contaminants in excess of Statewide Health Standards for petroleum constituents commonly associated with #2 fuel oil, i.e., benzene, toluene, ethyl benzene, cumene, naphthalene, fluorine, and phenanthrene.

Analytical results of soil from boring and test pit samples demonstrated that lead was present in excess of the Act 2 Statewide Health Standards at TP-412 (2,520 parts per million ("ppm")) at a depth of 8.5' - 9' and B-3 (59.9 ppm) at a depth of 13.5' - 14'. Because these were the only exceedances of lead in soils at this Site, PADEP set the background standard for lead at 2,520 ppm at a depth of 8.5' - 9'. If this soil is excavated in the future, it could represent a direct contact threat and should be handled appropriately.

A single analytical result for thallium in excess of the Non-Residential Soil to Groundwater Pathway Standard for saturated soils (2.6 ppm) was also noted in Boring 35 ("B-35") at a depth of 10.9 - 11.0'. Examination of the standing water elevation information indicates that the historic high standing water elevation in an adjacent well (MW-38) occurs at a depth of 10.5'. Based on this information, PADEP determined that the actionable standard for thallium in soils would be 1.4 ppm. Although this sample result exceeds the applicable Non-Residential

Statewide Health Standard for saturated soils, Boeing has shown attainment of the Site-Specific Elimination of Pathway Standard for thallium by filing a notice on the deed to the property in the vicinity of B-35 in the Office of the Recorder of Deeds for Delaware County which provides notice that installation of potable wells in this area is prohibited.

B. Groundwater Contamination

There is a network of twelve (12) monitoring wells at the 73.5 Acre Site. Analysis of samples taken on March 29, 2000, and May 8, 2000, indicated that the Act 2 Used Aquifer Statewide Health Standard for lead and antimony was exceeded in MW-40 and MW-76, respectively. Modeling of the diffuse groundwater to surface water discharge rate was performed using the standards set forth in the December 1997 TGM to determine the potential impacts of these contaminants to Crum Creek. The results were then evaluated against PADEP's Water Quality In-Stream Criterion and neither lead nor antimony was shown to exceed the in-stream criterion.

In a letter dated March 12, 2001, PADEP informed Boeing that it could attain the Site-Specific Standard for lead in the vicinity of MW-40 and antimony in the vicinity of MW-76 by filing a deed notice, which provides notice that installation of potable wells in this area is prohibited, in the Office of the Recorder of Deeds and thereby demonstrate attainment of the Site-Specific Elimination of Pathway Standard. Boeing filed such a deed notice in the Office of the Recorder of Deeds for Delaware County on October 3, 2003.

Sampling and analysis of the twelve (12) on-Site monitoring wells has been on-going from 1988 to the present. Concentrations of TCE were historically detected at concentrations up to 710 ppb. Concentrations of methylene chloride ("MC") were historically detected at concentrations of up to 8 ppb. Groundwater samples collected from February 1998 to May 2000 indicate that the Statewide Health Standard for TCE has been met and groundwater samples collected from February 1996 to May 2000 indicate that the Statewide Health Standard for MC has been met. Therefore, natural attenuation of these contaminants to the Statewide Health Standard for each contaminant has been demonstrated.

C. Final Report

By letter dated March 12, 2001, PADEP approved the February 20, 2001 Final Report submitted on behalf of Boeing pursuant to Act 2 and granted to Boeing an Act 2 Release of Liability for the 73.5 Acre Site. In the March 12, 2001 letter, PADEP advised Boeing of its determination that Boeing had achieved the Statewide Health Standard for petroleum impacted soils and that natural attenuation of TCE and MC in

groundwater to the Statewide Health Standard had been demonstrated at this Site. PADEP also advised Boeing that it could demonstrate attainment of the Site-Specific Elimination of Pathway Standard for thallium and the Site-Specific Elimination of Pathway Standard for lead in the vicinity of MW- 40 and antimony in the vicinity of MW-76 by filing a deed notice on the property in the vicinity of Boring 35, which provides notice that installation of potable wells in this area is prohibited, in the Office of the Recorder of Deeds. Boeing filed such a deed notice in the Delaware County Office of the Recorder of Deeds on October 3, 2003.

3. Center South Area Site

A. Soil Contamination

A Final Report dated April 14, 2003, for the Center South Area Site was submitted to PADEP on behalf of Boeing pursuant to Act 2. Investigation and remediation efforts undertaken at the Center South Area Site included the installation of thirty-four (34) test borings and eleven (11) additional monitoring wells to supplement the existing groundwater monitoring network of nine (9) wells. Additional work completed at this Site included performance of an electromagnetic survey, performance of a soil gas survey, determination of geotechnical parameters in Site soils, and the removal and remediation of three (3) aboveground storage tanks (“ASTs”) and three (3) underground storage tanks (“USTs”) along with the removal and disposal of approximately 1,276 feet of connecting piping. An ecological assessment was also completed and the inhalation pathway was evaluated using PADEP’s Vapor Intrusion Guidance, dated October 26, 2002, and proposed changes to the Vapor Intrusion Guidance, dated November 8, 2002.

Sixty-four (64) soil samples were collected and analyzed for inorganic metals and volatile organic compounds (“VOCs”) from the test borings. Based upon historic Site activities and the Remedial Investigation activities described above, PADEP determined that Boeing had met the Statewide Health Standard for soils at this Site with the exception of benzo(a)pyrene, dibenzo(a,h)anthracene, arsenic, lead, TCE, naphthalene, benzo(b)fluoranthene, benzene, mercury, and chrysene. These contaminants are present in soils above the Act 2 Non-Residential Statewide Health Standard. To address the direct contact exceedances, an exposure evaluation was performed and it was determined that a complete exposure pathway does not exist due to the presence of asphalt paved surfaces. Therefore, Boeing has demonstrated attainment of the Site-Specific Elimination of Pathway Standard for these contaminants.

B. Groundwater Contamination

Boeing’s April 14, 2003 Final Report indicated that groundwater data was

collected over eleven (11) consecutive quarterly rounds of groundwater sampling from the nine (9) pre-existing wells along with four (4) consecutive quarters of data from the eleven (11) new wells. Boeing also completed a tidal influence study and aquifer tests on five (5) on-Site wells. Based upon historic Site activities, historic environmental investigations, current Remedial Investigation activities, and the results of Domenico modeling, which demonstrated compliance with PADEP non-residential MSCs at the point of compliance, attainment of Statewide Health Standards has been demonstrated for all VOCs, semi-volatile organic compounds (“SVOCs”), and PP Metals. Site investigation activities also demonstrated that surface water has not been adversely impacted from current or historic Site operations.

C. Final Report

By letter dated July 22, 2003, PADEP approved the April 14, 2003 Final Report submitted on behalf of Boeing pursuant to Act 2 and granted to Boeing an Act 2 Release of Liability for the Center South Area Site. In the July 22, 2003 letter, PADEP informed Boeing of its determination that the Center South Area Site had met the Statewide Health Standard for soils with the exception of benzo(a)pyrene, dibenzo(a,h)anthracene, arsenic, lead, TCE, naphthalene, benzo(b)fluoranthene, benzene, mercury, and chrysene and that Boeing had demonstrated that surface water had not been adversely impacted by the Site. PADEP also advised Boeing that it could demonstrate Attainment of the Site-Specific Standard based on Elimination of Pathway by filing a deed notice on the property in the vicinity of Site AOC-3 (groundwater) and on both AOC-1 (soils in the western portion of the Site) and AOC-2 (soils in the eastern portion of the Site), which provides notice that installation of potable wells in this area is prohibited and that the use of the property is limited to non-residential use due to the potential direct contact threat associated with future digging/excavation activities, in the Office of the Recorder of Deeds. Boeing filed such a deed notice in the Delaware County Office of the Recorder of Deeds on April 4, 2005.

4. Old Landfill and Former Lagoon Area Site

A. Soil Contamination

A Final Report dated November 10, 2004, for the Old Landfill and Former Lagoon Area Site was submitted to PADEP on behalf of Boeing pursuant to Act 2. The Final Report summarized data and other information collected from numerous soil and groundwater investigations conducted by various consultants at the Facility from 1986 through 2004. Additional actions taken prior to preparation of the Final Report included installation and sampling of additional soil borings and groundwater monitoring wells, completion of an ecological evaluation, and evaluation of vapor and other potential exposure

pathways. Based upon a review of historical and current Site operations and previously completed investigations, two (2) AOCs were described in the March 10, 2004 Work Plan for Remedial Activities: the Old Landfill and the Former Lagoon Area.

The Final Report indicated that a total of twenty (20) soil samples were collected and analyzed for inorganic metals and volatile organic compounds. The results of the sampling indicated that there were no exceedances of PADEP's Act 2 Non-Residential Soil to Groundwater Pathway Standards or of the Direct Contact Non-Residential Standards in the Former Lagoon Area. In the Old Landfill area, there were no exceedances of PADEP's Act 2 Direct Contact Non-Residential Standards. However, lead, nickel, and cadmium were above PADEP's Act 2 Non-Residential Soil to Groundwater Pathway Standards. PADEP's Act 2 Direct Contact Non-Residential Standards (0 - 2') are substantially the same as EPA Region III's risk based concentrations ("RBCs") for industrial soils.

In a letter dated February 10, 2005, PADEP indicated that the metal contamination in the soils of the Old Landfill Site could be effectively managed under the Act 2 Site-Specific Standard by filing a deed notice, which provides notice that future use of the property is restricted to non-residential use, in the Office of the Recorder of Deeds and thereby demonstrate attainment of the Site-Specific Elimination of Pathway Standard. Boeing filed such a deed notice in the Delaware County Office of the Recorder of Deeds on April 4, 2005.

B. Groundwater Contamination

In the November 10, 2004 Final Report, Boeing indicated that groundwater sampling was conducted at all six (6) newly installed wells within the Old Landfill and Former Lagoon Area Site in 2004. All monitoring well samples were analyzed for Priority Pollutant VOCs ("PP VOCs"), SVOCs, and PP Metals and attainment of the Site-Specific Standards at the point of compliance (Crum Creek) was demonstrated. Fate and transport modeling indicated that there was no impact to surface water from Site groundwater. An evaluation of potential impacts to ecological receptors was also completed. Based upon the urban nature of the Site, the lack of identified sensitive receptors at the Site and surrounding area, and the presence of impermeable surfaces at the Site, Boeing determined that no additional ecological consideration was warranted.

The extent of impact of groundwater to surface soils was delineated to either the Statewide Health or Site-Specific Standard. At areas where soil concentrations did not meet the Statewide Health Standard, a Site-Specific pathway evaluation was conducted to ensure that there were no complete exposure routes at the Site and attainment of Site-Specific Standards was demonstrated. The inhalation pathway was

evaluated based upon Site-Specific concentrations detected in soil and groundwater. Soil and groundwater concentrations at the Site were compared to PADEP's Vapor Intrusion Final Guidance, dated January 24, 2004. Based upon the results of this evaluation, no further action is warranted with regard to indoor air quality. In accordance with PADEP's TGM, and the results of the completed exposure evaluation, a baseline risk assessment report was not prepared for the Site because there are no completed pathways from the contaminated media to potential receptors.

The groundwater sampling indicated that lead above the Act 2 Non-Residential Groundwater Standards was present in the Former Lagoon Area and that bis(2-ethylhexyl) phthalate was present above Act 2 standards in the Old Landfill. However, in an additional round of groundwater sampling, bis(2-ethylhexyl) phthalate was not detected, suggesting that the original contaminant concentration may have been due to laboratory contamination. The former Lagoon Area is in compliance with the Act 2 Site-Specific Standard based on Pathway Elimination since the area is now covered by the footprint of Building 3-31 so long as the slab-on-grade concrete cover that is the current floor of Building 3-31 is maintained. Boeing has included this requirement in its Post Remedial Care Plan for this parcel, which requires inspection, maintenance, and documentation of impermeable surfaces on an annual basis. PADEP has determined that the potential exposure pathway for lead in groundwater can be addressed by the filing of a deed notice, which provides notice that use of groundwater in this area for consumption is prohibited, in the Office of the Recorder of Deeds. Boeing filed such a deed notice in the Delaware County Office of the Recorder of Deeds on April 4, 2005. The most recent groundwater sampling results indicates that Boeing has attained the Act 2 Statewide Health Standard for lead in groundwater at the Old Landfill Site.

C. Final Report

By letter dated February 10, 2005, PAPEP approved the November 10, 2004 Final Report submitted on behalf of Boeing pursuant to Act 2 and granted to Boeing an Act 2 Release of Liability for the Old Landfill and Former Lagoon Area Site. In the February 10, 2005 letter, PADEP indicated that there were no exceedances of PADEP's Act 2 Non-Residential Soil to Groundwater Pathway Standards or of the Direct Contact Non-Residential Standards in the Former Lagoon Area. In the Old Landfill Area, there were no exceedances of PADEP's Act 2 Direct Contact Non-Residential Standards. PADEP also indicated that Boeing could meet the Act 2 Site-Specific Standard for metal contamination in the soils of the Old Landfill Site by filing a deed notice, which provides notice that future use of the property is restricted to non-residential use, in the Office of the Recorder of Deeds and thereby demonstrate attainment of the Site-Specific Elimination of Pathway Standard for this Site. Boeing filed such a deed notice in the Delaware County Office of the

Recorder of Deeds on April 4, 2005.

In the February 10, 2005 letter, PADEP also indicated that Boeing had attained the Site-Specific Standard for groundwater at the Old Landfill and the Former Lagoon Area Site at the point of compliance (Crum Creek), that there was no impact to surface water from Site groundwater, and that there were no additional ecological impacts caused by groundwater contamination at the Site. PADEP also determined that the former Lagoon Area is in compliance with the Act 2 Site-Specific Standard based on Pathway Elimination. PADEP also indicated that the Act 2 Non-Residential Groundwater Standard in the Former Lagoon Area can be attained by the filing of a deed notice, which provides notice that use of groundwater in this area is restricted, with the Office of the Recorder of Deeds. Boeing filed such a deed notice in the Delaware County Office of the Recorder of Deeds on April 4, 2005.

5. EPA Action

In meetings with PADEP and EPA on May 8, 2003, and November 21, 2003, Boeing requested that EPA make a determination that the Facility had achieved RCRA closure of all specified SWMUs and that No Further Action was necessary at the Facility based upon the information submitted to PADEP pursuant to the VCP of Act 2. Boeing agreed to keep EPA informed of the results of all investigations and closure activities in connection with the two AOCs in the Center North Area Site, namely, the Old Landfill and the Former Lagoon Area, which were occurring under the direction of PADEP.

By letter dated December 16, 2003, EPA informed Boeing of its determination that no further corrective action measures were necessary pursuant to RCRA for the specified units, with the exception of the Center North TCE Plume. EPA agreed that natural attenuation was gradually reducing the Center North TCE Plume and asked Boeing to continue its current reduced groundwater monitoring activities at the Center North Area Site.

On April 21, 2004, PADEP and EPA entered into the One Cleanup Program Memorandum of Agreement which was designed to promote working together to achieve cleanups that protect human health and the environment by making greater use of all available authorities, and selecting the optimum programmatic tools to increase pace, effectiveness, efficiency, and quality of cleanups.

By letter dated March 18, 2005, Boeing submitted to EPA a Voluntary Groundwater Sampling Plan for the Center North Area Site and an amended Post Remedial Care Plan that included the Center North TCE Plume, the Old Landfill, and the Former Lagoon Area. The Post Remedial Care Plan involves the inspection, maintenance, and documentation of impermeable surfaces to prevent direct contact with soils in certain areas of the Site. The Groundwater Sampling Plan includes the activities described in Attachment 4.

V. Control Activities

A. Soil

Because of the Site investigations and remedial activities completed by Boeing at the Facility, VOCs, SVOCs and PP Metals are below the Act 2 Non-Residential Statewide Health Standards except for the constituents previously indicated and further discussed, below. PADEP determined that the soil contamination identified can attain the Act 2 Site-Specific Standards based upon Pathway Elimination and EPA agrees. The direct contact exposure pathway from soils does not exist at the Facility due to the presence of either concrete slabs or asphalt paved surfaces.

1. 73.5 Acre Site

(a) Analytical results demonstrated that lead was present in excess of the Act 2 Statewide Health Standards at this Site at a depth of 8.5' - 9'. If this material is excavated in the future, it could represent a direct contact threat and should be handled appropriately.

(b) A single analytical result for thallium in Boring 35 was noted at a depth of 10.5 -11.0', which exceeds the Act 2 Non-Residential Soil to Groundwater Pathway Standard. On October 3, 2003, Boeing filed a deed notice, which provides notice that the property in the vicinity of Boring 35 cannot be used for residential purposes, with the Office of the Recorder of Deeds for Delaware County to demonstrate attainment of the Site-Specific Elimination of Pathway Standard.

2. Center South Area Site

Within the soils in the western portion of the Site (AOC-1), attainment of the Act 2 Site-Specific Standard based on Pathway Elimination has been demonstrated for both the benzo(a)pyrene detected in soil boring B-31 and the lead detected in the vicinity of Building 33. Within the soils in the eastern portion of the Site (AOC-2), attainment of the Act 2 Site-Specific Standard based on Pathway Elimination has been demonstrated through fate and transport modeling for Act 2 Soil to Groundwater exceedances of benzo(a)pyrene, dibenzo(a,h)anthracene, arsenic, lead, TCE, naphthalene, benzo(b)fluoranthene, benzene, mercury, and chrysene. On April 4, 2005, Boeing filed a deed notice, which provides notice that the property in both AOC-1 (soils in the western portion of the Site) and AOC-2 (soils in the eastern portion of the Site) can not be used for residential purposes, with the Office of the Recorder of Deeds for Delaware County to demonstrate attainment of the Site-Specific Elimination of Pathway Standard.

3. Old Landfill and Former Lagoon Area Site

Within the Old Landfill Area Site, PADEP's Act 2 Non-Residential Statewide Health Standards have been attained for VOCs, SVOCs, and PP Metals, with the exception of lead, nickel, and cadmium. Within the Former Lagoon Area, PADEP's Act 2 Non-Residential Statewide Health Standards have been attained for all VOCs, SVOCs, and PP Metals. On April 4, 2005, Boeing filed a deed notice, which provides notice that the property in the vicinity of the Old Landfill and the Former Lagoon Area can not be used for residential purposes, with the Office of the Recorder of Deeds for Delaware County to demonstrate attainment of the Site-Specific Elimination of Pathway Standard.

In addition, in order to ensure protection from exposure in the future and in accordance with PADEP's letter dated February 10, 2005, Boeing must perform visual inspections of the asphalt paved surface and concrete slab on an annual basis at the Former Lagoon Area Site in accordance with the inspection schedule indicated in Attachment 3. If significant cracks or breaks in the asphalt and/or concrete slab are apparent during the inspection, the affected area will be repaired in a timely manner and a brief description of the location of the affected area and action taken to repair the area will be provided to EPA. Boeing has included this requirement in the Post Remedial Care Plan for this parcel in the deed notice filed with the Delaware County Recorder of Deeds on April 4, 2005.

B. Groundwater

1. Center North Area Site

Based on the observed hydraulic connection between the overburden and bedrock wells, it was determined that the Site is underlain by one hydraulic unit. Groundwater flow within this unit is primarily south toward the Delaware River, with a westerly component toward Crum Creek. A low level volatile organic plume consisting primarily of TCE and its associated daughter products was detected within this hydraulic unit. The groundwater plume has been delineated in the downgradient flow to both the south and the west. Natural attenuation remediation reports indicate that the lateral extent of the TCE plume decreased between 1993 and 1998 by approximately 58% and that the dichloroethylene ("DCE") plume decreased by approximately 62%. The extent of the VC plume decreased between 1997 and 1998 by approximately 32%. Further evidence that the plume is decreasing can be found in a fate and transport analysis which was completed using the Domenico model which indicated that the plume is shrinking and will not migrate past the point of compliance within the next thirty (30) years. An ecological screen conducted pursuant to Section 250.311 of Act 2 indicated that groundwater impacted by the plume does not impact the closest potential receptors, which are the Delaware River and Crum Creek. The groundwater beneath the Boeing property is shallow and there is no reasonable expectation that this groundwater will

ever be used as a potable supply since deed notices, which provide notice that installation of potable wells in this area is prohibited, has been filed with the Office of the Recorder of Deeds for Delaware County.

In this SB, EPA is proposing that the current and potential use of this groundwater will be as surface water recharge. Therefore, sixteen (16) locations have been established as points of compliance for the contaminated plume. The point of compliance locations are shown in Table 1 of Attachment 4, "Voluntary Groundwater Sampling Plan - Center North Site, March 2005".

EPA has established cleanup levels for these COCs which are sufficient to protect the surface water quality of the Delaware River and Crum Creek. These levels are based on PADEP's Water Quality Criteria for Toxic Substances (Fish and Aquatic Life Criteria, November 2000) and are listed below:

(ug/l)	Constituents	Continuous (ug/l)	Maximum
	TCE	450	2300
	DCE	1500	7500
	PCE	140	700

Boeing has already met these levels as demonstrated by the letters from PADEP approving Boeing's Act 2 Final Reports previously discussed. In addition, Boeing has agreed to continue to monitor groundwater for three (3) additional years to provide further assurance that these levels will continue to be met.

While on-Site groundwater is not currently used as a drinking water source and Boeing has no plans for such future use, the control activities required as a condition of PADEP's approval and by this SB include institutional controls to prohibit the development of on-Site wells for drinking water or other domestic uses at the Site. Boeing filed notice of this restriction with the deed to the property in the Office of the Recorder of Deeds for Delaware County on April 4, 2005.

2. 73.5 Acre Site

Boeing has attained the Act 2 Site-Specific Standard based on Elimination of Pathway for lead in the vicinity of MW-40 and antimony in the vicinity of MW-76 by filing a deed notice, which provides notice that installation of potable wells in this area is prohibited, in the Office of the Recorder of Deeds for Delaware County on October 3, 2003. Groundwater samples collected from February 1998 to May 2000 indicate that the Statewide Health Standard for TCE has been met and groundwater samples collected from February 1996 to May 2000 indicate that the Statewide Health Standard for MC has been met.

3. Center South Area Site

Boeing filed a notice with the deed for the property in the vicinity of Site AOC-3 (groundwater) which provides notice that installation of potable wells in this area is prohibited in the Office of the Recorder of Deeds on April 4, 2005.

4. Old Landfill and Former Lagoon Area Site

Boeing filed a notice with the deed for the property on which the Old Landfill and Former Lagoon Area is located, which provides notice that installation of potable wells in this area is prohibited, with the Office of the Recorder of Deeds on April 4, 2005.

VI. Voluntary Action by Boeing

To confirm that groundwater quality is improving, Boeing will continue to monitor groundwater at the Center North Area Site on an annual basis. Boeing will perform the voluntary groundwater monitoring activities annually for a three (3) year period (November 2005 through November 2008) in accordance with Attachment 4, "Voluntary Groundwater Sampling Plan - Center North Area Site, March 2005". At the end of three (3) years of monitoring, Boeing will evaluate contaminant trends and report to EPA. EPA will determine if additional voluntary monitoring is necessary. Boeing will inform EPA of any changes to the voluntary groundwater monitoring activities. EPA will oversee the monitoring activities and evaluate the continued effectiveness of Boeing's voluntary groundwater monitoring program.

VII. Evaluation of Criteria

This section provides a description of the criteria EPA uses to evaluate the proposed remedy and the other alternatives considered under the Corrective Action Program. The criteria are applied in two phases. In the first phase, EPA evaluates three (3) threshold criteria as general goals. In the second phase, for those remedies which meet the threshold criteria, EPA then evaluates seven (7) balancing criteria to determine which control activity/corrective action activity provides the best balance of trade-offs with respect to all the criteria.

A. Threshold Criteria

1. Protection of Human Health and the Environment

Contamination in surface soils has been remediated to either PADEP Act 2 Statewide Health Standards or PADEP Act 2 Site-Specific Standards. At areas where soil concentrations did not meet Statewide

Health Standards, a Site-Specific pathway evaluation was conducted to ensure that no complete exposure pathway exists at the Site. For soils located at the Center North Area Site, the 73.5 Acre Site, the Center South Area Site, and the Old Landfill and Former Lagoon Area Site, Boeing has either attained PADEP Statewide Health Standards or the Site-Specific Standard based on Elimination of Pathway.

Groundwater concentrations of Site COCs have been delineated and attainment of Site-Specific Standards at the point of compliance (Crum Creek) for PP VOCs, PP SVOCs, and PP Metals has been demonstrated. Fate and transport modeling supports the determination of lack of impacts to surface water from Site groundwater. Based on existing groundwater monitoring data, natural attenuation has gradually reduced the Center North Area Site TCE plume. Boeing obtained an Act 2 Release of Liability from PADEP for the Center North Area Site TCE Plume in 1998 and has since voluntarily monitored groundwater conditions at the Center North Area Site on an annual basis. The voluntary monitoring program will ensure long-term protectiveness of human health and the environment.

An evaluation of potential impacts to ecological receptors from Site conditions was completed in accordance with all applicable and appropriate PADEP rules and regulations. Based on the urban nature of the Site, the lack of identified sensitive receptors at the Site and/or surrounding the Site, and the presence of impermeable surfaces at the Site, it has been determined that no additional ecological consideration is warranted. Information obtained during the Remedial Investigations performed by Boeing indicate that surface water has not been adversely impacted by current or historic Site operations.

The only possible exposure route to contaminated groundwater or soil at the Facility is to workers taking environmental samples or to workers excavating soil in the vicinity of the Center North Area, the 73.5 Acre, and the Center South Area Sites. However, Boeing is in compliance with applicable regulations governing worker safety and has developed Health and Safety Plans which provide for appropriate worker training and explains the circumstances under which it is necessary for workers to wear protective clothing if exposure to contaminated groundwater or soil is expected. It is also relevant to note that the current levels of groundwater and soil contamination do not represent an immediate threat to anyone who may be exposed during routine sampling or construction activities.

2. Achieve Media Cleanup Standards

Site investigations completed by Boeing demonstrate that levels of VOCs, SVOCs, and PP Metals in most soils are below the Act 2 Non-Residential Statewide Health Standard. At areas where the soil concentration did not meet the Statewide Health Standard, a Site-Specific pathway evaluation was conducted to ensure that no complete exposure pathways exist at the Site. Historic groundwater data indicates that concentrations of TCE in groundwater at the Center North Area Site have steadily declined

due to natural attenuation. This conclusion is supported by the observed reduction in plume extent, overall reduction in plume concentration, natural attenuation parameters, and calculated decay rates. The natural attenuation process is further supported by the fate and transport calculations presented in the Boeing's Act 2 Final Report of July 13, 1998. Additionally, Boeing will voluntarily continue to monitor the groundwater conditions at the Center North Area Site for three (3) years to ensure that groundwater quality continues to improve.

3. Control the Release(s)

Due to the presence of concrete slabs and asphalt paved surfaces, no direct contact pathway for soils exists. To further limit the potential for a complete exposure pathway, the Facility has filed a notice with the deeds to the properties at the Center North Area, the Center South Area, and the 73.5 Acre Sites which provide notice that use of the property is limited to non-residential use and that a Post Remedial Care Plan, which requires inspection, maintenance, and documentation of impermeable surfaces for these parcels, is in place and must be executed annually. Boeing's voluntary groundwater monitoring activities since 1998 have indicated that the TCE contamination at the North Center Area Site is declining due to natural attenuation. In addition, Boeing has filed a notice with the deeds to the properties at the Center North Area, the Center South Area, and the 73.5 Acre Sites which provide notice that development of on-Site groundwater for drinking and other domestic uses is prohibited. Boeing's removal of a vapor degreaser from Building 3-07 at the Center North Area Site along with 4,672 tons of contaminated soil in May 1990, has eliminated, to the extent practicable, further releases of hazardous constituents from on-Site soil as well as the source of the groundwater contamination.

B. Balancing Criteria

Because the control activities have already been implemented and are operating and because EPA is satisfied that the control activities are protective of human health and the environment, EPA is not choosing among alternative remedies/corrective action activities. Therefore, an evaluation of the balancing criteria is unnecessary. Nonetheless, EPA presents the seven criteria below to illustrate the suitability of the control activities:

1. Long-Term Reliability and Effectiveness

The Facility's Act 2 investigations and remediation activities have addressed soil and groundwater contamination at all of the Sites impacted. Voluntary groundwater monitoring is continuing to confirm the reliability and effectiveness of the natural attenuation processes at the Facility's Center North Area Site. EPA will oversee the monitoring activities and evaluate the continued effectiveness of Boeing's voluntary

groundwater monitoring program.

EPA also considers the restrictions on groundwater use and the restrictions on the use of the property to non-residential use as long-term components of the control activities. Boeing has filed a notice with the deeds to the properties at the Center North Area, the Center South Area, and the 73.5 Acre Sites which provide notice that development of on-Site groundwater for drinking and other domestic uses is prohibited. The Facility has also filed a notice with the deeds to the properties at the Center North Area, the Center South Area, and the 73.5 Acre Sites which provide notice that use of the property is limited to non-residential use.

2. Reduction of Toxicity, Mobility, or Volume of Wastes

Direct contact exposure pathways do not exist due to the presence of concrete slabs and asphalt paved surfaces. This has eliminated the potential for direct contact exposure and reduced the mobility of the contaminants as well. In addition, groundwater monitoring data indicate that natural attenuation processes at the Facility are reducing the volume and toxicity of the TCE plume. Continued monitoring is expected to confirm this trend. Boeing's removal of a vapor degreaser from Building 3-07 at the Center North Area Site along with 4,672 tons of contaminated soil in May 1990 has also reduced the volume of hazardous constituents in on-Site soil as well as eliminating the source of the groundwater contamination.

3. Short-Term Effectiveness

Continued monitoring of the groundwater at the Facility is effective in the short term since it is an activity that is currently ongoing and its continuation can be accomplished easily. In addition, continued monitoring provides information regarding environmental conditions and provides a basis for the Facility to respond to changes in the future, if necessary.

4. Implementability

The control activities include annual visual inspection of impermeable surfaces and deed notices which are both technically and administratively feasible. All the required deed notices have been filed in the Office of the Recorder of Deeds for Delaware County. The voluntary groundwater monitoring activity was implemented when Boeing obtained the Act 2 Release of Liability from PADEP in 1998 and is currently ongoing.

5. Cost

Boeing has already expended the capital costs involved in performing the investigations and remedial activities necessary to obtain a Release of Liability pursuant to PADEP's Act 2 program and in implementing the proposed control activities at the Facility. The additional cost required for operation and maintenance is nominal. The estimated cost for five (5) years of inspection of impermeable surfaces and voluntary groundwater monitoring is \$110,000.00 (in 2005 dollars).

6. Community Acceptance

The local community of Ridley Township, Pennsylvania, was given the opportunity to evaluate all of the Facility's proposed remedial plans from the earliest stages of the investigations through conclusion of the cleanup and it has accepted Boeing's corrective action and control activities. EPA will provide public notice and an opportunity for comment to any interested parties before this proposed decision becomes final.

7. State Acceptance/One Cleanup Program

All of Boeing's Remedial Investigation Workplans for the Facility were evaluated and approved by PADEP. PADEP issued letters approving Boeing's Act 2 Final Reports and granting Boeing an Act 2 Release of Liability on October 9, 1998 (Center North Area Site), March 12, 2001 (73.5 Acre Site), July 22, 2003 (Center South Area Site), and February 10, 2005 (Old Landfill and Former Lagoon Area Site). EPA's proposed determination that the Boeing Facility is Corrective Action Complete with Controls is based upon the activities performed by Boeing pursuant to PADEP's Act 2.

Under the terms of the One Cleanup Program Agreement, EPA finds that Boeing's actions have met the necessary criteria for *Protectiveness* found in Section V.C. of the Agreement. Boeing has met (or is meeting) final cleanup goals, has assessed the entire Facility, and has addressed all releases, including all SWMUs and AOCs, identified by EPA.

VIII. **Environmental Indicators**

EPA has established two environmental indicators that are designated to measure the human health and groundwater impacts of RCRA facilities. These two indicators use environmental data and apply a decision matrix to determine that human health impacts are under control and that groundwater contamination is under control. Boeing met these indicators at the Facility in November 2005. EPA believes that these environmental indicators provide additional evidence that the actions proposed and completed by Boeing have been effective and will protect human health and the groundwater at the Facility in the long-term.

IX. Public Participation

EPA is requesting comments from the public on its determination that the Facility is Corrective Action Complete with Controls. On January 17, 2006, EPA placed an announcement in the local newspaper, *The Daily and Sunday Times of Delaware County*, to notify the public of the availability of this Statement of Basis, its supporting Administrative Record, and the public's opportunity to request a public meeting on EPA's proposed corrective action for the Facility. The public comment period will last thirty (30) calendar days from the date that this matter is publicly noticed in a local paper. Comments should be sent to EPA in writing to the address listed below, and all commentors will receive a copy of the final decision and a copy of the response to comments.

A public meeting will be held upon request. Requests for a public meeting should be made to Mr. Hon Lee of the EPA Regional Office at the address listed below or at 215-814-3419.

The Administrative Record contains all information considered by EPA when making this determination. The Administrative Record is available for review during business hours at the two (2) following locations:

U.S. Environmental Protection Agency Region III (3WC22)
1650 Arch Street
Philadelphia, PA 19103
Contact: Hon Lee
Phone: 215-814-3419
Fax: 215-814-3113
[E-mail:lee.hon@epa.gov](mailto:lee.hon@epa.gov)

The Ridley Park Library
Ward & Cresswell Streets
Ridley Park, PA 19078
Phone: 610-583-7207
Contact: Library Director

Following the thirty (30) day public comment period, EPA will prepare a Final Decision and Response to Comments in which it will identify the selected remedy for the Facility. The Response to Comments will address all significant written comments and any significant oral comments generated at a public meeting, if such a meeting is held. The Final Decision and Response to Comments will be made

available to the public. If, on the basis of such comments or other relevant information, significant changes are proposed to be made to the remedy for the Facility as proposed by EPA in this Statement of Basis, EPA will seek additional public comments on any proposed revised remedy.

Date:

James J. Burke, Director

Waste and Chemical Management Division
US EPA, Region III

Attachment 1

Attachment 2

Attachment 3

Attachment 4