STORMWATER SOURCE CONTROL
ROUND 3 SAMPLING REPORT
2008-2009

FOR BOEING PLANT 2

Boeing Plant 2
Seattle/Tukwila, Washington

Prepared for:

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TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF ATTACHMENTS

1.0 INTRODUCTION

This report has been prepared on behalf of The Boeing Company (Boeing) as part of Duwamish Waterway sediment source control activities at the 107-acre Plant 2 facility (Figure 1). Plant 2 is located on East Marginal Way South in Seattle, Washington, with the southern portion extending into Tukwila, Washington. This report addresses sampling completed under the Revised Stormwater Source Control Work Plan (revised work plan) for Boeing Plant 2 (Golder and Floyd|Snider, 2007). The revised work plan was prepared and has been carried out in response to the Environmental Protection Agency's (EPA) May 26, 2006 request for an interim measure (IM), and in accordance with the 1994 Administrative Order on Consent (Order) No. 1092-01-22-3008(h) between Boeing and EPA Region X. The Order is issued pursuant to Section 3008(h) of the Solid Waste Disposal Act, also referred to as the Resource Conservation and Recovery Act (RCRA).

The west side of Plant 2 adjoins a section of the Lower Duwamish Waterway. Duwamish Waterway sediment in front of Plant 2 is being addressed as part of the Order, and is referred to as the Duwamish Sediment Other Area (DSOA). Cleanup of DSOA sediments will be performed under RCRA as an IM in a manner consistent with the corrective measure process under the Order.

As part of the sediment cleanup action, and within the context of a Duwamish-wide initiative, potential sources of contamination must be identified and demonstrated to be controlled. To this end, the objectives of stormwater source control are to 1) investigate and document the extent to which contaminants may be discharged from the Plant 2 storm system to the Duwamish Waterway via either water or suspended solids, and 2) initiate control actions necessary following the identification of any such contaminants and their source(s). The annual source control investigation consists of sampling of both stormwater and suspended solids in the stormwater from selected locations within the Plant 2 stormwater system, comparing analytical data to action levels, and identifying areas and methods for control actions, as necessary.

Boeing submitted the original Stormwater Source Control Work Plan (original work plan) (Golder and Floyd|Snider, 2006) to EPA on October 4, 2006 based on EPA's August 31, 2006 approval with modifications of the draft work plan. The first round (round 1) of source control sampling was conducted between October 18, 2006 and April 19, 2007. The round 1 results were presented in the Stormwater Source Control Round 1 Sampling Report (round 1 sampling report) (Golder, 2007) approved by EPA on October 15, 2007. Following completion of round 1, Boeing submitted the revised work plan, which was approved by EPA on January 15, 2008. The second round (round 2) of source control sampling began on October 2, 2007 and was completed on May 29, 2008. The round 2 results were presented in the Stormwater Source Control Round 2 Sampling Report (round 2 sampling report) (Golder, 2008a) approved by EPA (with modifications) on August 10, 2008.

The third round (round 3) of source control sampling began on November 11, 2008 and was completed on May 7, 2009. This report documents the round 3 sampling effort, presents the analytical results, and identifies response actions where necessary. Section 2 summarizes the overall source control investigation approach. Section 3 presents the field and analytical methodology for round 3 sampling. Section 4 summarizes the round 3 analytical results. Section 5 presents conclusions and identifies source control actions.

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2.0 SUMMARY OF SOURCE CONTROL EVALUATION

The annual stormwater source control investigation was initiated in 2006 in response to elevated concentrations of polychlorinated biphenyls (PCBs) and metals detected in catch basin solids samples during a 2005 storm system survey (Tier 1/Tier 2 survey) (Floyd|Snider, 2005). Source control sampling is now conducted annually during the rainy season (October to May). Rounds 1 and 2 of source control sampling (2006-2007 and 2008-2009, respectively) have been completed and reported to EPA (Golder, 2007 and Golder, 2008a). Round 3 (2008-2009) began on November 11, 2008 and was completed on May 7, 2009.

The Plant 2 stormwater source control evaluation described in the original work plan consisted of sampling and analysis of suspended solids and/or water along 12 of the 24 active stormwater lines. EPA selected the stormwater lines to be sampled in a letter dated May 26, 2006 following discussions and a tour of the Plant 2 stormwater system. For some lines, both a suspended solids sample and a water sample were to be collected. For lines where building roofs are the sole source of drainage, only water samples were to be collected.

Selected stormwater lines that convey primarily roof drainage (D, G, L, M, O, S, V) were selected to undergo one-time water-only sampling. Stormwater lines A, B, I, J and Z had detectable concentrations of PCBs and/or metals within catch basin solids samples collected during the Tier 1/Tier 2 survey (Floyd|Snider, 2005). Locations along these five lines were identified for either contingent one-time (line A) or periodic (lines B, I, J, and Z) sampling for both suspended solids (using a filtration device) and water (passing through the filtration device). Along line J, two sampling locations were selected due to the line's split piping configuration before it discharges to the municipal roadway drainage system along 16th Avenue. During round 1, the line A sampling location was re-located from the outfall (2-449), identified in the original work plan, to an upgradient location (2-371) due to continuous tidal interference. This modification was documented in the revised work plan. The original work plan also identified action levels to which the data would be compared to assess the need for further source control measures.

Based on comparison of round 1 results to action levels, the round 1 sampling report identified sampling locations, media, and associated analyses for subsequent source control sampling, beginning with the 2007-2008 rainy season. During round 1, source control analytes were detected above action levels in samples from only two of the seven locations selected for one-time water-only sampling (lines G and V). As a result, during round 2, water-only samples were collected from only these two locations. Both suspended solids and water sampling were continued at all six of the round 1 sampling locations. As identified in the revised work plan, the planned analyses were also updated based on results from the first sampling round.

The round 2 results affirmed some round 1 exceedances of source control action levels for both PCBs and metals. To address these exceedances, in March 2008, Boeing submitted an IM work plan that identified source control actions to be completed during the summer of 2008 (Golder, 2008b). The IM work plan was submitted in May 2008 (approved by EPA in June) prior to submission of the round 2 data report (Golder, 2008a) to allow implementation of the control actions during the dry summer months. The IM was conducted during the summer and fall of 2008, and is described in the Interim Measure Completion Report - 2008 Stormwater Source Control Catch Basin Sampling and Storm Line Cleaning for Boeing Plant 2 (IM Completion Report) (Golder, 2008c). In general, the 2008 IM consisted of:

- Visually inspecting catch basins and collecting solids samples to assess potential entry points for PCBs and metals
- Cleaning catch basins and structures based on the analytical results and visual observations of accumulated solids
- Cleaning stormwater lines to remove legacy solids that may be ongoing sources of PCBs and metals detected during source control sampling
- Conducting a video survey of the stormwater lines to assess the integrity of the pipes and evaluate the cleaning
- Installing geotextile filter fabric inserts at selected stormwater system entry points to reduce the volume of solids entering the stormwater system

As part of this IM:

- 494 samples were collected from 364 locations
- 27,034 linear feet of stormwater line were cleaned, including 349 storm line segments and 12 channel drains/trench drains
- 417 structures were cleaned, including catch basins, inlets, manholes, pump basins, channel drain collection boxes, and oil/water separators
- 18,435 linear feet of stormwater line were inspected via video survey
- 261 new geotextile filter fabric inserts were installed at grated structures such as catch basins and inlets, and 26 existing fabric inserts were removed, cleaned, and re-installed at the remaining catch basins and inlets

The 2008-2009 round 3 source control investigation data presented in this report is evaluated relative to round 1 and 2 results to gauge the effectiveness of the summer 2008 IM, and determine whether additional mitigation actions are warranted.

3.0 2008-2009 SOURCE CONTROL SAMPLING

The 2008-2009 Plant 2 stormwater source control evaluation consisted of sampling and analysis of suspended solids and/or water along seven of the 24 active stormwater lines. Two lines that convey primarily roof drainage (G and V) were sampled for water only. The remaining five lines (A, B, I, J, and Z) were sampled for both suspended solids and water.

Table 1 lists the sampling locations by stormwater line. For each sampling location, the table provides the media, sampling frequency, and laboratory analyses performed. Figures 2a and 2b present the 2008-2009 source control sampling locations. Samples were collected in accordance with the sampling and analysis plan (SAP) provided as Attachment A of the revised work plan. The following sections describe source control sample collection and, where applicable, deviations from the procedures described in the revised work plan.

3.1 Suspended Solids and Associated Water Samples

The revised work plan identified six locations along five stormwater lines (A, B, I, J, and Z) for sampling of both suspended solids and water (Table 1). Two sampling locations were selected along line J due to the line's split piping configuration before it discharges to the municipal roadway drainage system along 16th Avenue.

A pump and filtration method is used to obtain suspended solids and associated water samples. At each location, an electric sump pump is lowered to the bottom of the vault. The pump is controlled by a float switch calibrated to activate at approximately eight inches of submergence, and to deactivate at a lower water level just above the pump intake. The pump is fastened to a length of PVC pipe, which is connected at ground surface to a 20-inch stainless steel filter housing containing a 5 micron polypropylene felt filter bag. A pressure gauge is mounted on the filter housing. A water sampling port and a flow totalizer are placed downstream of the filter bag. Discharge is routed via garden hose to either the downstream pipe exiting the manhole or to a downstream catch basin. A rain gauge is placed on the ground surface near the sampling apparatus to measure cumulative rainfall over the sampling period.

Pumping and filtration at the six locations was conducted between November 11, 2008 and May 7, 2009 using three identically-constructed sampling devices. A water sample was collected as soon as practicable following setup of each sampler. Water samples for metals analysis were filtered using a 0.45 µm field filter.

At each location, the sampler was deployed for several weeks to several months, depending on weather conditions, the construction of the basin, and other logistical considerations. After filtering several thousand gallons, the filter bag was removed from its housing and inspected for solids accumulation. If the solids material present appeared to be sufficient for the required laboratory analyses, sampling was completed, and the filter bag was packaged for transport the laboratory. Otherwise, the filter bag was returned to the housing for additional filtration.

Table 2 presents the sampling duration, cumulative rainfall, volume of stormwater filtered, and the suspended solids mass recovery at each of the six sampling locations. Field sample collection forms for suspended solids and associated water samples are provided in Attachment A. Locations 2-371 (line A) and 36-131 (line Z) are periodically tidally influenced; the bottom elevation of each is generally below the high tide level, but above the low tide level. For these locations, the pump is connected to a timer programmed to switch on during low tide periods only. Therefore, pumping and filtration at these locations is limited to rain events occurring while the tide elevation is below the vault bottom.

Water and filter bag samples were submitted to Analytical Resources, Inc. (ARI), of Tukwila, Washington, for analysis of metals, dissolved metals, and/or PCBs, as indicated in Table 1. Both metals and dissolved metals analyses comprised arsenic, cadmium, chromium, copper, lead, mercury, silver, and zinc, the eight constituents for which State of Washington Sediment Management Standards (Chapter 173-204 WAC) have been developed. As specified in the revised work plan, the lab was instructed to conduct metals analysis on only those filter bag samples where sufficient solids mass was recovered to remove a representative sample for analysis independent of the filter bag matrix.

During round 3, each filter bag sample submitted contained sufficient solids for metals analysis, with the exception of the line A sample. As identified in the revised work plan, the sample from location 2-371 (line A) requires analysis of metals only (PCBs were detected below the source control action level in the round 1 sample). However, during round 3, the filter bag sample collected from this location between February 27 and March 19, 2009 was inadvertently submitted for both metals and PCB analysis. The laboratory was unable to remove sufficient solid material for metals analysis, but the filter bag was extracted for PCB analysis, and the data is reported in Section 4. (Although not considered a deviation, this circumstance was communicated to EPA by email on April 23, 2009.) A second filter bag sample was collected from this location between March 27 and May 7, 2009 and submitted for analysis of metals only. For the remaining filter bag samples, following removal of the metals sample, the entire filter bag was extracted for PCB analysis.

3.2 Water-Only Samples

As indicated in Tables 1 and 2, water-only samples were collected from one outfall (line G) and one upgradient catch basin (along line V, where the outfall is inaccessible). Water-only samples were collected on January 6, 2009. Rain event information is provided in Table 2. Field sample collection forms for water-only samples are provided in Attachment A.

Outfall G is easily accessible and can be sampled by holding bottles directly in front of the pipe opening. The 2-44 gate valve manhole is sampled from ground surface using a peristaltic pump and dedicated tubing. A field duplicate sample was collected at this location. Both the sample and its duplicate were filtered using a 0.45 µm field filter. Water samples were submitted to ARI for analysis of SVOCs and dissolved metals, as identified in Table 1.

3.3 Decontamination and Field Quality Assurance

The pump and filtration apparatus used to collect the suspended solids and associated water samples was decontaminated between sampling locations. After each sampling event, the system was flushed with approximately 30 gallons of an Alconox-tap water solution, then rinsed with 15 to 20 gallons of tap water followed by 35 gallons of deionized water (supplied by ARI). Following decontamination, an equipment blank sample was collected from the deionized water pumped through the sampling train. Equipment blanks were analyzed for PCBs and dissolved metals. Equipment blank results are provided in Attachment B.

Sampling material associated with the water-only samples was dedicated, single-use equipment and did not require decontamination.

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4.0 2008-2009 SOURCE CONTROL SAMPLING RESULTS

Samples were analyzed by ARI in accordance with the SAP provided as Attachment A of the revised work plan. The following sections describe the analytical methodology and summarize the analytical results. Analytical results are presented in Tables 3 through 5. Laboratory summary data packages are provided in Attachment B. Table B-1 lists the source control samples by stormwater line, media, and laboratory data package. Data validation results are provided in Attachment C.

4.1 Analytical Methodology and Data Conversion

The revised work plan specified that for round 2 and subsequent rounds, metals analysis is to be conducted on only those filter bag samples containing sufficient solids mass to remove a representative sample from the filter bag for analysis. This method eliminates the potential for metals contamination that was identified during round 1 based on detections of zinc in samples of unused filter fabric. The minimum amount of material that can be digested and analyzed for metals is limited by the analytical method to approximately 1 gram. For solids samples analyzed for both metals and PCBs, after the metals sample was removed the filter bag was dried, weighed, and extracted for PCB analysis.

Metals results were reported as a concentration in mg/kg-dry solids. PCB results were reported as total µg per sample. For comparison to source control action levels, the PCB result reported by the laboratory was adjusted to an estimated concentration in terms of analyte mass per dry solids weight. To facilitate this conversion, filter bags were pre-weighed by ARI. Analytical results were converted to µg/kg-dry solids based on the difference between the initial and final dry weight of the filter bag. Filter bag initial and final weights and the data conversion equation are presented in Table 3.

4.2 Analytical Results for Suspended Solids and Associated Water Samples

Table 4 presents analytical results for suspended solids samples from rounds 1 through 3. Table 4 presents the PCB data converted to estimated concentrations in µg/kg-dry solids, as described in Section 4.1. As noted in Section 3.1, during round 3, a line A sample was incorrectly analyzed for PCBs. The estimated total PCB concentration from this location was 244 µg/kg, below both the source control action level and the round 1 result (416 µg/kg). In addition, upon receipt of the line B filter bag sample data, it was noted that the wet and dry weights recorded for the sample indicated an anomalously low water loss percentage upon drying. ARI was not able to reproduce the measurement (the filter bag was consumed during analysis) or provide further documentation; however, after conducting an evaluation of water lost by the other round 3 samples during drying, ARI concluded that the original value reported was indeed an error, and submitted a letter and spreadsheet as documentation (ARI, 2009). The correction made by ARI results in a PCB concentration that is both more conservative (1,137 µg/kg vs. 0.15 µg/kg) and consistent with previous results for this line. ARI's letter and spreadsheet have been appended to the data package (ARI sample delivery group OY07)

provided as part of Attachment B of this report, and the correction has been noted in the data validation report (Attachment C).

PCBs were detected in all six round 3 suspended solids samples in which they were analyzed, with estimated concentrations exceeding the source control action level (1,000 µg/kg-solids) in four of the six samples (lines B, I, and J [18-249 and 18-505A]). Estimated concentrations above the action level ranged from 1,090 µg/kg to 2,705 µg/kg. PCBs were detected below the source control action level in the solids sample from 36-131 (line Z), at an estimated concentration of 947 µg/kg.

During round 2, six metals (cadmium, chromium, copper, lead, mercury, and zinc) were detected above action levels in suspended solids samples; only four metals (cadmium, chromium, copper, and zinc) exceeded action levels in round 3 suspended solids samples. There were no action level exceedances for metals in the line I and line Z round 3 suspended solids samples. The samples from line B and location 18-249 on line J had the most metals exceedances during round 3, both with three metals detected above action levels.

Table 5 presents analytical results from rounds 1 through 3 for detected constituents in water samples from suspended solids and water sampling locations. (Constituents, such as dissolved mercury, that were detected below action levels during round 1 and not detected in rounds 2 and 3 are not included in Table 5.) Dissolved arsenic, copper, and zinc were detected in round 3 water samples. Both dissolved copper and zinc exceeded action levels in the sample from location 18-505A along line J. Dissolved copper exceeded the action level in the water samples from line B and the second line J location (18-249). Dissolved zinc exceeded the action level in the line A water sample. There were no action level exceedances among the round 3 water sample results for lines I and Z.

4.3 Analytical Results for Water-Only Samples

Table 5 presents analytical results for detected constituents in water samples from water-only sampling locations (lines G and V) for rounds 1 through 3. The water sample from outfall G was analyzed for SVOCs only. Bis(2-ethylhexyl)phthalate was detected slightly above its source control action level (2.2 µg/L) at 2.4 µg/L, and phenanthrene, for which no source control action level has been developed, was detected at 0.12 µg/L. The water sample and duplicate from line V were analyzed for dissolved metals only. Dissolved copper was detected above the source control action level (3.1 µg/L) in the primary sample (4 µg/L), but below the action level in the duplicate (3 µg/L). Dissolved zinc was detected above the action level (81 µg/L) in both the primary and duplicate samples at 230 µg/L (both samples). Arsenic was detected below the action level in both samples.

5.0 CONCLUSIONS AND SOURCE CONTROL ACTIONS

In general, round 3 suspended solids data demonstrate an improvement from rounds 1 and 2, but indicate that PCBs and metals remain variably present in Plant 2 stormwater solids at concentrations above their respective action levels. Round 3 dissolved copper and zinc results for source control water samples are generally consistent with the results of the quarterly stormwater quality sampling conducted under the Plant 2 NPDES permit.

Ongoing source control sampling is discussed in Section 5.1. Section 5.1.1 identifies the criteria used annually, beginning with evaluation of the round 2 data, to identify the sampling matrix for the following round. Section 5.1.2 applies these criteria to round 3 results and presents the round 4 (2009-2010) sampling matrix. Round 3 results are evaluated with respect to the 2008 source control IM (Golder, 2008c) in Section 5.2. Section 5.3 presents the schedule for source control actions identified in Section 5.2, as well as for round 4 (2009-2010) source control sampling.

5.1 Ongoing Source Control Sampling

As described in Section 2, the Plant 2 stormwater source control evaluation specified in the original work plan consisted of sampling and analysis of suspended solids and/or water along 12 of the 24 active stormwater lines. Selected stormwater lines (D, G, L, M, O, S, V) were identified for contingent one-time (based on comparison of results to action levels) water-only sampling. Stormwater lines A, B, I, J and Z were identified for either contingent one-time (line A) or periodic (lines B, I, J, and Z) sampling for both suspended solids and water.

Based on rounds 1 results, line A (originally identified for one-time sampling) was designated for continued sampling of both suspended solids and water for metals analysis during round 2 and subsequent rounds. Among the seven locations originally selected for one-time water-only sampling, only two (lines G and V) were reported with source control analytes above action levels during round 1. As a result, during rounds 2 and 3, water-only samples were collected from only these two locations. Also during round 3, the four lines originally identified for periodic sampling of suspended solids and water (B, I, J, and Z) were re-sampled due to action level exceedances during rounds 1 and 2.

The round 3 data is similarly evaluated to define the source control investigation for the following year. Section 5.2.1 identifies the criteria established in the round 2 report to identify sampling to be conducted during the next round. Section 5.2.2 evaluates the round 3 results based on these criteria and identifies the round 4 sampling matrix.

5.1.1 Source Control Sampling Matrix Evaluation Criteria

As identified in the round 2 sampling report (Golder, 2008a), the following criteria are applied annually at each location to identify: 1) whether sampling will be continued during the next round, 2) media to be sampled, and 3) analyses to be performed.

- Location originally designated for one-time sampling of suspended solids and water (line A) – Given action level exceedances for metals, both media will continue to be

sampled for metals until three consecutive rounds are completed without action level exceedances.

- Locations originally designated for periodic sampling of suspended solids and water (lines B, I, J, and Z) – Given action level exceedances for PCBs and metals, sampling will continue for both suspended solids (PCBs and metals) and water (dissolved metals) until three consecutive rounds are completed without action level exceedances.
- Locations originally designated for one-time water only sampling (lines G and V) – Sampling and analysis of the target analyte group (i.e., SVOCs and dissolved metals, respectively) will continue until three consecutive rounds of sampling are completed without action level exceedances.

Sampling beyond durations indicated here for source control purposes will be evaluated for long term source monitoring objectives following completion of the DSOA dredging project.

5.1.2 Summary of 2008-2009 Results and Proposed 2009-2010 Sampling

The fourth round of source control sampling will be conducted during the 2009-2010 rainy season. The source control sampling matrix for 2009-2010 is presented in Table 6. Figures 2a and 2b present the 2008-2009 sampling locations and Figures 3a and 3b present the 2009-2010 sampling locations.

As identified in Section 2, the original work plan prescribed one-time sampling for location 2-449 along line A. However, due to tidal interference, an alternate upgradient location (2-371) was sampled. During round 1, PCBs were detected below the action level in suspended solids from this location (Table 4), and were subsequently eliminated from consideration at line A. Metals, however, were detected above action levels in both the solids and water samples. Therefore, during round 2, both suspended solids and water from this location were sampled for analysis of metals only. A suspended solids sample from this location was inadvertently submitted for PCB analysis during round 3. PCBs were detected below the action level in this sample. Cadmium and zinc concentrations in suspended solids exceeded action levels in a second sample collected for metals analysis. Dissolved zinc was also detected above the action level in the water sample. Sampling of suspended solids and water for metals analysis only will therefore be continued at this location during round 4.

At line B (3-307), originally designated for periodic sampling, total PCBs in the round 1 and 2 suspended solids samples exceeded the source control action level at 2,407 and 1,333 µg/kg, respectively. Total PCBs were again detected above the action level, at 1,137 µg/kg, in the round 3 suspended solids sample; however, the concentration in this sample, collected following completion of the source control IM, was lower than in both of the two previous years. Cadmium, lead, and zinc were detected above action levels in suspended solids during rounds 1 and 2, while cadmium, chromium, and zinc exceeded action levels in suspended solids during round 3. Except for cadmium and chromium, metals concentrations in line B suspended solids decreased between rounds 2 and 3. Dissolved copper and zinc were detected above action levels in round 1 and 2 water samples; only dissolved copper exceeded the action level during

round 3. Both suspended solids (metals and PCBs) and water (dissolved metals) will be re-sampled at 3-307 during round 4.

At line I (4-283), originally designated for periodic sampling, total PCBs in the round 1 and 2 suspended solids samples exceeded the source control action level at 5,429 and 6,177 µg/kg, respectively. Total PCBs were detected above the action level in the round 3 sample collected following completion of the source control IM, but at a significantly lower estimated concentration, 1,447 µg/kg. Metals data were not obtained for suspended solids during round 1 due to insufficient solids retention in the filter bag. During round 2, five metals were detected above action levels in suspended solids. During round 3, following completion of the 2008 source control IM, there were no metals exceedances in line I suspended solids. Metals concentrations in water samples from all three rounds were below action levels. Suspended solids (metals and PCBs) will be re-sampled at 4-283 during round 4; however, based on the criteria in Section 5.2.1, water sampling at this location will be discontinued beginning with round 4.

At line J (18-249), originally designated for periodic sampling, total PCBs in round 1 and 2 suspended solids samples exceeded the source control action level at 6,444 and 2,100 µg/kg, respectively. Total PCBs were also detected above the action level, at 2,705 µg/kg, in the round 3 sample. Metals data were not obtained for suspended solids during round 1 due to insufficient solids retention in the filter bag. During round 2, cadmium, copper, mercury, and zinc were detected above action levels in suspended solids. Cadmium, copper and zinc were detected above action levels in round 3 suspended solids. Dissolved copper and zinc were detected above action levels in the water sample from round 2; only dissolved copper exceeded the action level in the round 3 water sample. Both suspended solids (metals and PCBs) and water (dissolved metals) will be re-sampled at 18-249 during round 4.

Line J catch basin 18-505A was originally identified for periodic sampling. Sufficient suspended solids were not recovered from this location during round 1, but samples were successfully collected during rounds 2 and 3. PCBs were detected below the action level in the round 2 suspended solids sample and above the action level in the round 3 sample, at 658 and 1,090 µg/kg, respectively. Copper and zinc were detected above action levels in both rounds of suspended solids samples; round 3 levels of all metals were slightly lower. Copper and zinc were detected above action levels in all three rounds of water samples from this location. Sampling of both suspended solids (metals and PCBs) and water (dissolved metals) will be continued at 18-505A during round 4.

At line Z (36-131), total PCBs in the round 1 and 2 suspended solids samples exceeded the source control action level at 1,875 and 1,426 µg/kg, respectively. Total PCBs were detected below the action level, at 947 µg/kg, in the round 3 sample collected following completion of the source control IM. Metals data were not obtained for suspended solids during round 1 due to insufficient solids retention in the filter bag. During round 2, chromium was detected above its action level in the suspended solids sample. There were no metals exceedances in line Z suspended solids during round 3. Dissolved copper was detected above the action level in the

water sample from round 1; there were no action level exceedances in water samples from rounds 2 and 3. Both suspended solids (metals and PCBs) and water (dissolved metals) will be re-sampled at 36-131 during round 4.

Outfall G was originally selected for one-time water-only sampling of SVOCs. However, chrysene was detected above the action level in the round 1 sample from outfall G; accordingly, this location was re-sampled for SVOCs during round 2. Chrysene was not detected during rounds 2 and 3; however bis(2-ethylhexyl)phthalate was detected slightly above the action level during round 3. Outfall G will be re-sampled for SVOCs during round 4 based on the criteria identified in Section 5.2.1. Similarly, the 2-44 gate valve along line V was originally selected for one-time water-only sampling. Dissolved copper and zinc were detected above action levels during rounds 1 and 3; dissolved copper only was detected above the source control action level during round 2. This location will be re-sampled for dissolved metals during round 4.

5.2 Additional Source Control Actions

As described in Section 2, to address action level exceedances from round 1 and round 2 results, Boeing completed the 2008 source control IM during the summer and fall of 2008, as described in the IM Completion Report (Golder, 2008c). Source control actions performed under the IM work plan consisted of:

- Catch basin solids sampling from selected locations for analysis of PCBs and metals
- Cleaning of selected catch basins
- Cleaning of selected storm lines via pipe jetting
- Placement of filter fabric catch basin inserts at selected storm system entry points based on catch basin sampling results

In general, the IM removed legacy residual solids material from the stormwater system that may have been a source of PCBs and metals detected during the first two rounds of stormwater source control sampling, and implemented controls to reduce future solids accumulation in the system. During round 3, following completion of the IM, total PCB concentrations were below previous levels at four of the six locations where they were analyzed, and were below the action level for the first time at line Z. Round 3 source control investigation data indicates that, following completion of the IM, action level exceedances remain to be addressed for PCBs at lines B, I, and J; for metals at lines A, B, and J; and for SVOCs and metals at lines G and V, respectively. Of these lines, only G and V were not addressed by the 2008 source control IM.

To address source control exceedances at lines A (metals), B (PCBs and metals), G (SVOCs), I (PCBs), J (PCBs and metals), and V (metals), Boeing will initiate an analysis to identify sources upgradient of each sampling location. The analysis will incorporate catch basin data gathered during the 2008 source control IM and other information about operational uses in each drainage area. A source control action work plan identifying additional data required for this analysis and presenting sample collection procedures will be submitted for this next phase of

source control work. Field work to obtain any additional data will be conducted in conjunction with round 4 sampling if timely approval is received.

In addition to continued source analysis, specific to line B, the 2008 catch basin data (Golder, 2008c) indicated the presence of elevated PCB concentrations in catch basins within the Jet-A fuel tank containment area. In 2006, prior to reactivation of one of the tanks, Boeing removed PCB-containing materials from the concrete containment surfaces in this area (Boeing, 2006). Residual particles of the removed material may be an ongoing source of PCBs and metals detected in the stormwater: although the catch basins within the containment area are fitted with both metal and filter fabric inserts, the area is inaccessible to sweeper trucks and has not been routinely swept as part of Plant 2 stormwater best management practices. Therefore, during the summer/fall of 2009, prior to initiation of the source identification analysis, Boeing will identify a method to thoroughly vacuum and/or sweep the pavement in this area. This work will be documented in the round 4 report, and round 4 (2009-2010) source control results will be used to evaluate its effectiveness.

The drainage areas for lines I and J include three areas in which, pending EPA approval of the draft work plan, Boeing will remove caulk manufactured with PCB concentrations greater than 25 ppm from concrete pavements as part of the Phase 3 Interim Measure Work Plan - Removal of PCB-Containing Caulk in Concrete Pavements (Golder, 2009). Two of the planned caulk removal areas are within the line I drainage, east of Building 2-15 and south of Building 2-10, and one of the removal areas is within the line J drainage, under the South Park Bridge. Caulking material in these areas may be an ongoing source of PCBs to lines I and J. If EPA approval is not obtained in time to complete all caulk removals in 2009, results of line I and J area removals will be assessed as part of round 5 source control sampling. More extensive source control action will be planned in conjunction with King County's replacement of the South Park Bridge, which will affect lines I and J drainages. King County has not yet scheduled its multi-year bridge replacement construction work.

Finally, Boeing is planning a number of construction activities that will impact stormwater at Plant 2, including extensive site redevelopment to take place over the next several years. This work will include redesign of the stormwater system. Boeing will submit a work plan summarizing these activities, including proposed designs and timelines, and identifying which project(s) are expected to address stormwater at each of storm lines A, B, I, J, V, and Z.

5.3 Scheduling

A work plan for the source identification analysis described in Section 5.3 will be submitted perhaps prior to EPA's approval of this report given Boeing's desire to be timely with this next phase of source control work. Sweeping and/or vacuuming within the line B containment area will be carried out prior to commencement of round 4 source control sampling as part of Best Management Practices work. The fourth round of source control sampling as defined in the 2009-2010 sampling matrix (Table 6) will begin in October 2009 and continue until sufficient sample material has been collected at all sampling locations or until the end of the rainy season

(April to May, 2010). Boeing will submit a work plan summarizing the Plant 2 construction activities affecting stormwater, including site redevelopment and stormwater system replacement, by May 27, 2010.

6.0 REFERENCES

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TABLES

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2008-2009 Sampling Matrix

Stormwater Source Control Round 3 Sampling Report
Boeing Plant 2

Stormwater Line	Sampling Location	Suspended Solids Analyses Performed	Water Analyses Performed	Planned Sampling Frequency [1]
A	2-371 [2]	SMS metals [3] PCBs [4]	SMS metals (dissolved) [5]	one time
B	3-307	PCBs SMS metals	SMS metals (dissolved)	PCBs & metals periodically
G	discharge	NA	SVOCs	one time
I	4-283	PCBs SMS metals	SMS metals (dissolved)	PCBs & metals periodically
J	18-249, 18-505	PCBs SMS metals	SMS metals (dissolved)	PCBs & metals periodically
V	2-44 gate valve	NA	SMS metals (dissolved)	one time
Z	36-131	PCBs SMS metals	SMS metals (dissolved)	PCBs & metals periodically

Notes:

1. "One time" denotes locations that were originally designated for contingent one-time sampling in 2006 where, based on round 1 results, sampling was continued during round 2.
2. 2-449, the location immediately upgradient of the outfall was originally selected for sampling. Due to continuous tidal interference, 2-371 was selected as a replacement (Golder and Floyd|Snider, 2007).
3. SMS metals comprise the eight metals (arsenic, cadmium, chromium, copper, lead, mercury, silver, zinc) for which State of Washington Sediment Management Standards (Chapter 173-204 WAC) have been adopted.
4. Although PCBs were not part of the line A sampling matrix specified in the round 2 report, the suspended solids sample from this location was inadvertently submitted for PCB analysis.
5. Water samples for metals analysis are field-filtered using a 0.45 micron filter.

NA - Not analyzed or not applicable

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Rain Event and Stormwater Filtration Information

Stormwater Source Control Round 3 Sampling Report
Boeing Plant 2

Stormwater Line	Sampling Point	Tidal Influence?	Sampling Device	Filtration Start Date	Filtration End Date	Stormwater Volume Filtered (gallons)	Total Solids Mass Captured in Filter (g dry weight)	Water Sampling Date	Cumulative Rainfall during Sampling Period (in)
A [1]	2-371	Yes	1	2/27/2009	3/19/2009	3,114	14	3/5/2009	2.4
				3/27/2009	5/7/2009	14,504	68	NA	5.0 [4]
B	3-307	No	3	2/19/2009	5/7/2009	3,255 [3]	76	3/28/2009	5.0
G	discharge	NA	NA	NA	NA	NA	NA	1/6/2009	NA
I	4-283	No	2	11/11/2008	12/3/2008	13,418	68	11/20/2008	0.54
J	18-249 [2]	No	1	1/13/2009	2/12/2009	1,089	70	2/23/2009	1.7
	18-505A	No	2	12/5/2008	4/17/2009	3,163	70	3/28/2009	7.2
V	2-44 gate valve	Yes	NA	NA	NA	NA	NA	1/6/2009	NA
Z	36-131	Yes	3	11/21/2008	1/7/2009	3,070	69	1/7/2009	8.1

Notes:

1. Line A sample initially submitted March 19; filter bag contained insufficient solids for metals analysis. Location was re-sampled March 27 - May 7.
2. Filter was found clogged at this location on 2/12, prior to water sample collection. First filter bag was submitted to laboratory on 2/12 for analysis of PCBs and metals. Filter bag was replaced with a clean bag on 2/12 through which a water sample was collected on 2/23.
3. Flowmeter found malfunctioning mid-way through sampling period. Actual value is likely greater.
4. Rain gauge found broken mid-way through sampling period. Replaced on 4/17.
5. NA - Not analyzed or not applicable.

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TABLE 3

Filter Bag Information and Data Conversion Equation

Stormwater Source Control Round 3 Sampling Report

Lab SDG:	OR49	OY07 Boeing Plant 2	OY07	OC61	OM42	OW01	OG77
Golder Sample ID:	PL2SC-SS-A-031909	PL2SC-SS-A-050709	PL2SC-SS-B-050709	PL2SC-SS-I-120308	PL2SC-SS-J249-021209	PL2SC-SS-J505-041709	PL2SC-SS-Z-010809
Filter Bag ID:	FB-031	FB-032	FB-030	FB-011	FB-017	FB-013	FB-012
Initial Dry Weight of Sample Bag (g):	97.97	103.92	100.26	100.71	100.4	99.9	100.05
Final Dry Weight (g) [1]:	112.3	172.02	175.9	169.11	170.65	169.62	168.67
Total Solids Mass in Filter (Final Dry Weight - Initial Dry Weight of Sample Bag) (g):	14.33	68.1	75.6	68.4	70.25	69.72	68.62
Volume of water pumped through filter (gal):	3114	14504	3255 [2]	13418	1089	3163	3070

Notes:
1. Dry weight after solids split is removed for metals analysis.
2. Flowmeter appeared to be malfunctioning mid-way through sampling period. Actual value is likely greater.

Equation 1
Conversion Calculation (to µg/kg-solids):
(For data reported in Total µg)

$$\frac{AnalyteMass}{TotalSolidsMass} * 1000 g/kg$$

Analyte Mass: Per-sample result reported by the laboratory (µg)
Total Solids Mass: Total Solids Mass in Filter (Final Dry Weight - Initial Dry Weight of Sample Bag) (g):

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TABLE 4

Analytical Results for Suspended Solids Samples

Stormwater Source Control Round 3 Sampling Report
Boeing Plant 2

				Line A (2-371)				Line B (3-307)			Line I (4-283)		
				Round 1	Round 2	Round 3		Round 1	Round 2	Round 3	Round 1	Round 2	Round 3
Constituent	**Method**	**Source Control Action Level**	**Sample ID:**	**PL2SC-SS-A-041907**	**PL2SC-SS-A-032608**	**PL2SC-SS-A-031909** [4]	**PL2SC-SS-A-050709**	**PL2SC-SS-B-031407**	**PL2SC-SS-B-041108**	**PL2SC-SS-B-050709**	**PL2SC-SS-I-010207**	**PL2SC-SS-I-052908 (Hg only)**	**PL2SC-SS-I-120308**
Metals				**(mg/kg-dry)** [2]	**(mg/kg-dry)** [2]	**(mg/kg-dry)** [2]	**(mg/kg-dry)** [2]	**(mg/kg-dry)** [2]	**(mg/kg-dry)** [2]	**(mg/kg-dry)** [2]		**(mg/kg-dry)** [2]	**(mg/kg-dry)** [2]
Arsenic	7060A	93		11	2.9	NA	29	10	16	10.1	NA	38 J	19
Cadmium	6010B	6.7		**11.6**	4.9	NA	**31**	**10**	**6.8**	**7.5**	NA	**10**	2
Chromium	6010B	270		64.1	41	NA	124	131	238	**388**	NA	**279**	103
Copper	6010B	390		115	48.3	NA	182	196	320	254	NA	**466**	113
Lead	7421	530		93	23	NA	175	**540**	**610**	512	NA	**790 J**	180
Mercury	7471A	0.59		0.12	0.07 U	NA	0.4	0.3 U	0.2	0.3	NA	0.3	0.3 U
Silver	6010B	6.1		0.7	0.4 U	NA	2 U	2	3	2	NA	2 U	2 U
Zinc	6010B	960		**1280**	724	NA	**2500**	**2180**	**2040**	**1810**	NA	**3020**	676
PCBs				**Estimated Concentration (µg/kg-solids)** [3]	**Estimated Concentration (µg/kg-solids)** [3]	**Estimated Concentration (µg/kg-solids)** [3,4]	**Estimated Concentration (µg/kg-solids)** [3]	**Estimated Concentration (µg/kg-solids)** [3]	**Estimated Concentration (µg/kg-solids)** [3]	**Estimated Concentration (µg/kg-solids)** [3]	**Estimated Concentration (µg/kg-solids)** [3]	**Estimated Concentration (µg/kg-solids)** [3]	**Estimated Concentration (µg/kg-solids)** [3]
Aroclor 1016	8082			89 U	NA	70 U	NA	1294 U	123 U	331 U	554 U	1765 U	731 U
Aroclor 1242	8082			89 U	NA	70 U	NA	1294 U	123 U	331 U	554 U	1765 U	731 U
Aroclor 1248	8082			260	NA	70 U	NA	1294 U	123 U	331 U	554 U	1765 U	731 U
Aroclor 1254	8082			156	NA	126	NA	1294 U	370	370	1551	3353	731 U
Aroclor 1260	8082			89 U	NA	119	NA	2407	962	767	3878	2824	1447
Aroclor 1221	8082			89 U	NA	70 U	NA	1294 U	123 U	331 U	554 U	1765 U	731 U
Aroclor 1232	8082			89 U	NA	70 U	NA	1294 U	123 U	331 U	554 U	1765 U	731 U
Total PCB		1000		416	NA	244	NA	**2407**	**1333**	**1137**	**5429**	**6177**	**1447**

Notes:
1. NA - Not analyzed or not applicable.
2. Metals data reported in mg/kg-dry solids.
3. PCB laboratory data was reported in total mass (µg) per analysis. The estimated concentration in µg/kg-solids was calculated using Equation 1, Table 3.
4. This sample was incorrectly submitted for PCB analysis, which was eliminated from the sampling matrix on the basis of round 1 results for line A (Golder, 2007).
5. U - The target analyte was not detected at the reported concentration.
6. J - Estimated concentration.

TABLE 4

Analytical Results for Suspended Solids Samples

Stormwater Source Control Round 3 Sampling Report
Boeing Plant 2

				Line J (18-249)			Line J (18-505A)			Line Z (36-131)		
				Round 1	Round 2	Round 3	Round 1	Round 2	Round 3	Round 1	Round 2	Round 3
Constituent	**Method**	**Source Control Action Level**	**Sample ID:**	**PL2SC-SS-J249-111506**	**PL2SC-SS-J249-111207**	**PL2SC-SS-J249-021209**		**PL2SC-SS-J505-021508**	**PL2SC-SS-J505-041709**	**PL2SC-SS-Z-021607**	**PL2SC-SS-Z-011408**	**PL2SC-SS-Z-010809**
Metals					**(mg/kg-dry) [2]**	**(mg/kg-dry) [2]**		**(mg/kg-dry) [2]**	**(mg/kg-dry) [2]**		**(mg/kg-dry) [2]**	**(mg/kg-dry) [2]**
Arsenic	7060A	93		NA	13 J	26	NA	12.2	7.7	NA	18	35
Cadmium	6010B	6.7		NA	**9**	**7**	NA	4.5	3.6	NA	2	3.4
Chromium	6010B	270		NA	170	176	NA	256	214	NA	**296**	164
Copper	6010B	390		NA	**880**	**2,330**	NA	**723**	**575**	NA	210	137
Lead	7421	530		NA	380	390	NA	410	208	NA	124	251
Mercury	7471A	0.59		NA	**0.6**	0.5	NA	0.5	0.4	NA	0.3	0.3
Silver	6010B	6.1		NA	2 U	4	NA	1	1 U	NA	2 U	1 U
Zinc	6010B	960		NA	**3790**	**5,870**	NA	**2230**	**1990**	NA	837	836
PCBs				**Estimated Concentration (µg/kg-solids) [3]**	**Estimated Concentration (µg/kg-solids) [3]**	**Estimated Concentration (µg/kg-solids) [3]**		**Estimated Concentration (µg/kg-solids) [3]**	**Estimated Concentration (µg/kg-solids) [3]**	**Estimated Concentration (µg/kg-solids) [3]**	**Estimated Concentration (µg/kg-solids) [3]**	**Estimated Concentration (µg/kg-solids) [3]**
Aroclor 1016	8082			955 U	510 U	1423 U	NA	97 U	359 U	375 U	119 U	146 U
Aroclor 1242	8082			955 U	510 U	1423 U	NA	97 U	359 U	375 U	119 U	146 U
Aroclor 1248	8082			955 U	510 U	1423 U	NA	97 U	359 U	375 U	238 U	175
Aroclor 1254	8082			1551	550	1423 U	NA	271	416	750	618	335
Aroclor 1260	8082			4893	1549	2705	NA	387	674	1125	808	437
Aroclor 1221	8082			955 U	510 U	1423 U	NA	97 U	359 U	375 U	119 U	146 U
Aroclor 1232	8082			955 U	510 U	1423 U	NA	97 U	359 U	375 U	119 U	146 U
Total PCB		1000		**6444**	**2100**	**2705**	NA	**658**	**1090**	**1875**	**1426**	947

Notes:
1. NA - Not analyzed or not applicable.
2. Metals data reported in mg/kg-dry solids.
3. PCB laboratory data was reported in total mass (µg) per analysis. The estimated concentration in µg/kg-solids was calculated using Equation 1, Table 3.
4. This sample was incorrectly submitted for PCB analysis, which was eliminated from the sampling matrix on the basis of round 1 results for line A (Golder, 2007).
5. U - The target analyte was not detected at the reported concentration.
6. J - Estimated concentration.

TABLE 5

Analytical Results for Detected Constituents in Water Samples

Stormwater Source Control Round 3 Sampling Report
Boeing Plant 2

				Line A (2-371)			Line B (3-307)			Line G (Outfall)			Line I (4-283)		
				Round 1	Round 2	Round 3	Round 1	Round 2	Round 3	Round 1	Round 2	Round 3	Round 1	Round 2	Round 3
Constituent	Method	Source Control Action Level	Sample Date:	4/9/2007	3/3/2008	3/5/2009	3/7/2007	3/10/2008	3/28/2009	10/18/2006	10/2/2007	1/6/2009	1/2/2007	11/28/2007	11/20/2008
SVOCs (µg/L)															
bis(2-ethylhexyl)phthalate	8270D	2.2		1.0 U	NA	NA	NA	NA	NA	2.2 U	1.2 J	**2.4**	2.3 U	NA	NA
Chrysene	8270DSIM	0.1		0.1 U	NA	NA	NA	NA	NA	**0.13**	0.1 U	0.1 U	0.1 U	NA	NA
Phenanthrene	8270DSIM			0.1 U	NA	NA	NA	NA	NA	0.1 U	0.1 U	0.12	0.1 U	NA	NA
Dissolved Metals (µg/L)															
Arsenic	7060A	36		2	2	1 U	1 U	1 U	1 U	NA	NA	NA	1 U	1 U	1 U
Copper	6010B	3.1		2 U	2	2	**4**	**7**	**4**	NA	NA	NA	2 U	3 U	2 U
Zinc	6010B	81		**110**	**400**	**290**	**178**	**136**	50	NA	NA	NA	24	32	60 J+

				Line J (18-249)			Line J (18-505A)			Line V (2-44 Gate Valve)						Line Z (36-131)		
				Round 1	Round 2	Round 3	Round 1	Round 2	Round 3	Round 1		Round 2		Round 3		Round 1	Round 2	Round 3
Constituent	Method	Source Control Action Level	Sample Date:	11/15/2006	11/12/2007	2/23/2009	2/28/2007	2/5/2008	3/28/2009	11/3/2006	Duplicate 11/3/2006	10/18/2007	Duplicate 10/18/2007	1/6/2009	Duplicate 1/6/2009	2/14/2007	12/18/2008	1/7/2009
SVOCs (µg/L)																		
bis(2-ethylhexyl)phthalate	8270D	2.2		1.5	NA	NA	1.0 U	NA	NA	1 U	1.1 U	NA	NA	NA	NA	1.0 U	NA	NA
Chrysene	8270DSIM	0.1		0.1 UJ	NA	NA	0.1 U	NA	NA	0.1 U	0.1 U	NA	NA	NA	NA	0.1 U	NA	NA
Phenanthrene	8270DSIM			0.1 UJ	NA	NA	0.1 U	NA	NA	0.1 U	0.1 U	NA	NA	NA	NA	0.1 U	NA	NA
Dissolved Metals (µg/L)																		
Arsenic	7060A	36		1 U	1 U	1 U	1 U	1 U	1 U	1	2	1 U	1	2	1	1	2	2
Copper	6010B	3.1		6 U	**14**	**8 J+**	**10**	**4**	**10 J+**	**18**	**12**	**10**	**10**	**4**	3	**5**	2 U	2 U
Zinc	6010B	81		81	**138**	60	**98**	**122**	**90**	**74**	**108**	27	22	**230**	**230**	45	23	32

Notes:
1. Metals results were field filtered (0.45 µm) and represent dissolved concentrations.
2. NA - Not analyzed
3. U - Indicates that the target analyte was not detected at the reported concentration.
4. B - Analyte detected in an associated method blank at a concentration greater than one-half of laboratory's reporting limit or 5% of the analyte concentration in the sample.
5. J - Estimated concentration.
6. J+ - Elevated (estimated) result due to equipment blank contamination.

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2009-2010 Sampling Matrix

Stormwater Source Control Round 3 Sampling Report
Boeing Plant 2

Stormwater Line	Sampling Point	Suspended Solids	Water
A	2-371	SMS metals [1]	SMS metals (dissolved) [2]
B	3-307	PCBs SMS metals [1]	SMS metals (dissolved)
G	discharge	NS	SVOCs
I	4-283	PCBs SMS metals [1]	NS
J	18-249	PCBs SMS metals [1]	SMS metals (dissolved)
	18-505A	PCBs SMS metals [1]	SMS metals (dissolved)
V	2-44 gate valve	NS	SMS metals (dissolved)
Z	36-131	PCBs SMS metals [1]	SMS metals (dissolved)

Notes:
1. Metals analysis for suspended solids samples will be contingent upon adequate solids mass recovery.
2. Water samples for metals analysis are field-filtered using a 0.45 micron filter.
3. SMS -State of Washington Sediment Management Standards (Chapter 173-204 WAC)
4. NS -Not sampled

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FIGURES

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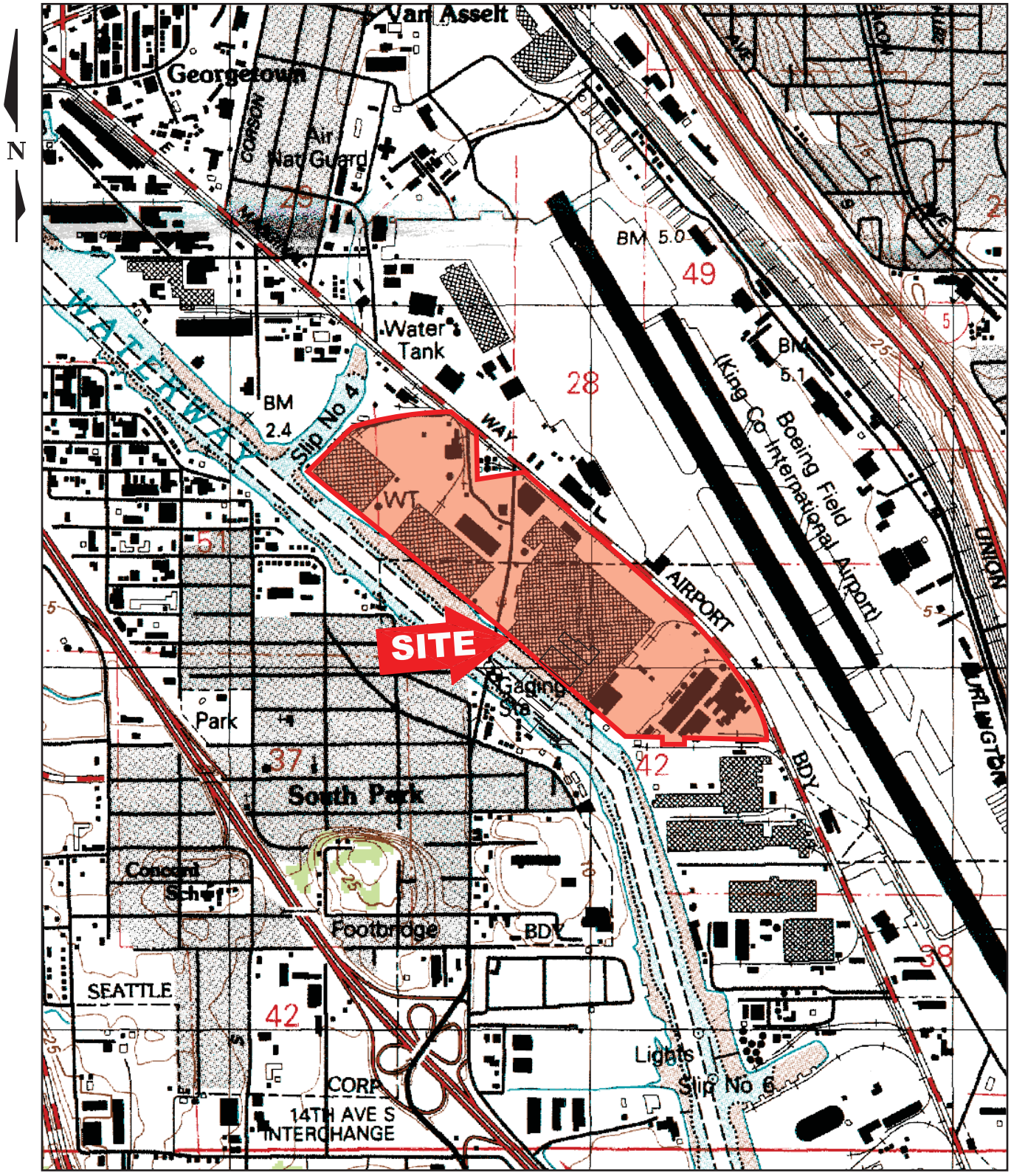

Golder Associates			
SHEET 1 of 1	*DRAWN BY* JDD	*REVIEWED BY* AMP	*DATE* 06/02/09

Stormwater Source Control Round 3 Report
Boeing Plant 2
Seattle/Tukwila, Washington

Figure 1
Vicinity Map

0131646001600fig01_R3.ai

OUTFALL 'L'
OUTFALL 'K'
PUBLIC OUTFALL 'J'
OUTFALL 'I'
OUTFALL 'H'
OUTFALL 'G'
OUTFALL 'F'
OUTFALL 'E'
OUTFALL 'D'
OUTFALL 'C'
OUTFALL 'B'
OUTFALL 'A'
DISCHARGE
2-10
3-307
2-371
4-283
18-249
2-15
2-123
2-122
SLIP No.4
N
16TH AVE S.
T8-505A
CITY OF TUKWILA (NW 33-24-4)
CITY OF SEATTLE (GW 28-24-4)
AIR GAS
14TH AVE S.
1ST. AUSTIN ST.
12TH AVE S.
S. WEBSTER ST.
PROPERTY LINE
EAST MARGINAL WAY SOUTH

LEGEND
3-307 SUSPENDED SOLIDS AND WATER
DISCHARGE WATER ONLY

0 160 320
Scale in Feet

FIGURE 2A
ROUND 3 SAMPLING LOCATIONS (NORTH)
STORMWATER SOURCE CONTROL ROUND 3 REPORT
BOEING PLANT 2

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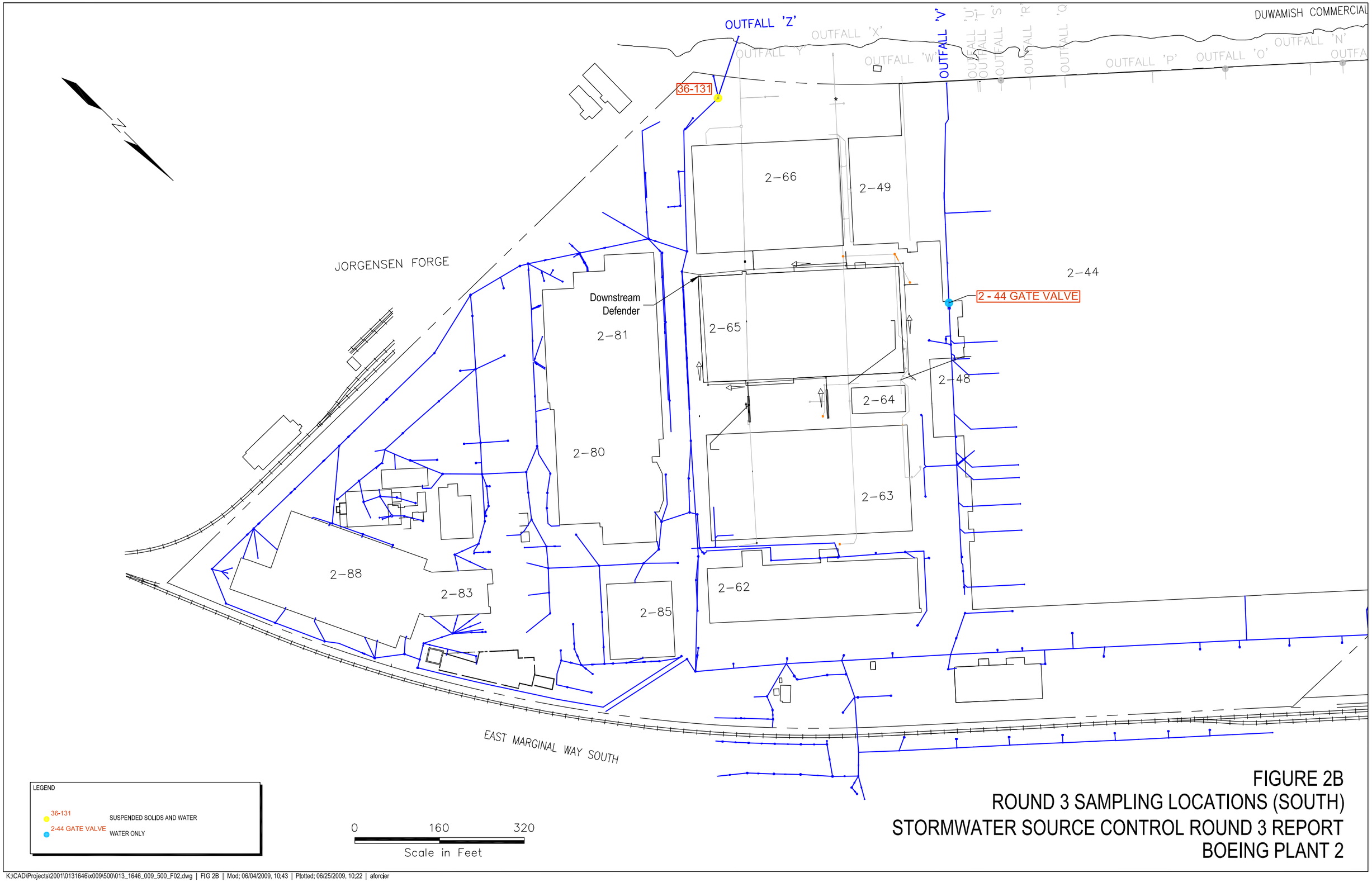

FIGURE 2B
ROUND 3 SAMPLING LOCATIONS (SOUTH)
STORMWATER SOURCE CONTROL ROUND 3 REPORT
BOEING PLANT 2

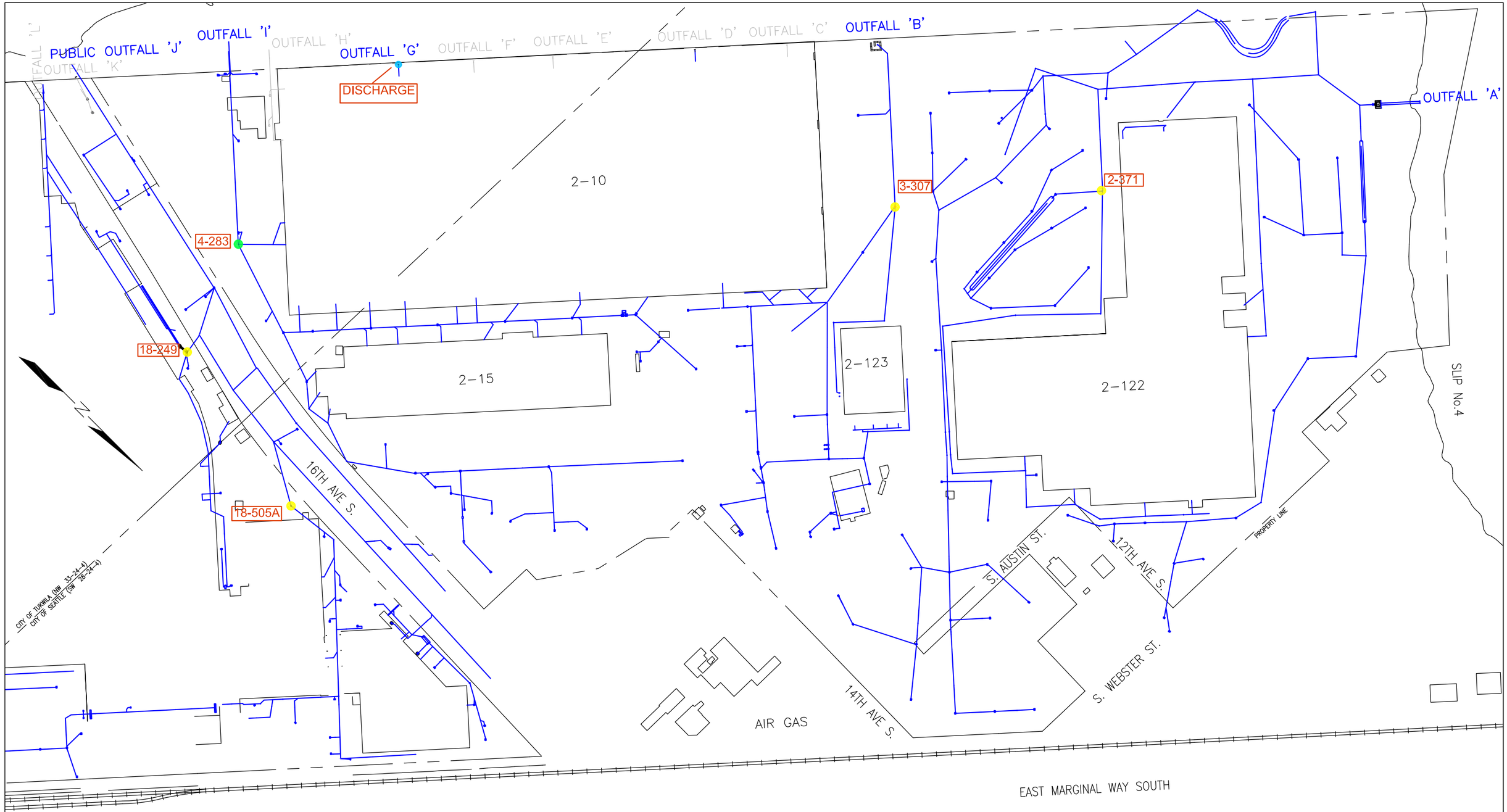

FIGURE 3A
ROUND 4 SAMPLING LOCATIONS (NORTH)
STORMWATER SOURCE CONTROL ROUND 3 REPORT
BOEING PLANT 2

013_1646_009_500_F03.dwg | Layout: FIG 3A | Modified: 06/04/2009, 09:19 | Plotted: 06/04/2009, 10:38

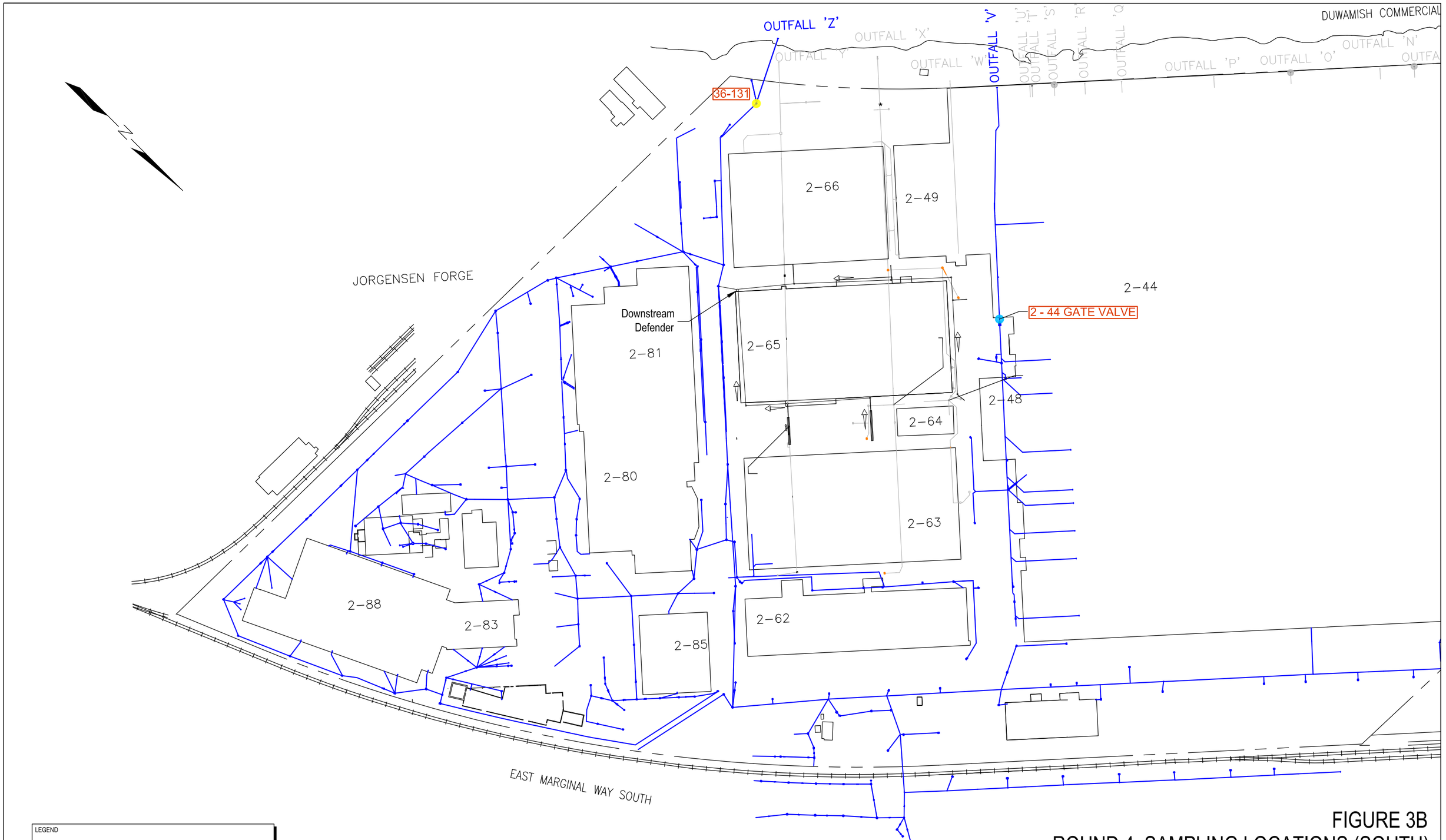

FIGURE 3B
ROUND 4 SAMPLING LOCATIONS (SOUTH)
STORMWATER SOURCE CONTROL ROUND 3 REPORT
BOEING PLANT 2

K:\CAD\Projects\2001\0131646\x009\500\013_1646_009_500_F03.dwg | FIG 3B | Mod: 06/04/2009, 10:43 | Plotted: 06/09/2009, 08:24 | aforder

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ATTACHMENT A

SOURCE CONTROL SAMPLE COLLECTION FORMS

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Source Control Sample Collection Form

Boeing Plant 2, Seattle/Tukwila, Washington

Stormwater Line:	A	Station:	2-371
Sample Type:	☒ Suspended Solids/Whole Water	Suspended Solids Sample ID:	PL2SC-SS-A-031909 PL2SC-SS-A-050709
	☐ Whole Water Only	Water Sample ID:	PL2SC-W-A-030509
		Field Team (Initials):	LS, JL
Initial Flowmeter Reading:	46433.2 (2/27) (3/19)	Sampling Start Date:	2/27/09
Final Flowmeter Reading:	49547.2 Total Rainfall: 61mm=2.4in 125.6mm=5"*	Sampling End Date:	5/7/09
Weather/Field Conditions:	2/27: sunny, warm 3/19: rainy, ~40°C 3/27: cloudy, ~40°C 3/27 - flow = 49547.2 gal 5/7 - flow = 64050.9 gal 5/7: clouds + sun ~50°F		

Water Sampling Information

Water Sampling Date:	3/5/09
Water Sampling Time:	1030
Gallons Pumped:	3077.2

Sample Collection Method (Check One)

- Submersible Pump ☒
- Peristaltic Pump ☐
- Pole-Mounted Bottle Dipper (water only) ☐
- Hand (water only) ☐
- Other _____ ☐

Date	Time	Turbidity (NTU)	pH	Temp (°C)	Cond (µS/cm OR mS/cm)	Appearance
3/5/09	1030	1.37	8.16	9.0	73.2	clear

Water Samples

Sample Collection Time:	10:30
Number of Bottles:	2

Bottle Type/Preservative	Number Filled	Analysis	Field Filtered (Y/N)	Comments
1L HDPE / HNO3	1	SMS Metals	Y	
1L HDPE / HNO3	1	LL Hg	Y	

Suspended Solids Samples

	FB-031	FB-032
Filtration Start Date:	2/27/09	3/27/09
Filtration End Date:	3/19/09	5/7/09
Total Volume Filtered:	3114 gal	14503.7 gal

Filter Bags Collected: 2

Filter Bag #: FB-031 FB-032

Initial Dry Weight: 97.97g 103.92g

Sampler #1

2/27 - Set up. Tidally influenced. Timer set for pump to engage when tide level < 8.4 ft

3/19 - Filter bag appears clogged. Collected PL2SC-SS-A-031909

3/27 - Re-set up sampler #1 to collect filter bag sample for metals only (3/19 sample did not contain enough volume for metals)
FB-032: Initial Flow = 49547.2 gal

5/7 - Collected PL2SC-SS-A-050709

* Rain gauge found broken midway through sampling period - replaced on 4/17. Readings from two rain gauges were 61.2mm and 64.4mm. Reading #1 is probably biased low, as rain gauge was broken, and possibly knocked over.

Source Control Sample Collection Form

Boeing Plant 2, Seattle/Tukwila, Washington

Stormwater Line:	B	Station:	3-307
Sample Type:	☒ Suspended Solids/Whole Water	Suspended Solids Sample ID:	PL2SC-SS-B-050709
	☐ Whole Water Only	Water Sample ID:	PL2SC-W-B-032809
		Field Team (Initials):	LS/JL/DG
Initial Flowmeter Reading:	3167.9 gal	Sampling Start Date:	2/19/09
Final Flowmeter Reading:	6423.1 gal Total Rainfall: 127.2mm = 5 in	Sampling End Date:	5/7/09
Weather/Field Conditions:	2/19/09 - cold, breezy, partly cloudy 3/28/09 - rainy, mild 5/7/09 - clouds + sun, ~50°F		

Water Sampling Information

Water Sampling Date:	3/28/09
Water Sampling Time:	11:15
Gallons Pumped:	109.7 *

Sample Collection Method (Check One)

- ☒ Submersible Pump
- ☐ Peristaltic Pump
- ☐ Pole-Mounted Bottle Dipper (water only)
- ☐ Hand (water only)
- ☐ Other _____

Date	Time	Turbidity (NTU)	pH	Temp (°C)	Cond (µS/cm OR mS/cm)	Appearance
3/28/09	1115	4.33	7.92	9.5	220	clear

Water Samples

Sample Collection Time:	1115
Number of Bottles :	2

Bottle Type/Preservative	Number Filled	Analysis	Field Filtered (Y/N)	Comments
1L HDPE / HNO3	1	SMS metals	Y	
1L HDPE / HNO3	1	LL Hg	Y	

Suspended Solids Samples

Filtration Start Date:	2/19/09 (is)	# Filter Bags Collected:	1
Filtration End Date:	5/7/09	Filter Bag #:	FB-030
Total Volume Filtered:	3255.2 gal **	Initial Dry Weight:	100.26g

Sampler #3

* 3/28 Flowmeter appears broken; flow moving through, but meter not moving

5/7/09 - collected PL2SC-SS-B-050709. Filter bag full and clogged.

** Approximate value - flowmeter appeared to be malfunctioning mid-way through sampling period. Actual value is likely greater.

Source Control Sample Collection Form

Boeing Plant 2, Seattle/Tukwila, Washington

Stormwater Line:	G	Station:	Outfall G
Sample Type:	☐ Suspended Solids/Whole Water	Suspended Solids Sample ID:	N/A
	☒ Whole Water Only	Water Sample ID:	PL25C-W-G-010609
		Field Team (Initials):	CS/JL
Initial Flowmeter Reading:	N/A	Sampling Start Date:	1/6/09
Final Flowmeter Reading:	N/A	Total Rainfall:	Sampling End Date: N/A
Weather/Field Conditions:	drizzly, windy		

Water Sampling Information

Water Sampling Date:	1/6/09
Water Sampling Time:	
Gallons Pumped:	N/A

Sample Collection Method (Check One)

- Submersible Pump ☐
- Peristaltic Pump ☐
- Pole-Mounted Bottle Dipper (water only) ☐
- Hand (water only) ☒
- Other _____ ☐

Date	Time	Turbidity (NTU)	pH *	Temp (°C)	Cond (µS/cm OR mS/cm)	Appearance
1/6/2009	1455	1.63	9.36	9.4	31.3	clear

Water Samples

Sample Collection Time:	1500
Number of Bottles :	4

Bottle Type/Preservative	Number Filled	Analysis	Field Filtered (Y/N)	Comments
500 mL amber/None	2	SVOCS	N	
500mL amber/None	2	SVOCs SIM	N	

Suspended Solids Samples

Filtration Start Date:	N/A	# Filter Bags Collected:	N/A
Filtration End Date:	/	Filter Bag #:	/
Total Volume Filtered:	/	Initial Dry Weight:	

Extender pipe has been added to outfall since round 2. Outfall pipe now extends all the way to the catwalk (~1 ft from edge).

Slow trickle from outfall pipe.

* pH meter appears broken - flashing "9.23". Could not calibrate. Collected extra (unpreserved) volume for lab pH.

Source Control Sample Collection Form

Boeing Plant 2, Seattle/Tukwila, Washington

Stormwater Line:	I	Station:	4-283
Sample Type:	☒ Suspended Solids/Whole Water	Suspended Solids Sample ID:	P2SC-SS-I-120308
	☐ Whole Water Only	Water Sample ID:	P2SC-W-I-112008
		Field Team (Initials):	LS/DG
Initial Flowmeter Reading:	31238.1 gal	Sampling Start Date:	11/11/08
Final Flowmeter Reading:	44655.9 Total Rainfall: 13.6 mm = 0.54 in	Sampling End Date:	12/3/08
Weather/Field Conditions:	11/11/08 - overcast, breezy, cool 11/20/08 - rainy 12/3/08 - sunny		

Water Sampling Information

Water Sampling Date:	11/20/08
Water Sampling Time:	1055
Gallons Pumped:	9352

Sample Collection Method (Check One)

Submersible Pump	☒
Peristaltic Pump	☐
Pole-Mounted Bottle Dipper (water only)	☐
Hand (water only)	☐
Other _____	☐

Date	Time	Turbidity (NTU)	pH	Temp (°C)	Cond (µS/cm OR mS/cm)	Appearance
11/20/08	1050	5.72	9.54	10.1	70.1	CLEAR

Water Samples

Sample Collection Time:	1055
Number of Bottles :	2

Bottle Type/Preservative	Number Filled	Analysis	Field Filtered (Y/N)	Comments
1L Poly / HNO3	1	SMS Metals	Y	
500mL Poly / HNO3	1	LL Hg	Y	

Suspended Solids Samples

Filtration Start Date:	11/11/08	# Filter Bags Collected:	1
Filtration End Date:	12/3/08	Filter Bag #:	FB-011
Total Volume Filtered:	13417.8 gal	Initial Dry Weight:	100.71

Sampler #2

Source Control Sample Collection Form

Boeing Plant 2, Seattle/Tukwila, Washington

Stormwater Line:	J	Station:	18-249
Sample Type:	☐ Suspended Solids/Whole Water	Suspended Solids Sample ID:	PL25C-SS-J249-022309
	☐ Whole Water Only	Water Sample ID:	PL25C-W-J249-022309
		Field Team (Initials):	LS/DC
Initial Flowmeter Reading:	44655.8 gal (2/12)	Sampling Start Date:	1/13/09
* Final Flowmeter Reading:	45744.6	Total Rainfall: 2/12: 19.6mm / 0.77in; 2/27: 43.6mm / 1.72in	Sampling End Date: 2/27/09
Weather/Field Conditions:	1/13 - overcast, mild 2/12 - sunny, cold 2/23 - rainy, mild	* gallons 2/23 - 46432.2 2/27 - 46433.1	

Water Sampling Information

Water Sampling Date:	2/23/09
Water Sampling Time:	1630
Gallons Pumped:	1088.8 (FB-017) 687.6 (FB-029)

Sample Collection Method (Check One)

Submersible Pump	☒
Peristaltic Pump	☐
Pole-Mounted Bottle Dipper (water only)	☐
Hand (water only)	☐
Other _____	☐

Date	Time	Turbidity (NTU)	pH	Temp (°C)	Cond (µS/cm OR mS/cm)	Appearance
2/23/09	1615	7.49	7.75	11.4	146.4	clear

Water Samples

Sample Collection Time:	1030
Number of Bottles :	2

Bottle Type/Preservative	Number Filled	Analysis	Field Filtered (Y/N)	Comments
Poly 1 L HNO3	1	SMS metals	Y	
Poly 1L HNO3	1	1L Hg	Y	

Suspended Solids Samples

Filtration Start Date:	1/13/09	# Filter Bags Collected:	1
Filtration End Date:	2/12/09 *	Filter Bag #:	FB-017
Total Volume Filtered:	1088.8	Initial Dry Weight:	100.4 g

Sampler #1

2/10 - Pump running, but no flow emerging from discharge hose or sampling port. Pressure = 10psi. Filter likely clogged.

* 2/12 - Pump not running - water level below intake. Inspected filter bag - appears clogged.
Collected PL25C-SS-J249-021209
Replaced filter bag with FB-029 (Have not yet collected water sample). Will return and sample water through second filter bag.

2/23 - Collected PL25C-W-J249-022309

2/27 - Broke down sampler. Delivered second filter bag to lab for hold.

Source Control Sample Collection Form

Boeing Plant 2, Seattle/Tukwila, Washington

Stormwater Line:	J	Station:	18-505A
Sample Type:	☒ Suspended Solids/Whole Water	Suspended Solids Sample ID:	PL2SC-SS-J505-041709
	☐ Whole Water Only	Water Sample ID:	PL2SC-W-J505-032809
		Field Team (Initials):	LS, DG, JL
Initial Flowmeter Reading:	23963.7 gal	Sampling Start Date:	12/5/08
Final Flowmeter Reading:	27126.2 gal Total Rainfall: 183mm = 7.2in	Sampling End Date:	4/17/09
Weather/Field Conditions:	12/5 - clear, cold 3/28 - rainy, mild 4/17 - ptly cloudy, windy		

Water Sampling Information

Water Sampling Date:	3/28/09
Water Sampling Time:	1145
Gallons Pumped:	1626

Sample Collection Method (Check One)

Submersible Pump	☒
Peristaltic Pump	☐
Pole-Mounted Bottle Dipper (water only)	☐
Hand (water only)	☐
Other _____	☐

Date	Time	Turbidity (NTU)	pH	Temp (°C)	Cond (µS/cm) OR mS/cm)	Appearance
3/28/09	1140	5.04	8.98	8.8	27.7	clear

Water Samples

Sample Collection Time:	1145
Number of Bottles :	2

Bottle Type/Preservative	Number Filled	Analysis	Field Filtered (Y/N)	Comments
1L Poly / HNO3	1	SMS Metals	Y	
1L Poly / HNO3	1	LL Hg	Y	

Suspended Solids Samples

Filtration Start Date:	12/5/08	# Filter Bags Collected:	1
Filtration End Date:	4/17/09	Filter Bag #:	FB-013
Total Volume Filtered:	3162.5 gal	Initial Dry Weight:	99.9g

Sampler #2

Location is wide, flat, flow through basin. Blocked outflow pipe with wooden board + sandbags to allow water level to rise sufficiently to trigger pump.

Source Control Sample Collection Form

Boeing Plant 2, Seattle/Tukwila, Washington

Stormwater Line:	V	Station:	2-44 Gate Valve
Sample Type:	☐ Suspended Solids/Whole Water	Suspended Solids Sample ID:	N/A
	☒ Whole Water Only	Water Sample ID:	P12SC-W-V-010609
		Field Team (Initials):	LS/JL
Initial Flowmeter Reading:	N/A	Sampling Start Date:	1/6/09
Final Flowmeter Reading:	N/A Total Rainfall:	Sampling End Date:	
Weather/Field Conditions:	~45°F, windy, rainy		

Water Sampling Information

Water Sampling Date:	1/6/2009
Water Sampling Time:	1525
Gallons Pumped:	N/A

Sample Collection Method (Check One)

- Submersible Pump ☐
- Peristaltic Pump ☒
- Pole-Mounted Bottle Dipper (water only) ☐
- Hand (water only) ☐
- Other _____ ☐

Date	Time	Turbidity (NTU)	pH*	Temp (°C)	Cond (µS/cm OR mS/cm)	Appearance
1/6/2009	1537	4.46	7.83	8.5	113.4	clear

Water Samples

Sample Collection Time:	1525
Number of Bottles:	5 LS

Bottle Type/Preservative	Number Filled	Analysis	Field Filtered (Y/N)	Comments
1L Poly / HNO3	2	Metals (5 mls)	Y	clear
500mL poly HNO3	2	LL Hg	Y	
500mL Volume	1	pH	N	

Suspended Solids Samples

Filtration Start Date:	N/A	# Filter Bags Collected:	N/A
Filtration End Date:	/	Filter Bag #:	/
Total Volume Filtered:		Initial Dry Weight:	

Collected duplicate P12SC-W-DUP-010609

*pH meter not working. Collected extra unpreserved volume for lab pH.

Source Control Sample Collection Form

Boeing Plant 2, Seattle/Tukwila, Washington

Stormwater Line:	Z	Station:	36-131
Sample Type:	☒ Suspended Solids/Whole Water	Suspended Solids Sample ID:	P12SC-SS-Z-010809
	☐ Whole Water Only	Water Sample ID:	P12SC-W-Z-010709
		Field Team (Initials):	ZS/DG
Initial Flowmeter Reading:	97.1 gal	Sampling Start Date:	11/21/08
Final Flowmeter Reading:	3167.5	Total Rainfall: 205.8 mm = 8.1 in	Sampling End Date: 1/7/09
Weather/Field Conditions:	11/21/08 - clear, ~50°F 1/7/09 - rainy, windy, ~50°F		

Water Sampling Information

Water Sampling Date:	1/7/09
Water Sampling Time:	1540
Gallons Pumped:	3070.4

Sample Collection Method (Check One)

Submersible Pump	☒
Peristaltic Pump	☐
Pole-Mounted Bottle Dipper (water only)	☐
Hand (water only)	☐
Other _____	☐

Date	Time	Turbidity (NTU)	pH*	Temp (°C)	Cond (µS/cm OR mS/cm)	Appearance
1/7/09	1533	5.23	8.70	10.6	84.5	clear

Water Samples

Sample Collection Time:	15:40
Number of Bottles:	3

Bottle Type/Preservative	Number Filled	Analysis	Field Filtered (Y/N)	Comments
1L Poly / HNO3	1	SMS Metals	Y	
500mL Poly / HNO3	1	LL Hg	Y	
~500mL poly / None	1	pH	N	

Suspended Solids Samples

Filtration Start Date:	11/21/08	# Filter Bags Collected:	1
Filtration End Date:	1/7/09	Filter Bag #:	FB-012
Total Volume Filtered:	3070.4 gal	Initial Dry Weight:	100.05

Sampler #3

1/7/09 * pH meter broken, collected unpreserved volume for pH (lab)

1/7/09 - pump running, but no flow emerging from filter housing. Filter appears to be clogged. Turned off timer. Will check filter bag.

1/8/09 - Inspected filter bag. Appears clogged and holds water. Pulled and submitted to lab.

Tidally influenced: Timer set for pump to engage when tide level ≤ 7 ft.

ATTACHMENT B

LABORATORY ANALYTICAL DATA

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Table B-1
Source Control Sample List

Stormwater Source Control Round 3 Sampling Report
Boeing Plant 2

Stormwater Line	Sampling Location	Sample Name	Sample Type	Analytes	ARI Sample Delivery Group
Line A	2-371	PL2SC-SS-A-031909	Suspended Solids	PCBs and Metals	OR49
Line A	2-371	PL2SC-SS-A-050709	Suspended Solids	Metals	OY07
Line A	2-371	PL2SC-W-A-030509	Water, Field Filtered (filter bag plus 0.45 um field filter)	Dissolved Metals	OP48/OP51
Line B	3-307	PL2SC-SS-B-050709	Suspended Solids	PCBs and Metals	OY07
Line B	3-307	PL2SC-W-B-032809	Water, Field Filtered (filter bag plus 0.45 um field filter)	Dissolved Metals	OS73/OS79
Line G	Outfall G	PL2SC-W-G-010609	Water	SVOCs	OG55
Line I	4-283	PL2SC-SS-I-120308	Suspended Solids	PCBs and Metals	OC61
Line I	4-283	PL2SC-W-I-112008	Water, Field Filtered (filter bag plus 0.45 um field filter)	Dissolved Metals	OB32/OB33
Line J	18-249	PL2SC-SS-J249-021209	Suspended Solids	PCBs and Metals	OM42
Line J	18-249	PL2SC-W-J249-022309	Water, Field Filtered (filter bag plus 0.45 um field filter)	Dissolved Metals	OO10/OO11
Line J	18-505A	PL2SC-SS-J505-041709	Suspended Solids	PCBs and Metals	OW01
Line J	18-505A	PL2SC-W-J505-032809	Water, Field Filtered (filter bag plus 0.45 um field filter)	Dissolved Metals	OS73/OS79
Line V	2-44 Gate Valve	PL2SC-W-DUP-010609	Water, Field Filtered (0.45 um field filter)	Dissolved Metals	OG55/OG57
Line V	2-44 Gate Valve	PL2SC-W-V-010609	Water, Field Filtered (0.45 um field filter)	Dissolved Metals	OG55/OG57
Line Z	36-131	PL2SC-SS-Z-010809	Suspended Solids	PCBs and Metals	OG77
Line Z	36-131	PL2SC-W-Z-010709	Water, Field Filtered (0.45 um field filter)	Dissolved Metals	OG70/OG74
--	--	PL2SC-EB1-011309	Equipment Blank, Sampler #1	PCBs and Dissolved Metals	OH84/OH86
--	--	PL2SC-EBI-022709	Equipment Blank, Sampler #1	PCBs and Dissolved Metals	OO85/OO87
--	--	PL2SC-EB1-032709	Equipment Blank, Sampler #1	PCBs and Dissolved Metals	OS60/OS61
--	--	PL2SC-EB1-111108	Equipment Blank, Sampler #1	PCBs and Dissolved Metals	NZ46/NZ56
--	--	PL2SC-EB2-111108	Equipment Blank, Sampler #2	PCBs and Dissolved Metals	NZ46/NZ56
--	--	PL2SC-W-EB2-120308	Equipment Blank, Sampler #2	PCBs and Dissolved Metals	OC61/OC62
--	--	PL2SC-EB3-011309	Equipment Blank, Sampler #3	PCBs and Dissolved Metals	OH84/OH86
--	--	PL2SC-EB3-021909	Equipment Blank, Sampler #3	PCBs and Dissolved Metals	ON49/ON53
--	--	PL2SC-EB3-112108	Equipment Blank, Sampler #3	PCBs and Dissolved Metals	OB37/OB38

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ANALYTICAL RESOURCES INCORPORATED

ANALYST NOTES - Organic Extractions

ARI Job No: N/A Client Name: The Boeing Company

Parameter: Filter Weights Client Project: N/A

N/A SOP Number(s) [ ] No Anomalies

List problems, corrective actions, and any other pertinent information:

FB-020	101.66g (as received)	After air drying = 101.63g
FB-024	100.45g	
FB-025	100.12g	
FB-022	99.83g	
FB-019	100.37g	
FB-046	101.35g	
FB-045	103.80g	
FB-044	102.44g	Piece ~~of dry Leaf removed~~ Brown Paint Flake removed
FB-043	101.70g	
FB-042	103.29g	
FB-041	99.93g	
FB-040	99.04g	
FB-039	102.18g	
FB-038	100.62g	
FB-037	101.04g	
FB-036	99.97g	
FB-035	102.37g	
034	102.06g	
033	96.21g	
032	103.92g	
031	97.97g	
030	100.26g	
029	102.56g	
018	99.72g	
017	100.40g	
016	99.33g	

Extraction

Analyst: _____ Date Extracted: _____

See Reverse Side for Additional Information

ANALYTICAL
RESOURCES
INCORPORATED

ANALYST NOTES - Organic Extractions

ARI Job No: _____ Client Name: _____

Parameter: _____ Client Project: _____

[ ] SOP Number(s) [ ] No Anomalies

List problems, corrective actions, and any other pertinent information:

FB-027 — ~~100.61g~~ w/12/24 100.61g
026 — 100.00g
028 — 99.65g
023 — 101.72g
021 — 101.22g
001 — 101.28g
006 — 101.88g
005 — 100.49g
004 — 100.70g
009 — 103.75g
010 — 97.11g
~~002~~ 007 w/12/24 97.73g
002 — 98.12g
008 — 99.08g
003 — 100.20g
014 — 101.22g
013 — 99.90g
012 — 100.05g
011 — 100.71g
015 — 98.85g

Extraction
Analyst: _____ Date Extracted: _____

See Reverse Side for Additional Information

Analytical Resources, Incorporated
Analytical Chemists and Consultants

November 28, 2008

Will Ernst
The Boeing Company
Energy and Environmental Affairs
P.O. Box 3707, M/S 7A-WH
Seattle, WA 98124-2207

RE: Boeing Plant 2 Source Control
ARI ID: NZ46 and NZ56

Dear Will:

Please find enclosed the original *Chain of Custody* (COC) record and final data package for the project referenced above.

Sample receipt information and analytical details are addressed in the *Case Narrative*.

Copies of the reports and all associated raw data will be kept on file at ARI. If you have any questions or require additional information, please contact me at your convenience.

Sincerely,
ANALYTICAL RESOURCES, INC.

Kelly Bottem
Client Services Manager
(206) 695-6211
kellyb@arilabs.com

KB/eb

Enclosures

cc: Kent Angelos, Golder Associates Inc., 18300 NE Union Hill Road, Suite 200, Redmond, WA 98052-3333

Chain of Custody &
Sample Receipt Documentation

Prepared
for

The Boeing Company

Project: PLANT 2 SOURCE CONTROL

ARI IDS.: NZ46 & NZ56

Prepared
By

Analytical Resources, Inc.

Chain of Custody Record & Laboratory Analysis Request

ARI Assigned Number: NZ46	Turn-around Requested: Std	Page: 1 of 1	
ARI Client Company: BOEING	Phone:	Date: 11/11/08	Ice Present?
Client Contact: WILL ERNST		No. of Coolers:	Cooler Temps:
Client Project Name: Boeing Plant 2 Source Control			
Client Project #:	Samplers: Liz Shea, Daniel Gorman		

Analytical Resources, Incorporated
Analytical Chemists and Consultants
4611 South 134th Place, Suite 100
Tukwila, WA 98168
206-695-6200 206-695-6201 (fax)

Sample ID	Date	Time	Matrix	No. Containers	Analysis Requested: Dissolved * SMS Metals	Analysis Requested: PCB	Analysis Requested: LL Hg Dissolved *	Notes/Comments
PL2SC-EB1-111108	11/11/08	0950	W	4	X	X	X	* metals field filtered
PL2SC-EB2-111108	"	1300	W	4	X	X	X	

Comments/Special Instructions: SMS metals as per QAPP - see PM	Relinquished by: (Signature) Elizabeth Shea	Received by: (Signature)	Relinquished by: (Signature)	Received by: (Signature)
	Printed Name: Liz Shea	Printed Name: Mikka Mulumba	Printed Name:	Printed Name:
	Company: Golder Associates	Company: ARI	Company:	Company:
	Date & Time: 11/11/08 1445	Date & Time: 11/11/08 1445	Date & Time:	Date & Time:

Analytical Resources, Incorporated
Analytical Chemists and Consultants

Cooler Receipt Form

ARI Client: BOEING
COC No: _____
Assigned ARI Job No: NZ46

Project Name: _____
Delivered by: Hand
Tracking No: _____

Preliminary Examination Phase:

Were intact, properly signed and dated custody seals attached to the outside of to cooler?	YES	(NO)
Were custody papers included with the cooler?	(YES)	NO
Were custody papers properly filled out (ink, signed, etc.)	(YES)	NO
Record cooler temperature (recommended 2.0-6.0 °C for chemistry	2.2 °C	

Cooler Accepted by: MM Date: 11/11/08 Time: 1445

Complete custody forms and attach all shipping documents

Log-In Phase:

Was a temperature blank included in the cooler?	YES	(NO)
What kind of packing material was used?	ice	
Was sufficient ice used (if appropriate)?	(YES)	NO
Were all bottles sealed in individual plastic bags?	(YES)	NO
Did all bottle arrive in good condition (unbroken)?	(YES)	NO
Were all bottle labels complete and legible?	(YES)	NO
Did all bottle labels and tags agree with custody papers?	(YES)	NO
Were all bottles used correct for the requested analyses?	(YES)	NO
Do any of the analyses (bottles) require preservation? (attach preservation checklist)	(YES)	NO
Were all VOC vials free of air bubbles? (NA)	YES	NO
Was sufficient amount of sample sent in each bottle?	(YES)	NO

Samples Logged by: JH Date: 11.12.08 Time: 10:15

***** Notify Project Manager of discrepancies or concerns *****

Explain discrepancies or negative responses:

By: Date:

Chain of Custody Record & Laboratory Analysis Request

ARI Assigned Number: N246	Turn-around Requested: Std
ARI Client Company: BOEING	Phone:
Client Contact: WILL ERNST	
Client Project Name: Boeing Plant 2 Source Control	
Client Project #:	Samplers: Liz Shea, Daniel Gorman

Page: 1 of 1	
Date: 11/11/08	Ice Present?
No. of Coolers:	Cooler Temps:

Analytical Resources, Incorporated
Analytical Chemists and Consultants
4611 South 134th Place, Suite 100
Tukwila, WA 98168
206-695-6200 206-695-6201 (fax)

Sample ID	Date	Time	Matrix	No. Containers	Analysis Requested: Dissolved * SMS Metals	PCB	LLHg Dissolved **						Notes/Comments
PL2SC-EB1-111108	11/11/08	0950	W	4	X	X	X						* Metals field filtered
PL2SC-EB2-111108	"	1300	W	4	X	X	X						

Comments/Special Instructions: SMS metals as per QAPP - see PM	Relinquished by: (Signature) Elizabeth Shea	Received by: (Signature) Mikka Mulumba	Relinquished by: (Signature)	Received by: (Signature)
	Printed Name: Liz Shea	Printed Name: Mikka Mulumba	Printed Name:	Printed Name:
	Company: Golder Associates	Company: ARI	Company:	Company:
	Date & Time: 11/11/08 1445	Date & Time: 11/11/08 1445	Date & Time:	Date & Time:

PRESERVATION VERIFICATION 11/12/08
Page 1 of 1

ANALYTICAL RESOURCES INCORPORATED

ARI Job No: **NZ56**

Inquiry Number: NONE
Analysis Requested: 11/11/08
Contact: Ernst, Will
Client: The Boeing Company
Logged by: JW
Sample Set Used: Yes-481
Validatable Package: YES
Deliverables:

PC: Kelly
VTSR: 11/11/08

Project #:
Project: BOEING PLANT 2 SOURCE CONTROL
Sample Site:
SDG No:
Analytical Protocol: In-house

LOGNUM ARI ID	CLIENT ID	CN >12	WAD >12	NH3 <2	COD <2	FOG <2	MET <2	PHEN <2	PHOS <2	TKN <2	NO23 <2	TOC <2	S2 >9	DMET FLT	DOC FLT	PARAMETER	ADJUSTED TO	LOT NUMBER	AMOUNT ADDED	DATE/BY
08-30790 **NZ56A**	PL2SC-EB1-111108						DIS ok							Y						
08-30791 **NZ56B**	PL2SC-EB2-111108						DIS ok							Y						

0005

Checked By JH Date 11/12/08

Analytical Resources, Incorporated
Analytical Chemists and Consultants

Cooler Receipt Form

ARI Client: BOEING | Project Name: _____

COC No: _____ | Delivered by: Hand

Assigned ARI Job No: NZ56 | Tracking No: _____

Preliminary Examination Phase:

Were intact, properly signed and dated custody seals attached to the outside of to cooler?	YES	(NO)
Were custody papers included with the cooler?	(YES)	NO
Were custody papers properly filled out (ink, signed, etc.)	(YES)	NO
Record cooler temperature (recommended 2.0-6.0 °C for chemistry	2.2 °C	

Cooler Accepted by: MM Date: 11/11/08 Time: 1445

Complete custody forms and attach all shipping documents

Log-In Phase:

Was a temperature blank included in the cooler?	YES	(NO)
What kind of packing material was used?	ice	
Was sufficient ice used (if appropriate)?	(YES)	NO
Were all bottles sealed in individual plastic bags?	(YES)	NO
Did all bottle arrive in good condition (unbroken)?	(YES)	NO
Were all bottle labels complete and legible?	(YES)	NO
Did all bottle labels and tags agree with custody papers?	(YES)	NO
Were all bottles used correct for the requested analyses?	(YES)	NO
Do any of the analyses (bottles) require preservation? (attach preservation checklist)	(YES)	NO
Were all VOC vials free of air bubbles? (NA)	YES	NO
Was sufficient amount of sample sent in each bottle?	(YES)	NO

Samples Logged by: JH Date: 11-12-08 Time: 1015

*** Notify Project Manager of discrepancies or concerns ***

Explain discrepancies or negative responses:

By: Date:

Case Narrative &
Data Reporting Qualifiers

Prepared
for

The Boeing Company

Project: PLANT 2 SOURCE CONTROL

ARI IDS.: NZ46 & NZ56

Prepared
By

Analytical Resources, Inc.

ANALYTICAL
RESOURCES
INCORPORATED

Case Narrative

Project: Boeing Plant 2 Source Control
ARI ID: NZ46 and NZ56
Matrix: Water
Date: November 28, 2008

Sample Receipt Information

Two water samples were received in good condition at ARI on 11/11/08 under ARI sample delivery groups NZ46 and NZ56. One cooler arrived at a temperature of 2.2°C.

PCBs by Method 8082:

The samples were extracted on 11/14/08 and analyzed on 11/20/08 within the method recommended holding times.

Initial calibration (s): All analytes of interest were within method acceptance criteria.

Continuing calibration (s): Are in control.

Samples: There were no anomalies associated with these samples.

Surrogates: The method blank surrogate TCMX is out of control low. All other surrogate recoveries were in control; therefore no further corrective action was taken.

LCS(s): All percent recoveries for the analytes of interest were within compliance.

Method Blank: The method blank was free of contamination.

Total Metals by Methods 6010B and 7000 series

The samples were digested on between 11/17/08 and 11/18/08. The digests were analyzed between 11/19/08 and 11/24/08 within the method recommended holding times.

Replicate(s): All percent recoveries were within compliance.

Samples: No anomalies were encountered for these samples.

LCS/Blank Spike(s): All percent recoveries were within compliance.

Method Blank(s): Are in control.

Standard Reference: All percent recoveries were within compliance.

Data Reporting Qualifiers

Effective 12/28/04

Inorganic Data

U	Indicates that the target analyte was not detected at the reported concentration
*	Duplicate RPD is not within established control limits
B	Reported value is less than the CRDL but ≥ the Reporting Limit
N	Matrix Spike recovery not within established control limits
NA	Not Applicable, analyte not spiked
H	The natural concentration of the spiked element is so much greater than the concentration spiked that an accurate determination of spike recovery is not possible
L	Analyte concentration is ≤5 times the Reporting Limit and the replicate control limit defaults to ±1 RL instead of the normal 20% RPD

Organic Data

U	Indicates that the target analyte was not detected at the reported concentration
*	Flagged value is not within established control limits
B	Analyte detected in an associated Method Blank at a concentration greater than one-half of ARI's Reporting Limit or 5% of the regulatory limit or 5% of the analyte concentration in the sample.
J	Estimated concentration when the value is less than ARI's established reporting limits
D	The spiked compound was not detected due to sample extract dilution
NR	Spiked compound recovery is not reported due to chromatographic interference
E	Estimated concentration calculated for an analyte response above the valid instrument calibration range. A dilution is required to obtain an accurate quantification of the analyte.
S	Indicates an analyte response that has saturated the detector. The calculated concentration is not valid; a dilution is required to obtain valid quantification of the analyte
NA	The flagged analyte was not analyzed for
NS	The flagged analyte was not spiked into the sample

M Estimated value for an analyte detected and confirmed by an analyst but with low spectral match parameters. This flag is used only for GC-MS analyses

M2 The sample contains PCB congeners that do not match any standard Aroclor pattern. The PCBs are identified and quantified as the Aroclor whose pattern most closely matches that of the sample. The reported value is an estimate.

N The analysis indicates the presence of an analyte for which there is presumptive evidence to make a "tentative identification"

Y The analyte is not detected at or above the reported concentration. The reporting limit is raised due to chromatographic interference. The Y flag is equivalent to the U flag with a raised reporting limit.

C The analyte was positively identified on only one of two chromatographic columns. Chromatographic interference prevented a positive identification on the second column

P The analyte was detected on both chromatographic columns but the quantified values differ by ≥40% RPD with no obvious chromatographic interference

Geotechnical Data

A The total of all fines fractions. This flag is used to report total fines when only sieve analysis is requested and balances total grain size with sample weight.

F Samples were frozen prior to particle size determination

SM Sample matrix was not appropriate for the requested analysis. This normally refers to samples contaminated with an organic product that interferes with the sieving process and/or moisture content, porosity and saturation calculations

SS Sample did not contain the proportion of "fines" required to perform the pipette portion of the grain size analysis

W Weight of sample in some pipette aliquots was below the level required for accurate weighting

Data Summary Package

Prepared for

The Boeing Company

Project: PLANT 2 SOURCE CONTROL

ARI IDS.: NZ46 & NZ56

Prepared By

Analytical Resources, Inc.

PCBS

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PCB by GC/ECD Method SW8082
Page 1 of 1

Sample ID: PL2SC-EB1-111108
SAMPLE

Lab Sample ID: NZ46A
LIMS ID: 08-30749
Matrix: Water
Data Release Authorized:
Reported: 11/21/08

QC Report No: NZ46-The Boeing Company
Project: BOEING PLANT 2 SOURCE CONTROL

Date Sampled: 11/11/08
Date Received: 11/11/08

Date Extracted: 11/14/08
Date Analyzed: 11/20/08 00:30
Instrument/Analyst: ECD5/PK
GPC Cleanup: No
Sulfur Cleanup: No

Sample Amount: 500 mL
Final Extract Volume: 5.0 mL
Dilution Factor: 1.00
Silica Gel: No
Acid Cleanup: No

CAS Number	Analyte	RL	Result
12674-11-2	Aroclor 1016	1.0	< 1.0 U
53469-21-9	Aroclor 1242	1.0	< 1.0 U
12672-29-6	Aroclor 1248	1.0	< 1.0 U
11097-69-1	Aroclor 1254	1.0	< 1.0 U
11096-82-5	Aroclor 1260	1.0	< 1.0 U
11104-28-2	Aroclor 1221	1.0	< 1.0 U
11141-16-5	Aroclor 1232	1.0	< 1.0 U

Reported in µg/L (ppb)

PCB Surrogate Recovery	
Decachlorobiphenyl	75.2%
Tetrachlorometaxylene	70.8%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PCB by GC/ECD Method SW8082
Page 1 of 1

Sample ID: PL2SC-EB2-111108
SAMPLE

Lab Sample ID: NZ46B
LIMS ID: 08-30750
Matrix: Water
Data Release Authorized:
Reported: 11/21/08

QC Report No: NZ46-The Boeing Company
Project: BOEING PLANT 2 SOURCE CONTROL

Date Sampled: 11/11/08
Date Received: 11/11/08

Date Extracted: 11/14/08
Date Analyzed: 11/20/08 00:47
Instrument/Analyst: ECD5/PK
GPC Cleanup: No
Sulfur Cleanup: No

Sample Amount: 500 mL
Final Extract Volume: 5.0 mL
Dilution Factor: 1.00
Silica Gel: No
Acid Cleanup: No

CAS Number	Analyte	RL	Result
12674-11-2	Aroclor 1016	1.0	< 1.0 U
53469-21-9	Aroclor 1242	1.0	< 1.0 U
12672-29-6	Aroclor 1248	1.0	< 1.0 U
11097-69-1	Aroclor 1254	1.0	< 1.0 U
11096-82-5	Aroclor 1260	1.0	< 1.0 U
11104-28-2	Aroclor 1221	1.0	< 1.0 U
11141-16-5	Aroclor 1232	1.0	< 1.0 U

Reported in µg/L (ppb)

PCB Surrogate Recovery

Decachlorobiphenyl	73.8%
Tetrachlorometaxylene	72.5%

ANALYTICAL RESOURCES INCORPORATED

SW8082/PCB WATER SURROGATE RECOVERY SUMMARY

Matrix: Water

QC Report No: NZ46-The Boeing Company
Project: BOEING PLANT 2 SOURCE CONTROL

Client ID	DCBP % REC	DCBP LCL-UCL	TCMX % REC	TCMX LCL-UCL	TOT OUT
MB-111408	75.2%	47-101	58.2%*	61-104	1
LCS-111408	79.5%	47-101	67.5%	61-104	0
LCSD-111408	79.5%	47-101	72.2%	61-104	0
PL2SC-EB1-111108	75.2%	42-120	70.8%	55-102	0
PL2SC-EB2-111108	73.8%	42-120	72.5%	55-102	0

Prep Method: SW3510C
Log Number Range: 08-30749 to 08-30750

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PCB by GC/ECD Method SW8082
Page 1 of 1

Sample ID: LCS-111408
LCS/LCSD

Lab Sample ID: LCS-111408
LIMS ID: 08-30749
Matrix: Water
Data Release Authorized:
Reported: 11/21/08

QC Report No: NZ46-The Boeing Company
Project: BOEING PLANT 2 SOURCE CONTROL

Date Sampled: NA
Date Received: NA

Date Extracted LCS/LCSD: 11/14/08

Date Analyzed LCS: 11/19/08 23:56
LCSD: 11/20/08 00:13
Instrument/Analyst LCS: ECD5/PK
LCSD: ECD5/PK
GPC Cleanup: No
Sulfur Cleanup: No

Sample Amount LCS: 500 mL
LCSD: 500 mL
Final Extract Volume LCS: 5.0 mL
LCSD: 5.0 mL
Dilution Factor LCS: 1.00
LCSD: 1.00
Silica Gel: No
Acid Cleanup: No

Analyte	LCS	Spike Added-LCS	LCS Recovery	LCSD	Spike Added-LCSD	LCSD Recovery	RPD
Aroclor 1016	3.45	5.00	69.0%	3.74	5.00	74.8%	8.1%
Aroclor 1260	3.94	5.00	78.8%	4.10	5.00	82.0%	4.0%

PCB Surrogate Recovery

	LCS	LCSD
Decachlorobiphenyl	79.5%	79.5%
Tetrachlorometaxylene	67.5%	72.2%

Results reported in µg/L
RPD calculated using sample concentrations per SW846.

PCB METHOD BLANK SUMMARY

BLANK NO.

NZ46MBW1

Lab Name: ANALYTICAL RESOURCES, INC
Client: THE BOEING COMPANY

ARI Job No.: NZ46
Project: BOEING PLANT 2 SOURC

Lab Sample ID: NZ46MBW1
Lab File ID: 1119B051

Date Extracted: 11/14/08
Matrix: LIQUID

Date Analyzed: 11/19/08
Instrument ID: ECD5

Time Analyzed: 2339
GC Columns: ZB5/ZB35

THIS METHOD BLANK APPLIES TO THE FOLLOWING SAMPLES, MS and MSD:

	CLIENT SAMPLE NO.	LAB SAMPLE ID	DATE ANALYZED
01	NZ46LCSW1	NZ46LCSW1	11/19/08
02	NZ46LCSDW1	NZ46LCSDW1	11/20/08
03	PL2SC-EB1-111108	NZ46A	11/20/08
04	PL2SC-EB2-111108	NZ46B	11/20/08

ALL RUNS ARE DUAL COLUMN

FORM IV PCB

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PCB by GC/ECD Method SW8082
Page 1 of 1

Sample ID: MB-111408
METHOD BLANK

Lab Sample ID: MB-111408
LIMS ID: 08-30749
Matrix: Water
Data Release Authorized:
Reported: 11/21/08

QC Report No: NZ46-The Boeing Company
Project: BOEING PLANT 2 SOURCE CONTROL

Date Sampled: NA
Date Received: NA

Date Extracted: 11/14/08
Date Analyzed: 11/19/08 23:39
Instrument/Analyst: ECD5/PK
GPC Cleanup: No
Sulfur Cleanup: No

Sample Amount: 500 mL
Final Extract Volume: 5.0 mL
Dilution Factor: 1.00
Silica Gel: No
Acid Cleanup: No

CAS Number	Analyte	RL	Result
12674-11-2	Aroclor 1016	1.0	< 1.0 U
53469-21-9	Aroclor 1242	1.0	< 1.0 U
12672-29-6	Aroclor 1248	1.0	< 1.0 U
11097-69-1	Aroclor 1254	1.0	< 1.0 U
11096-82-5	Aroclor 1260	1.0	< 1.0 U
11104-28-2	Aroclor 1221	1.0	< 1.0 U
11141-16-5	Aroclor 1232	1.0	< 1.0 U

Reported in µg/L (ppb)

PCB Surrogate Recovery

Decachlorobiphenyl	75.2%
Tetrachlorometaxylene	58.2%

METALS

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
DISSOLVED METALS
Page 1 of 1

Sample ID: PL2SC-EB1-111108
SAMPLE

Lab Sample ID: NZ46A
LIMS ID: 08-30749
Matrix: Water
Data Release Authorized:
Reported: 11/25/08

QC Report No: NZ46-The Boeing Company
Project: BOEING PLANT 2 SOURCE CONTROL

Date Sampled: 11/11/08
Date Received: 11/11/08

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	RL	µg/L	Q
7000A	11/17/08	7060A	11/20/08	7440-38-2	Arsenic	1	1	U
6010B	11/17/08	6010B	11/24/08	7440-43-9	Cadmium	2	2	U
6010B	11/17/08	6010B	11/24/08	7440-47-3	Chromium	5	5	U
6010B	11/17/08	6010B	11/24/08	7440-50-8	Copper	2	2	U
7000A	11/17/08	7421	11/19/08	7439-92-1	Lead	1	1	U
6010B	11/17/08	6010B	11/24/08	7440-22-4	Silver	3	3	U
6010B	11/17/08	6010B	11/24/08	7440-66-6	Zinc	10	10	U

U-Analyte undetected at given RL
RL-Reporting Limit

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
DISSOLVED METALS
Page 1 of 1

Sample ID: PL2SC-EB2-111108
SAMPLE

Lab Sample ID: NZ46B
LIMS ID: 08-30750
Matrix: Water
Data Release Authorized:
Reported: 11/25/08

QC Report No: NZ46-The Boeing Company
Project: BOEING PLANT 2 SOURCE CONTROL

Date Sampled: 11/11/08
Date Received: 11/11/08

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	RL	µg/L	Q
7000A	11/17/08	7060A	11/20/08	7440-38-2	Arsenic	1	1	U
6010B	11/17/08	6010B	11/24/08	7440-43-9	Cadmium	2	2	U
6010B	11/17/08	6010B	11/24/08	7440-47-3	Chromium	5	5	U
6010B	11/17/08	6010B	11/24/08	7440-50-8	Copper	2	2	U
7000A	11/17/08	7421	11/19/08	7439-92-1	Lead	1	1	U
6010B	11/17/08	6010B	11/24/08	7440-22-4	Silver	3	3	U
6010B	11/17/08	6010B	11/24/08	**7440-66-6**	**Zinc**	10	**10**	

U-Analyte undetected at given RL
RL-Reporting Limit

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
DISSOLVED METALS **Sample ID: LAB CONTROL**

Lab Sample ID: NZ46LCS
LIMS ID: 08-30749
Matrix: Water
Data Release Authorized:
Reported: 11/25/08

QC Report No: NZ46-The Boeing Company
Project: BOEING PLANT 2 SOURCE CONTROL
Date Sampled: NA
Date Received: NA

BLANK SPIKE QUALITY CONTROL REPORT

Analyte	Analysis Method	Spike Found	Spike Added	% Recovery	Q
Arsenic	7060A	21	20	105%	
Cadmium	6010B	501	500	100%	
Chromium	6010B	483	500	96.6%	
Copper	6010B	472	500	94.4%	
Lead	7421	22	20	110%	
Silver	6010B	509	500	102%	
Zinc	6010B	490	500	98.0%	

Reported in µg/L

N-Control limit not met
Control Limits: 80-120%

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
DISSOLVED METALS **Sample ID: METHOD BLANK**

Lab Sample ID: NZ46MB
LIMS ID: 08-30749
Matrix: Water
Data Release Authorized:
Reported: 11/25/08

QC Report No: NZ46-The Boeing Company
Project: BOEING PLANT 2 SOURCE CONTROL
Date Sampled: NA
Date Received: NA

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	RL	µg/L	Q
7000A	11/17/08	7060A	11/20/08	7440-38-2	Arsenic	1	1	U
6010B	11/17/08	6010B	11/24/08	7440-43-9	Cadmium	2	2	U
6010B	11/17/08	6010B	11/24/08	7440-47-3	Chromium	5	5	U
6010B	11/17/08	6010B	11/24/08	7440-50-8	Copper	2	2	U
7000A	11/17/08	7421	11/19/08	7439-92-1	Lead	1	1	U
6010B	11/17/08	6010B	11/24/08	7440-22-4	Silver	3	3	U
6010B	11/17/08	6010B	11/24/08	7440-66-6	Zinc	10	10	U

U-Analyte undetected at given RL
RL-Reporting Limit

Low-Level Mercury

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
Dissolved Mercury by Method SW7470A

Data Release Authorized:
Reported: 11/25/08
Date Received: 11/11/08
Page 1 of 1

QC Report No: NZ56-The Boeing Company
Project: BOEING PLANT 2 SOURCE CONTROL

Client/ ARI ID	Date Sampled	Matrix	Prep Date Anal Date	RL	Result
PL2SC-EB1-111108 NZ56A 08-30790	11/11/08	Water	11/18/08 11/24/08	20.0	20.0 U
PL2SC-EB2-111108 NZ56B 08-30791	11/11/08	Water	11/18/08 11/24/08	20.0	20.0 U
MB-111808 Method Blank	NA	Water	11/18/08 11/24/08	20.0	20.0 U

Reported in ng/L

RL-Analytical reporting limit
U-Undetected at reported detection limit

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
DISSOLVED METALS
Page 1 of 1

Sample ID: LAB CONTROL

Lab Sample ID: NZ56LCS
LIMS ID: 08-30790
Matrix: Water
Data Release Authorized:
Reported: 11/25/08

QC Report No: NZ56-The Boeing Company
Project: BOEING PLANT 2 SOURCE CONTROL

Date Sampled: NA
Date Received: NA

BLANK SPIKE QUALITY CONTROL REPORT

Analyte	Analysis Method	Spike Found	Spike Added	% Recovery	Q
Mercury	7470A	183	200	91.5%	

Reported in ng/L

N-Control limit not met
Control Limits: 80-120%

Analytical Resources, Incorporated
Analytical Chemists and Consultants

December 11, 2008

Kent Angelos
Golder Associates, Inc.
18300 NE Union Hill Road, Suite 200
Redmond, WA 98052-3333

RE: Boeing Plant 2 Source Control, 013-1646-008-500
ARI ID: OB32 & OB33

Dear Kent:

Please find enclosed the original Chain-of-Custody (COC) record, sample receipt documentation, and the final data package for the project referenced above.

Sample receipt information and analytical details are addressed in the Case Narrative.

An electronic copy of this package will be kept on file at ARI. If you have any questions or require additional information, please contact me at your convenience.

Sincerely,
ANALYTICAL RESOURCES, INC.

Kelly Bottem
Client Services Manager
(206) 695-6211
kellyb@arilabs.com

KB/co

Enclosures

cc: Kent Angelos, Golder Associates Inc., 18300 NE Union Hill Road, Suite 200, Redmond, WA 98052-3333

Chain of Custody &
Sample Receipt Documentation

Prepared
for

The Boeing Company

Project: PLANT 2 SOURCE CONTROL

ARI IDS.: OB32 & OB33

Prepared
By

Analytical Resources, Inc.

Chain of Custody Record & Laboratory Analysis Request

ARI Assigned Number: OB32	Turn-around Requested: Std
ARI Client Company: Boeing	Phone: 2*
Client Contact: WILL ERNST	
Client Project Name: BP2 Source Control	
Client Project #:	Samplers: Liz Shea

Page: 1 of 1	
Date: 11/20/08	Ice Present?
No. of Coolers:	Cooler Temps:

Analytical Resources, Incorporated
Analytical Chemists and Consultants
4611 South 134th Place, Suite 100
Tukwila, WA 98168
206-695-6200 206-695-6201 (fax)

Sample ID	Date	Time	Matrix	No. Containers	SMS Metals* Diss	LL Hg* Diss	Notes/Comments
PL2SC-W-I-112008	11/20/08	1055	W	2	X	X	* Field Filtered

Analysis Requested

Comments/Special Instructions	Relinquished by: (Signature)	Received by: (Signature)	Relinquished by: (Signature)	Received by: (Signature)
*SMS Metals as per QAPP see PM	Printed Name: Liz Shea	Printed Name: Mikka Mulumba	Printed Name:	Printed Name:
	Company: Order	Company: ARI	Company:	Company:
	Date & Time: 11/20/08 1426	Date & Time: 11/20/08 1426	Date & Time:	Date & Time:

Limits of Liability: *ARI will perform all requested services in accordance with appropriate methodology following ARI Standard Operating Procedures and the ARI Quality Assurance Program. This program meets standards for the industry. The total liability of ARI, its officers, agents, employees, or successors, arising out of or in connection with the requested services, shall not exceed the Invoiced amount for said services. The acceptance by the client of a proposal for services by ARI release ARI from any liability in excess thereof, not withstanding any provision to the contrary in any contract, purchase order or co-signed agreement between ARI and the Client.*

Sample Retention Policy: All samples submitted to ARI will be appropriately discarded no sooner than 90 days after receipt or 60 days after submission of hardcopy data, whichever is longer, unless alternate retention schedules have been established by work-order or contract.

Analytical Resources, Incorporated
Analytical Chemists and Consultants

Cooler Receipt Form

ARI Client: Boeing — Project Name: _____

COC No: _____ — Delivered by: Hand

Assigned ARI Job No: OB32 — Tracking No: _____

Preliminary Examination Phase:

Were intact, properly signed and dated custody seals attached to the outside of to cooler?	YES	(NO)
Were custody papers included with the cooler?	(YES)	NO
Were custody papers properly filled out (ink, signed, etc.)	(YES)	NO
Record cooler temperature (recommended 2.0-6.0 °C for chemistry	1.2 °C	

Cooler Accepted by: MM — Date: 11/20/08 — Time: 1426

Complete custody forms and attach all shipping documents

Log-In Phase:

Was a temperature blank included in the cooler?	YES	(NO)
What kind of packing material was used?	ICE	
Was sufficient ice used (if appropriate)?	(YES)	NO
Were all bottles sealed in individual plastic bags?	(YES)	NO
Did all bottle arrive in good condition (unbroken)?	(YES)	NO
Were all bottle labels complete and legible?	(YES)	NO
Did all bottle labels and tags agree with custody papers?	(YES)	NO
Were all bottles used correct for the requested analyses?	(YES)	NO
Do any of the analyses (bottles) require preservation? (attach preservation checklist)	(YES)	NO
Were all VOC vials free of air bubbles? (NA)	YES	NO
Was sufficient amount of sample sent in each bottle?	(YES)	NO

Samples Logged by: JW — Date: 11/24 — Time: 805

*** Notify Project Manager of discrepancies or concerns ***

Explain discrepancies or negative responses:

By: Date:

OB32 OB33:00003

PRESERVATION VERIFICATION 11/24/08
Page 1 of 1

ANALYTICAL RESOURCES INCORPORATED

ARI Job No: **OB32**

Inquiry Number: NONE
Analysis Requested: 11/20/08
Contact: Ernst, Will
Client: The Boeing Company
Logged by: JW
Sample Set Used: Yes-481
Validatable Package: No
Deliverables:

PC: Kelly
VTSR: 11/20/08

Project #:
Project: BP2 Source Control
Sample Site:
SDG No:
Analytical Protocol: In-house

LOGNUM / ARI ID	CLIENT ID	CN >12	WAD >12	NH3 <2	COD <2	FOG <2	MET <2	PHEN <2	PHOS <2	TKN <2	NO23 <2	TOC <2	S2 >9	DMET FLT	DOC FLT	PARAMETER	ADJUSTED TO	LOT NUMBER	AMOUNT ADDED	DATE/BY
08-31760							DIS							Y						
OB32A	PL2SC-W-I-112008						6F													

Checked By JW Date 11/24/08

OB32 OB32 0033 0000 1

Analytical Resources, Incorporated
Analytical Chemists and Consultants

Cooler Receipt Form

ARI Client: Boeing
COC No:
Assigned ARI Job No: OB33

Project Name:
Delivered by: Hand
Tracking No:

Preliminary Examination Phase:

Were intact, properly signed and dated custody seals attached to the outside of to cooler? YES (NO)
Were custody papers included with the cooler? (YES) NO
Were custody papers properly filled out (ink, signed, etc.) (YES) NO
Record cooler temperature (recommended 2.0-6.0 °C for chemistry 1.2 °C

Cooler Accepted by: MM Date: 11/20/08 Time: 1426

Complete custody forms and attach all shipping documents

Log-In Phase:

Was a temperature blank included in the cooler? YES (NO)
What kind of packing material was used? ICE
Was sufficient ice used (if appropriate)? (YES) NO
Were all bottles sealed in individual plastic bags? (YES) NO
Did all bottle arrive in good condition (unbroken)? (YES) NO
Were all bottle labels complete and legible? (YES) NO
Did all bottle labels and tags agree with custody papers? JW (YES) (NO)
Were all bottles used correct for the requested analyses? (YES) NO
Do any of the analyses (bottles) require preservation? (attach preservation checklist) (YES) NO
Were all VOC vials free of air bubbles? (NA) YES NO
Was sufficient amount of sample sent in each bottle? (YES) NO

Samples Logged by: JW Date: 11/24/08 Time: 805

** *Notify Project Manager of discrepancies or concerns* **

Explain discrepancies or negative responses:

Bottle reads PL2CS-W-I-112008, COC: PL2SC-W-I-112008

By: Date:

PRESERVATION VERIFICATION 11/24/08
Page 1 of 1

ANALYTICAL RESOURCES INCORPORATED

ARI Job No: **OB33**

Inquiry Number: NONE
Analysis Requested: 11/20/08
Contact: Ernst, Will
Client: The Boeing Company
Logged by: JW
Sample Set Used: Yes-481
Validatable Package: ~~No~~ Yes
Deliverables:

PC: Kelly
VTSR: 11/20/08

Project #:
Project: BP2 Source Control
Sample Site:
SDG No:
Analytical Protocol: In-house

LOGNUM ARI ID	CLIENT ID	CN >12	WAD >12	NH3 <2	COD <2	FOG <2	MET <2	PHEN <2	PHOS <2	TKN <2	NO23 <2	TOC <2	S2 >9	DMET FLT	DOC FLT	PARAMETER	ADJUSTED TO	LOT NUMBER	AMOUNT ADDED	DATE/BY
08-31761							DIS							Y						
OB33A	PL2SC-W-I-112008						OK													

Checked By JW Date 11/24/08

Case Narrative &
Data Reporting Qualifiers

Prepared
for

The Boeing Company

Project: PLANT 2 SOURCE CONTROL

ARI IDS.: OB32 & OB33

Prepared
By

Analytical Resources, Inc.

ANALYTICAL
RESOURCES
INCORPORATED

Case Narrative

Project: Boeing Plant 2 Source Control, 013-1646-008-500
ARI ID: OB32 & OB33
Matrix: Water
Date: December 11, 2008

Sample Receipt Information

One water sample was received in good condition at Analytical Resources, Inc. (ARI) on November 20, 2008 under ARI sample delivery groups OB32 and OB33. The cooler temperature measured by IR thermometer was 1.2°C. For further details regarding sample receipt, please refer to the Cooler Receipt Form.

Dissolved Metals by Methods 6010B and 7000 series

The samples were digested between 11/25/08. The digests were analyzed between 12/3/08 and 12/9/08 within the method recommended holding times.

Replicate(s): All percent recoveries were within compliance.

Samples: No anomalies were encountered for these samples.

LCS/Blank Spike(s): All percent recoveries were within compliance.

Method Blank(s): Are in control.

Standard Reference: All percent recoveries were within compliance.

Data Reporting Qualifiers

Effective 12/28/04

Inorganic Data

U	Indicates that the target analyte was not detected at the reported concentration
*	Duplicate RPD is not within established control limits
B	Reported value is less than the CRDL but ≥ the Reporting Limit
N	Matrix Spike recovery not within established control limits
NA	Not Applicable, analyte not spiked
H	The natural concentration of the spiked element is so much greater than the concentration spiked that an accurate determination of spike recovery is not possible
L	Analyte concentration is ≤5 times the Reporting Limit and the replicate control limit defaults to ±1 RL instead of the normal 20% RPD

Organic Data

U	Indicates that the target analyte was not detected at the reported concentration
*	Flagged value is not within established control limits
B	Analyte detected in an associated Method Blank at a concentration greater than one-half of ARI's Reporting Limit or 5% of the regulatory limit or 5% of the analyte concentration in the sample.
J	Estimated concentration when the value is less than ARI's established reporting limits
D	The spiked compound was not detected due to sample extract dilution
NR	Spiked compound recovery is not reported due to chromatographic interference
E	Estimated concentration calculated for an analyte response above the valid instrument calibration range. A dilution is required to obtain an accurate quantification of the analyte.
S	Indicates an analyte response that has saturated the detector. The calculated concentration is not valid; a dilution is required to obtain valid quantification of the analyte
NA	The flagged analyte was not analyzed for
NS	The flagged analyte was not spiked into the sample

M Estimated value for an analyte detected and confirmed by an analyst but with low spectral match parameters. This flag is used only for GC-MS analyses

M2 The sample contains PCB congeners that do not match any standard Aroclor pattern. The PCBs are identified and quantified as the Aroclor whose pattern most closely matches that of the sample. The reported value is an estimate.

N The analysis indicates the presence of an analyte for which there is presumptive evidence to make a "tentative identification"

Y The analyte is not detected at or above the reported concentration. The reporting limit is raised due to chromatographic interference. The Y flag is equivalent to the U flag with a raised reporting limit.

C The analyte was positively identified on only one of two chromatographic columns. Chromatographic interference prevented a positive identification on the second column

P The analyte was detected on both chromatographic columns but the quantified values differ by ≥40% RPD with no obvious chromatographic interference

Geotechnical Data

A The total of all fines fractions. This flag is used to report total fines when only sieve analysis is requested and balances total grain size with sample weight.

F Samples were frozen prior to particle size determination

SM Sample matrix was not appropriate for the requested analysis. This normally refers to samples contaminated with an organic product that interferes with the sieving process and/or moisture content, porosity and saturation calculations

SS Sample did not contain the proportion of "fines" required to perform the pipette portion of the grain size analysis

W Weight of sample in some pipette aliquots was below the level required for accurate weighting

LCS SOLUTIONS

11/08/08

LABE	SOLN ID	TEST	CONC. UG/ML	SOLVENT	EXP.
1	1549-3	PCB	20	ACETONE	10/10/09
2	1472-3	BCOC PEST	10	ACETONE	07/20/08
3	1517-1	PEST	02/04/20	ACETONE	05/15/09
4	1546-4	LOW PEST	0.2/0.4/2	ACETONE	05/15/09
5	1537-1	EPH	1500	MECL2	08/16/09
6	1559-2	PCP	12.5/125	ACETONE	11/05/09
7	1548-2	ABN	100	ACETONE	08/01/09
8	1487-2	TBT	10	MECL2	12/15/08
9	1493-3	PORE TBT	.25/.5	MECL2	12/15/08
10	1554-3	ABN ACID	100/200	MEOH	10/21/09
11	1556-1	TPHD	15000	ACETONE	10/23/09
12	1542-1	ABN BASE	200	ACETONE	07/01/09
13*	1427-3	LOW PCB	2	ACETONE	10/11/08
14	1547-1	LOW ABN ACID	10/20	MEOH	04/10/09
15*	1452-1	SIM PNA	15/75	MEOH	04/09/09
16	1502-2	DIOXANE	100	MEOH	02/20/09
17	1516-2	1248 PCB	20	ACETONE	05/07/09
18	1514-4	LOW SIM PNA	1.5/7.5	ACETONE	04/24/09
19	1517-3	AK103	7500	MECL2	12/29/08
20	1490-4	PNA	100	MEOH	01/10/09
21*	1414-4	SKY/BHT	100	MEOH	04/08/09
22	1539-1	HERB	12.5/12500	MEOH	08/31/09
23	1505-1	LOW ABN BASE	20	MEOH	03/20/09
24	1541-4	LOW ABN	10	ACETONE	08/01/09
25	1481-1	DIPHENYL	100	MEOH	07/20/08
26	1545-2	OP-PEST	25	MEOH	02/14/09
27	1495-1	STEROLS	200	MEOH	12/29/08
28	1494-1	ADD. PEST	4	ACETONE	01/23/09
29	1496-3	DECANES	100	MEOH	02/12/09
30	1497-2	EDB/DBCP	2	ACETONE	02/12/09
31	1510-3	TERPINEOL	100	MEOH	03/21/09

LCS SOLUTIONS

11/08/08

32	1545-3	GUAIACOL	50-200	ACETONE	06/05/09
33	1522-1	RESIN ACID	250	ACETONE	06/11/09
34	1530-2	CONGENERS	1	ACETONE	07/23/09
50	1523-1	FULL RESIN	250	ACETONE	06/10/09
*=REVERIFIED SOLUTION					

SURR SOLUTIONS

11/08/2008

LABEL	SOLN ID	TEST	CONC. UG/ML	SOLVENT	EXP.
A	1559-5	ABN	100/150	MEOH	03/13/09
B	1513-1	SIM PNA	15/75	MEOH	04/15/09
C	1559-1	SIM ABN	25/37.5	MEOH	03/13/09
D	1538-3	LOW PCB	0.2	ACETONE	07/31/09
E*	1478-1	HERB	62.5	MEOH	09/21/09
F	1520-3	PCP	12.5	ACETONE	04/18/09
G	1534-1	1,4DIOXANE	100	MEOH	02/20/09
H	1545-1	OP-PEST	25	MEOH	02/14/09
I	1559-4	LOW S. PNA	1.5	MEOH	08/28/09
J	1493-2	TBT-PORE	0.25	MECL2	12/15/08
K	1538-1	MED PCB	20	ACETONE	07/31/09
L	1486-5	TBT	10	MECL2	12/15/08
M	1558-2	EPH	1500	MECL2	09/24/09
N	1538-2	PCB	2	ACETONE	07/31/09
O	1544-3	TPH	450	MECL2	09/24/09
P	1544-2	HCID	2250	MECL2	09/24/09
Q	1497-3	EDB	2	ACETONE	02/12/09
R	1521-4	RESIN ACID	250	ACETONE	06/11/09
S	*reverified solution				
T					
U					
V					
W					
X					
Y					
Z					

Data Summary
Package

Prepared
for

The Boeing Company

Project: PLANT 2 SOURCE CONTROL

ARI IDS.: OB32 & OB33

Prepared
By

Analytical Resources, Inc.

Metals

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
DISSOLVED METALS
Page 1 of 1

Sample ID: PL2SC-W-I-112008
SAMPLE

Lab Sample ID: OB32A
LIMS ID: 08-31760
Matrix: Water
Data Release Authorized:
Reported: 12/10/08

QC Report No: OB32-The Boeing Company
Project: BP2 Source Control

Date Sampled: 11/20/08
Date Received: 11/20/08

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	RL	mg/L	Q
7000A	11/25/08	7060A	12/09/08	7440-38-2	Arsenic	0.001	0.001	U
6010B	11/25/08	6010B	12/03/08	7440-43-9	Cadmium	0.002	0.002	U
6010B	11/25/08	6010B	12/03/08	7440-47-3	Chromium	0.005	0.005	U
6010B	11/25/08	6010B	12/03/08	7440-50-8	Copper	0.002	0.002	U
7000A	11/25/08	7421	12/09/08	7439-92-1	Lead	0.001	0.001	U
6010B	11/25/08	6010B	12/03/08	7440-22-4	Silver	0.003	0.003	U
6010B	11/25/08	6010B	12/03/08	**7440-66-6**	**Zinc**	0.01	**0.06**	

U-Analyte undetected at given RL
RL-Reporting Limit

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
DISSOLVED METALS

Sample ID: LAB CONTROL

Lab Sample ID: OB32LCS
LIMS ID: 08-31760
Matrix: Water
Data Release Authorized:
Reported: 12/10/08

QC Report No: OB32-The Boeing Company
Project: BP2 Source Control

Date Sampled: NA
Date Received: NA

BLANK SPIKE QUALITY CONTROL REPORT

Analyte	Analysis Method	Spike Found	Spike Added	% Recovery	Q
Arsenic	7060A	0.021	0.020	105%	
Cadmium	6010B	0.547	0.500	109%	
Chromium	6010B	0.515	0.500	103%	
Copper	6010B	0.510	0.500	102%	
Lead	7421	0.021	0.020	105%	
Silver	6010B	0.527	0.500	105%	
Zinc	6010B	0.52	0.50	104%	

Reported in mg/L

N-Control limit not met
Control Limits: 80-120%

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
DISSOLVED METALS

Sample ID: METHOD BLANK

Lab Sample ID: OB32MB
LIMS ID: 08-31760
Matrix: Water
Data Release Authorized:
Reported: 12/10/08

QC Report No: OB32-The Boeing Company
Project: BP2 Source Control

Date Sampled: NA
Date Received: NA

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	RL	mg/L	Q
7000A	11/25/08	7060A	12/09/08	7440-38-2	Arsenic	0.001	0.001	U
6010B	11/25/08	6010B	12/03/08	7440-43-9	Cadmium	0.002	0.002	U
6010B	11/25/08	6010B	12/03/08	7440-47-3	Chromium	0.005	0.005	U
6010B	11/25/08	6010B	12/03/08	7440-50-8	Copper	0.002	0.002	U
7000A	11/25/08	7421	12/09/08	7439-92-1	Lead	0.001	0.001	U
6010B	11/25/08	6010B	12/03/08	7440-22-4	Silver	0.003	0.003	U
6010B	11/25/08	6010B	12/03/08	7440-66-6	Zinc	0.01	0.01	U

U-Analyte undetected at given RL
RL-Reporting Limit

Low-Level Mercury

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
Dissolved Mercury by Method SW7470A

Data Release Authorized:
Reported: 12/08/08
Date Received: 11/20/08
Page 1 of 1

QC Report No: OB33-The Boeing Company
Project: BP2 Source Control

Client/ ARI ID	Date Sampled	Matrix	Prep Date Anal Date	RL	Result
PL2SC-W-I-112008 OB33A 08-31761	11/20/08	Water	11/25/08 12/03/08	20.0	20.0 U
MB-112508 Method Blank	NA	Water	11/25/08 12/03/08	20.0	20.0 U

Reported in ng/L

RL-Analytical reporting limit
U-Undetected at reported detection limit

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
DISSOLVED METALS

Sample ID: PL2SC-W-I-112008
DUPLICATE

Lab Sample ID: OB33A
LIMS ID: 08-31761
Matrix: Water
Data Release Authorized:
Reported: 12/08/08

QC Report No: OB33-The Boeing Company
Project: BP2 Source Control

Date Sampled: 11/20/08
Date Received: 11/20/08

MATRIX DUPLICATE QUALITY CONTROL REPORT

Analyte	Analysis Method	Sample	Duplicate	RPD	Control Limit	Q
Mercury	7470A	20.0 U	20.0 U	0.0%	+/- 20.0	L

Reported in ng/L

*-Control Limit Not Met
L-RPD Invalid, Limit = Detection Limit

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
DISSOLVED METALS

Sample ID: PL2SC-W-I-112008
MATRIX SPIKE

Lab Sample ID: OB33A
LIMS ID: 08-31761
Matrix: Water
Data Release Authorized:
Reported: 12/08/08

QC Report No: OB33-The Boeing Company
Project: BP2 Source Control

Date Sampled: 11/20/08
Date Received: 11/20/08

MATRIX SPIKE QUALITY CONTROL REPORT

Analyte	Analysis Method	Sample	Spike	Spike Added	% Recovery	Q
Mercury	7470A	20.0 U	124	100	124%	

Reported in ng/L

N-Control Limit Not Met
H-% Recovery Not Applicable, Sample Concentration Too High
NA-Not Applicable, Analyte Not Spiked

Percent Recovery Limits: 75-125%

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
DISSOLVED METALS

Sample ID: LAB CONTROL

Lab Sample ID: OB33LCS
LIMS ID: 08-31761
Matrix: Water
Data Release Authorized:
Reported: 12/08/08

QC Report No: OB33-The Boeing Company
Project: BP2 Source Control

Date Sampled: NA
Date Received: NA

BLANK SPIKE QUALITY CONTROL REPORT

Analyte	Analysis Method	Spike Found	Spike Added	% Recovery	Q
Mercury	7470A	235	200	118%	

Reported in ng/L

N-Control limit not met
Control Limits: 80-120%

Analytical Resources, Incorporated
Analytical Chemists and Consultants

December 11, 2008

Kent Angelos
Golder Associates, Inc.
18300 NE Union Hill Road, Suite 200
Redmond, WA 98052-3333

RE: Boeing Plant 2 Source Control, 013-1646-008-500
ARI ID: OB37 & OB38

Dear Kent:

Please find enclosed the original Chain-of-Custody (COC) records, sample receipt documentation, and the final data package for the project referenced above.

Sample receipt information and analytical details are addressed in the Case Narrative.

An electronic copy of this package will be kept on file at ARI. If you have any questions or require additional information, please contact me at your convenience.

Sincerely,
ANALYTICAL RESOURCES, INC.

Kelly Bottem
Client Services Manager
(206) 695-6211
kellyb@arilabs.com

KB/co

Enclosures

cc: Kent Angelos, Golder Associates Inc., 18300 NE Union Hill Road, Suite 200, Redmond, WA 98052-3333

Chain of Custody &
Sample Receipt Documentation

Prepared
for

The Boeing Company

Project: PLANT 2 SOURCE CONTROL

ARI IDS.: OB37 & OB38

Prepared
By

Analytical Resources, Inc.

Chain of Custody Record & Laboratory Analysis Request

ARI Assigned Number: OB37	Turn-around Requested: STD
ARI Client Company: BOEING	Phone:
Client Contact: WILL ERNST	
Client Project Name: BP2 Source Control	
Client Project #: 013646 008500	Samplers: Liz Shea Dan Gorman

Page: 1	of 1
Date: 11/21/08	Ice Present? Y
No. of Coolers: 1	Cooler Temps: 6.0

Analytical Resources, Incorporated
Analytical Chemists and Consultants
4611 South 134th Place, Suite 100
Tukwila, WA 98168
206-695-6200 206-695-6201 (fax)

Sample ID	Date	Time	Matrix	No. Containers	Dissolved SMS Metals*	Dissolved LL Hg*	PCB						Notes/Comments
PL2SC-EB3-112108	11/21/08	1215	W	4	X	X	X						* field filtered

Comments/Special Instructions: SMS Metals as per QAPP- see PM

Relinquished by: (Signature) Elizabeth Shea	Received by: (Signature)	Relinquished by: (Signature)	Received by: (Signature)
Printed Name: Liz Shea	Printed Name: A. Vorgardsen	Printed Name:	Printed Name:
Company: Golder	Company: ARI	Company:	Company:
Date & Time: 11/21/08 1446	Date & Time: 11/21/08 1446	Date & Time:	Date & Time:

Analytical Resources, Incorporated
Analytical Chemists and Consultants

Cooler Receipt Form

ARI Client: Boeing
COC No:
Assigned ARI Job No: OB37

Project Name: BP2 Source Control
Delivered by: Hand
Tracking No:

Preliminary Examination Phase:

Were intact, properly signed and dated custody seals attached to the outside of to cooler?	YES	(NO)
Were custody papers included with the cooler?	(YES)	NO
Were custody papers properly filled out (ink, signed, etc.)	(YES)	NO
Record cooler temperature (recommended 2.0-6.0 °C for chemistry	0.8	°C

Cooler Accepted by: AV Date: 11/21/08 Time: 1446

Complete custody forms and attach all shipping documents

Log-In Phase:

Was a temperature blank included in the cooler?	YES	(NO)
What kind of packing material was used?	ICE/Bw	
Was sufficient ice used (if appropriate)?	YES	(NO)
Were all bottles sealed in individual plastic bags?	(YES)	NO
Did all bottle arrive in good condition (unbroken)?	(YES)	NO
Were all bottle labels complete and legible?	(YES)	NO
Did all bottle labels and tags agree with custody papers?	(YES)	NO
Were all bottles used correct for the requested analyses?	(YES)	NO
Do any of the analyses (bottles) require preservation? (attach preservation checklist)	(YES)	NO
Were all VOC vials free of air bubbles? (NA)	YES	NO
Was sufficient amount of sample sent in each bottle?	(YES)	NO

Samples Logged by: JW Date: 11/24/08 Time: 845

*** Notify Project Manager of discrepancies or concerns ***

Explain discrepancies or negative responses:

By: Date:

OB37 OB38 : 00003

PRESERVATION VERIFICATION 11/24/08
Page 1 of 1

ANALYTICAL RESOURCES INCORPORATED

ARI Job No: **OB37**

Inquiry Number: NONE
Analysis Requested: 11/21/08
Contact: Ernst, Will
Client: The Boeing Company
Logged by: JW
Sample Set Used: Yes-481
Validatable Package: ~~No~~ Yes
Deliverables:

PC: Kelly
VTSR: 11/21/08

Project #: 0131646008500
Project: BP2 Source Control
Sample Site:
SDG No:
Analytical Protocol: In-house

LOGNUM ARI ID	CLIENT ID	CN >12	WAD >12	NH3 <2	COD <2	FOG <2	MET <2	PHEN <2	PHOS <2	TKN <2	NO23 <2	TOC <2	S2 >9	DMET FLT	DOC FLT	PARAMETER	ADJUSTED TO	LOT NUMBER	AMOUNT ADDED	DATE/BY
08-31764 OB37A	PL2SC-EB3-112108						DIS ok							Y						

Checked By JW Date 11/24/08

PRESERVATION VERIFICATION 11/24/08
Page 1 of 1

ANALYTICAL RESOURCES INCORPORATED

ARI Job No: **OB38**

Inquiry Number: NONE
Analysis Requested: 11/21/08
Contact: Ernst, Will
Client: The Boeing Company
Logged by: JW
Sample Set Used: Yes-481
Validatable Package: ~~No~~ Yes
Deliverables:

PC: Kelly
VTSR: 11/21/08

Project #: 0131646008500
Project: BP2 Source Control
Sample Site:
SDG No:
Analytical Protocol: In-house

LOGNUM ARI ID	CLIENT ID	CN >12	WAD >12	NH3 <2	COD <2	FOG <2	MET <2	PHEN <2	PHOS <2	TKN <2	NO23 <2	TOC <2	S2 >9	DMET FLT	DOC FLT	PARAMETER	ADJUSTED TO	LOT NUMBER	AMOUNT ADDED	DATE/BY
08-31765 **OB38A**	PL2SC-EB3-112108						DIS ok							Y						

Checked By JW Date 11/24/08

Analytical Resources, Incorporated
Analytical Chemists and Consultants

Cooler Receipt Form

ARI Client: Boeing
COC No:
Assigned ARI Job No: 0838

Project Name: BP2 Source Control
Delivered by: Hand
Tracking No:

Preliminary Examination Phase:

Were intact, properly signed and dated custody seals attached to the outside of to cooler? YES (NO)
Were custody papers included with the cooler? (YES) NO
Were custody papers properly filled out (ink, signed, etc.) (YES) NO
Record cooler temperature (recommended 2.0-6.0 °C for chemistry 6.8 °C

Cooler Accepted by: AV Date: 11/21/08 Time: 1446

Complete custody forms and attach all shipping documents

Log-In Phase:

Was a temperature blank included in the cooler? YES (NO)
What kind of packing material was used? ICE
Was sufficient ice used (if appropriate)? YES (NO)
Were all bottles sealed in individual plastic bags? (YES) NO
Did all bottle arrive in good condition (unbroken)? (YES) NO
Were all bottle labels complete and legible? (YES) NO
Did all bottle labels and tags agree with custody papers? (YES) NO
Were all bottles used correct for the requested analyses? (YES) NO
Do any of the analyses (bottles) require preservation? (attach preservation checklist) (YES) NO
Were all VOC vials free of air bubbles? (NA) YES NO
Was sufficient amount of sample sent in each bottle? (YES) NO

Samples Logged by: JW Date: 11/24/08 Time: 845

** *Notify Project Manager of discrepancies or concerns* **

Explain discrepancies or negative responses:

By: Date:

Case Narrative &
Data Reporting Qualifiers

Prepared
for

The Boeing Company

Project: PLANT 2 SOURCE CONTROL

ARI IDS.: OB37 & OB38

Prepared
By

Analytical Resources, Inc.

ANALYTICAL
RESOURCES
INCORPORATED

Case Narrative

Project: Boeing Plant 2 Source Control, 013-1646-008-500
ARI ID: OB37 & OB38
Matrix: Water
Date: December 11, 2008

Sample Receipt Information

One water sample was received in good condition at Analytical Resources, Inc. (ARI) on November 21, 2008 under ARI sample delivery groups OB37 and OB38. The cooler temperature measured by IR thermometer was 6.8°C. For further details regarding sample receipt, please refer to the Cooler Receipt Form.

PCBs by Method 8082:

The sample was extracted on 11/24/08 and analyzed on 11/29/08 within the method recommended holding times.

Initial calibration (s): All analytes of interest were within method acceptance criteria.

Continuing calibration (s): Are in control.

Samples: There were no anomalies associated with these samples.

Surrogates: The surrogate percent recoveries were within control limits.

LCS(s): All LCS percent recoveries were within control limits..

Method Blank: The method blank was free of contamination.

Dissolved Metals by Methods 6010B and 7000 series

The samples were digested on 11/25/08. The digests were analyzed between 11/25/08 and 12/9/08 within the method recommended holding times.

Replicate(s): All percent recoveries were within compliance.

Samples: No anomalies were encountered for these samples.

LCS/Blank Spike(s): All percent recoveries were within compliance.

Method Blank(s): Are in control.

Standard Reference: All percent recoveries were within compliance.

Data Reporting Qualifiers

Effective 12/28/04

Inorganic Data

U	Indicates that the target analyte was not detected at the reported concentration
*	Duplicate RPD is not within established control limits
B	Reported value is less than the CRDL but ≥ the Reporting Limit
N	Matrix Spike recovery not within established control limits
NA	Not Applicable, analyte not spiked
H	The natural concentration of the spiked element is so much greater than the concentration spiked that an accurate determination of spike recovery is not possible
L	Analyte concentration is ≤5 times the Reporting Limit and the replicate control limit defaults to ±1 RL instead of the normal 20% RPD

Organic Data

U	Indicates that the target analyte was not detected at the reported concentration
*	Flagged value is not within established control limits
B	Analyte detected in an associated Method Blank at a concentration greater than one-half of ARI's Reporting Limit or 5% of the regulatory limit or 5% of the analyte concentration in the sample.
J	Estimated concentration when the value is less than ARI's established reporting limits
D	The spiked compound was not detected due to sample extract dilution
NR	Spiked compound recovery is not reported due to chromatographic interference
E	Estimated concentration calculated for an analyte response above the valid instrument calibration range. A dilution is required to obtain an accurate quantification of the analyte.
S	Indicates an analyte response that has saturated the detector. The calculated concentration is not valid; a dilution is required to obtain valid quantification of the analyte
NA	The flagged analyte was not analyzed for
NS	The flagged analyte was not spiked into the sample

M Estimated value for an analyte detected and confirmed by an analyst but with low spectral match parameters. This flag is used only for GC-MS analyses

M2 The sample contains PCB congeners that do not match any standard Aroclor pattern. The PCBs are identified and quantified as the Aroclor whose pattern most closely matches that of the sample. The reported value is an estimate.

N The analysis indicates the presence of an analyte for which there is presumptive evidence to make a "tentative identification"

Y The analyte is not detected at or above the reported concentration. The reporting limit is raised due to chromatographic interference. The Y flag is equivalent to the U flag with a raised reporting limit.

C The analyte was positively identified on only one of two chromatographic columns. Chromatographic interference prevented a positive identification on the second column

P The analyte was detected on both chromatographic columns but the quantified values differ by ≥40% RPD with no obvious chromatographic interference

Geotechnical Data

A The total of all fines fractions. This flag is used to report total fines when only sieve analysis is requested and balances total grain size with sample weight.

F Samples were frozen prior to particle size determination

SM Sample matrix was not appropriate for the requested analysis. This normally refers to samples contaminated with an organic product that interferes with the sieving process and/or moisture content, porosity and saturation calculations

SS Sample did not contain the proportion of "fines" required to perform the pipette portion of the grain size analysis

W Weight of sample in some pipette aliquots was below the level required for accurate weighting

LCS SOLUTIONS

11/08/08

LABE	SOLN ID	TEST	CONC. UG/ML	SOLVENT	EXP.
1	1549-3	PCB	20	ACETONE	10/10/09
2	1472-3	BCOC PEST	10	ACETONE	07/20/08
3	1517-1	PEST	02/04/20	ACETONE	05/15/09
4	1546-4	LOW PEST	0.2/0.4/2	ACETONE	05/15/09
5	1537-1	EPH	1500	MECL2	08/16/09
6	1559-2	PCP	12.5/125	ACETONE	11/05/09
7	1548-2	ABN	100	ACETONE	08/01/09
8	1487-2	TBT	10	MECL2	12/15/08
9	1493-3	PORE TBT	.25/.5	MECL2	12/15/08
10	1554-3	ABN ACID	100/200	MEOH	10/21/09
11	1556-1	TPHD	15000	ACETONE	10/23/09
12	1542-1	ABN BASE	200	ACETONE	07/01/09
13*	1427-3	LOW PCB	2	ACETONE	10/11/08
14	1547-1	LOW ABN ACID	10/20	MEOH	04/10/09
15*	1452-1	SIM PNA	15/75	MEOH	04/09/09
16	1502-2	DIOXANE	100	MEOH	02/20/09
17	1516-2	1248 PCB	20	ACETONE	05/07/09
18	1514-4	LOW SIM PNA	1.5/7.5	ACETONE	04/24/09
19	1517-3	AK103	7500	MECL2	12/29/08
20	1490-4	PNA	100	MEOH	01/10/09
21*	1414-4	SKY/BHT	100	MEOH	04/08/09
22	1539-1	HERB	12.5/12500	MEOH	08/31/09
23	1505-1	LOW ABN BASE	20	MEOH	03/20/09
24	1541-4	LOW ABN	10	ACETONE	08/01/09
25	1481-1	DIPHENYL	100	MEOH	07/20/08
26	1545-2	OP-PEST	25	MEOH	02/14/09
27	1495-1	STEROLS	200	MEOH	12/29/08
28	1494-1	ADD. PEST	4	ACETONE	01/23/09
29	1496-3	DECANES	100	MEOH	02/12/09
30	1497-2	EDB/DBCP	2	ACETONE	02/12/09
31	1510-3	TERPINEOL	100	MEOH	03/21/09

LCS SOLUTIONS

11/08/08

32	1545-3	GUAIACOL	50-200	ACETONE	06/05/09
33	1522-1	RESIN ACID	250	ACETONE	06/11/09
34	1530-2	CONGENERS	1	ACETONE	07/23/09
50	1523-1	FULL RESIN	250	ACETONE	06/10/09
*=REVERIFIED SOLUTION					

SURR SOLUTIONS

11/08/2008

LABEL	SOLN ID	TEST	CONC. UG/ML	SOLVENT	EXP.
A	1559-5	ABN	100/150	MEOH	03/13/09
B	1513-1	SIM PNA	15/75	MEOH	04/15/09
C	1559-1	SIM ABN	25/37.5	MEOH	03/13/09
D	1538-3	LOW PCB	0.2	ACETONE	07/31/09
E*	1478-1	HERB	62.5	MEOH	09/21/09
F	1520-3	PCP	12.5	ACETONE	04/18/09
G	1534-1	1,4DIOXANE	100	MEOH	02/20/09
H	1545-1	OP-PEST	25	MEOH	02/14/09
I	1559-4	LOW S. PNA	1.5	MEOH	08/28/09
J	1493-2	TBT-PORE	0.25	MECL2	12/15/08
K	1538-1	MED PCB	20	ACETONE	07/31/09
L	1486-5	TBT	10	MECL2	12/15/08
M	1558-2	EPH	1500	MECL2	09/24/09
N	1538-2	PCB	2	ACETONE	07/31/09
O	1544-3	TPH	450	MECL2	09/24/09
P	1544-2	HCID	2250	MECL2	09/24/09
Q	1497-3	EDB	2	ACETONE	02/12/09
R	1521-4	RESIN ACID	250	ACETONE	06/11/09
S	*reverified	solution			
T					
U					
V					
W					
X					
Y					
Z					

Data Summary
Package

Prepared
for

The Boeing Company

Project: PLANT 2 SOURCE CONTROL

ARI IDS.: OB37 & OB38

Prepared
By

Analytical Resources, Inc.

PCBs

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PCB by GC/ECD Method SW8082
Page 1 of 1

Sample ID: PL2SC-EB3-112108
SAMPLE

Lab Sample ID: OB37A
LIMS ID: 08-31764
Matrix: Water
Data Release Authorized:
Reported: 12/02/08

QC Report No: OB37-The Boeing Company
Project: BP2 Source Control
0131646008500
Date Sampled: 11/21/08
Date Received: 11/21/08

Date Extracted: 11/24/08
Date Analyzed: 11/29/08 07:04
Instrument/Analyst: ECD5/JGR
GPC Cleanup: No
Sulfur Cleanup: No

Sample Amount: 410 mL
Final Extract Volume: 5.0 mL
Dilution Factor: 1.00
Silica Gel: No
Acid Cleanup: No

CAS Number	Analyte	RL	Result
12674-11-2	Aroclor 1016	1.2	< 1.2 U
53469-21-9	Aroclor 1242	1.2	< 1.2 U
12672-29-6	Aroclor 1248	1.2	< 1.2 U
11097-69-1	Aroclor 1254	1.2	< 1.2 U
11096-82-5	Aroclor 1260	1.2	< 1.2 U
11104-28-2	Aroclor 1221	1.2	< 1.2 U
11141-16-5	Aroclor 1232	1.2	< 1.2 U

Reported in µg/L (ppb)

PCB Surrogate Recovery

Decachlorobiphenyl	86.2%
Tetrachlorometaxylene	74.5%

ANALYTICAL RESOURCES INCORPORATED

SW8082/PCB WATER SURROGATE RECOVERY SUMMARY

Matrix: Water

QC Report No: OB37-The Boeing Company
Project: BP2 Source Control
0131646008500

Client ID	DCBP % REC	DCBP LCL-UCL	TCMX % REC	TCMX LCL-UCL	TOT OUT
MB-112408	84.0%	47-101	79.2%	61-104	0
LCS-112408	81.0%	47-101	76.2%	61-104	0
LCSD-112408	86.2%	47-101	80.0%	61-104	0
PL2SC-EB3-112108	86.2%	42-120	74.5%	55-102	0

Prep Method: SW3510C
Log Number Range: 08-31764 to 08-31764

FORM-II SW8082

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PCB by GC/ECD Method SW8082
Page 1 of 1

Sample ID: LCS-112408
LCS/LCSD

Lab Sample ID: LCS-112408
LIMS ID: 08-31764
Matrix: Water
Data Release Authorized:
Reported: 12/02/08

QC Report No: OB37-The Boeing Company
Project: BP2 Source Control
0131646008500
Date Sampled: NA
Date Received: NA

Date Extracted LCS/LCSD: 11/24/08

Date Analyzed LCS: 11/29/08 06:30
LCSD: 11/29/08 06:47
Instrument/Analyst LCS: ECD5/JGR
LCSD: ECD5/JGR
GPC Cleanup: No
Sulfur Cleanup: No

Sample Amount LCS: 500 mL
LCSD: 500 mL
Final Extract Volume LCS: 5.0 mL
LCSD: 5.0 mL
Dilution Factor LCS: 1.00
LCSD: 1.00
Silica Gel: No
Acid Cleanup: No

Analyte	LCS	Spike Added-LCS	LCS Recovery	LCSD	Spike Added-LCSD	LCSD Recovery	RPD
Aroclor 1016	4.53	5.00	90.6%	4.74	5.00	94.8%	4.5%
Aroclor 1260	4.71	5.00	94.2%	4.86	5.00	97.2%	3.1%

PCB Surrogate Recovery

	LCS	LCSD
Decachlorobiphenyl	81.0%	86.2%
Tetrachlorometaxylene	76.2%	80.0%

Results reported in µg/L
RPD calculated using sample concentrations per SW846.

PCB METHOD BLANK SUMMARY

BLANK NO.

OB37MBW1

Lab Name: ANALYTICAL RESOURCES, INC
Client: THE BOEING COMPANY

ARI Job No.: OB37
Project: BP2 SOURCE CONTROL

Lab Sample ID: OB37MBW1
Lab File ID: 1128B085

Date Extracted: 11/24/08
Matrix: LIQUID

Date Analyzed: 11/29/08
Instrument ID: ECD5

Time Analyzed: 0613
GC Columns: ZB5/ZB35

THIS METHOD BLANK APPLIES TO THE FOLLOWING SAMPLES, MS and MSD:

	CLIENT SAMPLE NO.	LAB SAMPLE ID	DATE ANALYZED
01	OB37LCSW1	OB37LCSW1	11/29/08
02	OB37LCSDW1	OB37LCSDW1	11/29/08
03	PL2SC-EB3-112108	OB37A	11/29/08

ALL RUNS ARE DUAL COLUMN

FORM IV PCB

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PCB by GC/ECD Method SW8082
Page 1 of 1

Sample ID: MB-112408
METHOD BLANK

Lab Sample ID: MB-112408
LIMS ID: 08-31764
Matrix: Water
Data Release Authorized:
Reported: 12/02/08

QC Report No: OB37-The Boeing Company
Project: BP2 Source Control
0131646008500
Date Sampled: NA
Date Received: NA

Date Extracted: 11/24/08
Date Analyzed: 11/29/08 06:13
Instrument/Analyst: ECD5/JGR
GPC Cleanup: No
Sulfur Cleanup: No

Sample Amount: 500 mL
Final Extract Volume: 5.0 mL
Dilution Factor: 1.00
Silica Gel: No
Acid Cleanup: No

CAS Number	Analyte	RL	Result
12674-11-2	Aroclor 1016	1.0	< 1.0 U
53469-21-9	Aroclor 1242	1.0	< 1.0 U
12672-29-6	Aroclor 1248	1.0	< 1.0 U
11097-69-1	Aroclor 1254	1.0	< 1.0 U
11096-82-5	Aroclor 1260	1.0	< 1.0 U
11104-28-2	Aroclor 1221	1.0	< 1.0 U
11141-16-5	Aroclor 1232	1.0	< 1.0 U

Reported in µg/L (ppb)

PCB Surrogate Recovery

Decachlorobiphenyl	84.0%
Tetrachlorometaxylene	79.2%

Metals

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
DISSOLVED METALS
Page 1 of 1

Sample ID: PL2SC-EB3-112108
SAMPLE

Lab Sample ID: OB37A
LIMS ID: 08-31764
Matrix: Water
Data Release Authorized:
Reported: 12/10/08

QC Report No: OB37-The Boeing Company
Project: BP2 Source Control
0131646008500
Date Sampled: 11/21/08
Date Received: 11/21/08

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	RL	mg/L	Q
7000A	11/25/08	7060A	12/09/08	7440-38-2	Arsenic	0.001	0.001	U
6010B	11/25/08	6010B	12/03/08	7440-43-9	Cadmium	0.002	0.002	U
6010B	11/25/08	6010B	12/03/08	7440-47-3	Chromium	0.005	0.005	U
6010B	11/25/08	6010B	12/03/08	7440-50-8	Copper	0.002	0.002	U
7000A	11/25/08	7421	12/09/08	7439-92-1	Lead	0.001	0.001	U
6010B	11/25/08	6010B	12/03/08	7440-22-4	Silver	0.003	0.003	U
6010B	11/25/08	6010B	12/03/08	7440-66-6	Zinc	0.01	0.01	U

U-Analyte undetected at given RL
RL-Reporting Limit

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
DISSOLVED METALS
Page 1 of 1

Sample ID: LAB CONTROL

Lab Sample ID: OB37LCS
LIMS ID: 08-31764
Matrix: Water
Data Release Authorized:
Reported: 12/10/08

QC Report No: OB37-The Boeing Company
Project: BP2 Source Control
0131646008500
Date Sampled: NA
Date Received: NA

BLANK SPIKE QUALITY CONTROL REPORT

Analyte	Analysis Method	Spike Found	Spike Added	% Recovery	Q
Arsenic	7060A	0.021	0.020	105%	
Cadmium	6010B	0.536	0.500	107%	
Chromium	6010B	0.515	0.500	103%	
Copper	6010B	0.501	0.500	100%	
Lead	7421	0.021	0.020	105%	
Silver	6010B	0.526	0.500	105%	
Zinc	6010B	0.52	0.50	104%	

Reported in mg/L

N-Control limit not met
Control Limits: 80-120%

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
DISSOLVED METALS
Page 1 of 1

Sample ID: METHOD BLANK

Lab Sample ID: OB37MB
LIMS ID: 08-31764
Matrix: Water
Data Release Authorized:
Reported: 12/10/08

QC Report No: OB37-The Boeing Company
Project: BP2 Source Control
0131646008500
Date Sampled: NA
Date Received: NA

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	RL	mg/L	Q
7000A	11/25/08	7060A	12/09/08	7440-38-2	Arsenic	0.001	0.001	U
6010B	11/25/08	6010B	12/03/08	7440-43-9	Cadmium	0.002	0.002	U
6010B	11/25/08	6010B	12/03/08	7440-47-3	Chromium	0.005	0.005	U
6010B	11/25/08	6010B	12/03/08	7440-50-8	Copper	0.002	0.002	U
7000A	11/25/08	7421	12/09/08	7439-92-1	Lead	0.001	0.001	U
6010B	11/25/08	6010B	12/03/08	7440-22-4	Silver	0.003	0.003	U
6010B	11/25/08	6010B	12/03/08	7440-66-6	Zinc	0.01	0.01	U

U-Analyte undetected at given RL
RL-Reporting Limit

Low-Level Mercury

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
Dissolved Mercury by Method SW7470A

Data Release Authorized:
Reported: 12/08/08
Date Received: 11/21/08
Page 1 of 1

QC Report No: OB38-The Boeing Company
Project: BP2 Source Control
0131646008500

Client/ ARI ID	Date Sampled	Matrix	Prep Date Anal Date	RL	Result
PL2SC-EB3-112108 OB38A 08-31765	11/21/08	Water	11/25/08 12/03/08	20.0	20.0 U
MB-112508 Method Blank	NA	Water	11/25/08 12/03/08	20.0	20.0 U

Reported in ng/L

RL-Analytical reporting limit
U-Undetected at reported detection limit

FORM-I

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
DISSOLVED METALS

Sample ID: PL2SC-EB3-112108
DUPLICATE

Lab Sample ID: OB38A
LIMS ID: 08-31765
Matrix: Water
Data Release Authorized:
Reported: 12/08/08

QC Report No: OB38-The Boeing Company
Project: BP2 Source Control
0131646008500
Date Sampled: 11/21/08
Date Received: 11/21/08

MATRIX DUPLICATE QUALITY CONTROL REPORT

Analyte	Analysis Method	Sample	Duplicate	RPD	Control Limit	Q
Mercury	7470A	20.0 U	20.0 U	0.0%	+/- 20.0	L

Reported in ng/L

*-Control Limit Not Met
L-RPD Invalid, Limit = Detection Limit

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
DISSOLVED METALS

Sample ID: PL2SC-EB3-112108
MATRIX SPIKE

Lab Sample ID: OB38A
LIMS ID: 08-31765
Matrix: Water
Data Release Authorized:
Reported: 12/08/08

QC Report No: OB38-The Boeing Company
Project: BP2 Source Control
0131646008500
Date Sampled: 11/21/08
Date Received: 11/21/08

MATRIX SPIKE QUALITY CONTROL REPORT

Analyte	Analysis Method	Sample	Spike	Spike Added	% Recovery	Q
Mercury	7470A	20.0 U	113	100	113%	

Reported in ng/L

N-Control Limit Not Met
H-% Recovery Not Applicable, Sample Concentration Too High
NA-Not Applicable, Analyte Not Spiked

Percent Recovery Limits: 75-125%

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
DISSOLVED METALS

Sample ID: LAB CONTROL

Lab Sample ID: OB38LCS
LIMS ID: 08-31765
Matrix: Water
Data Release Authorized:
Reported: 12/08/08

QC Report No: OB38-The Boeing Company
Project: BP2 Source Control
0131646008500
Date Sampled: NA
Date Received: NA

BLANK SPIKE QUALITY CONTROL REPORT

Analyte	Analysis Method	Spike Found	Spike Added	% Recovery	Q
Mercury	7470A	208	200	104%	

Reported in ng/L

N-Control limit not met
Control Limits: 80-120%

Analytical Resources, Incorporated
Analytical Chemists and Consultants

December 31, 2008

Will Ernst
The Boeing Company
Energy and Environmental Affairs
P.O. Box 3707, M/S 7A-WH
Seattle, WA 98124-2207

RE: Boeing Plant 2 Source Control
ARI ID: OC61 and OC62

Dear Will:

Please find enclosed the original *Chain of Custody* (COC) record and final data package for the project referenced above.

Sample receipt information and analytical details are addressed in the *Case Narrative*.

Copies of the reports and all associated raw data will be kept on file at ARI. If you have any questions or require additional information, please contact me at your convenience.

Sincerely,
ANALYTICAL RESOURCES, INC.

Kelly Bottem
Client Services Manager
(206) 695-6211
kellyb@arilabs.com

KB/eb

Enclosures

cc: Kent Angelos, Golder Associates Inc., 18300 NE Union Hill Road, Suite 200, Redmond, WA 98052-3333

Chain of Custody
Documentation

prepared
for

THE BOEING COMPANY

Project: BPL Source Control

ARI JOB NOS.: OC61 & OC62

prepared
by

Analytical Resources, Inc.

Chain of Custody Record & Laboratory Analysis Request

ARI Assigned Number: OC61 / OC62	Turn-around Requested: Std	Page: 1 of 1	
ARI Client Company: BOEING	Phone:	Date: 12/03/08	Ice Present?
Client Contact: WILLERNST		No. of Coolers:	Cooler Temps:
Client Project Name: BP2 Source Control			
Client Project #: 08-LS	Samplers: Liz Shea Jill Lamberts		

Analytical Resources, Incorporated
Analytical Chemists and Consultants
4611 South 134th Place, Suite 100
Tukwila, WA 98168
206-695-6200 206-695-6201 (fax)

Sample ID	Date	Time	Matrix	No. Containers	Analysis Requested: PCBs	SVOCs	*SVOCs Metals Dissolved	LL Hg * Dissolved					Notes/Comments
PL25C-SS-I-120308	12-3-08	1245	Filter bag	1	X	X							*field filtered
PL25C-W-EB2-120308	12-3-08	1315	W	4	X		X	X					

Comments/Special Instructions	Relinquished by: (Signature)	Printed Name:	Company:	Date & Time:	Received by: (Signature)	Printed Name:	Company:	Date & Time:	Relinquished by: (Signature)	Printed Name:	Company:	Date & Time:	Received by: (Signature)	Printed Name:	Company:	Date & Time:
*SMS Metals	Elizabeth Shea	Liz Shea 1350	Golder	12-3-08		Kelly Dolliver	ARI	12-3-08								

PRESERVATION VERIFICATION 12/05/08
Page 1 of 1

ANALYTICAL RESOURCES INCORPORATED

ARI Job No: OC61

Inquiry Number: NONE
Analysis Requested: 12/05/08
Contact: Ernst, Will
Client: The Boeing Company
Logged by: AV
Sample Set Used: Yes-490 Yes
Validatable Package: ~~No~~
Deliverables:

PC: Kelly
VTSR: 12/03/08

Project #: LS
Project: BPL SOURCE CONTROL
Sample Site:
SDG No:
Analytical Protocol: In-house

LOGNUM ARI ID	CLIENT ID	CN >12	WAD >12	NH3 <2	COD <2	FOG <2	MET <2	PHEN <2	PHOS <2	TKN <2	NO23 <2	TOC <2	S2 >9	DMET FLT	DOC FLT	PARAMETER	ADJUSTED TO	LOT NUMBER	AMOUNT ADDED	DATE/BY
08-32588 OC61C	PL2SC-W-EB2-120308						DIS													

Yead notes

Checked By AV Date 12/5/08

OC61 OC61-SDG

Analytical Resources, Incorporated
Analytical Chemists and Consultants

Cooler Receipt Form

ARI Client: Boeing
COC No: _____
Assigned ARI Job No: _____

Project Name: _____
Delivered by: Hand
Tracking No: _____

Preliminary Examination Phase:

Were intact, properly signed and dated custody seals attached to the outside of to cooler?	YES	(NO)
Were custody papers included with the cooler?	(YES)	NO
Were custody papers properly filled out (ink, signed, etc.)	(YES)	NO
Record cooler temperature (recommended 2.0-6.0 °C for chemistry	12.8 °C	

Cooler Accepted by: JH Date: 12.2.08 Time: 13:53

Complete custody forms and attach all shipping documents

no cooler

Log-In Phase:

Was a temperature blank included in the cooler?	YES	(NO)
What kind of packing material was used?	—	
Was sufficient ice used (if appropriate)?	YES	(NO)
Were all bottles sealed in individual plastic bags?	(YES)	NO
Did all bottle arrive in good condition (unbroken)?	(YES)	NO
Were all bottle labels complete and legible?	(YES)	NO
Did all bottle labels and tags agree with custody papers?	(YES)	NO
Were all bottles used correct for the requested analyses?	(YES)	NO
Do any of the analyses (bottles) require preservation? (attach preservation checklist)	(YES)	NO
Were all VOC vials free of air bubbles? (NA)	YES	NO
Was sufficient amount of sample sent in each bottle?	(YES)	NO

Samples Logged by: AV Date: 12/5/08 Time: 1106

*** Notify Project Manager of discrepancies or concerns ***

Explain discrepancies or negative responses:

By: Date:

PRESERVATION VERIFICATION 12/05/08
Page 1 of 1

ANALYTICAL RESOURCES INCORPORATED

ARI Job No: **OC62**

Inquiry Number: NONE
Analysis Requested: 12/05/08
Contact: Ernst, Will
Client: The Boeing Company
Logged by: AV
Sample Set Used: Yes-481
Validatable Package: No
Deliverables:

PC: Kelly
VTSR: 12/05/08

Project #: LS
Project: BP2 SORCE CONTROL
Sample Site:
SDG No:
Analytical Protocol: In-house

LOGNUM ARI ID	CLIENT ID	CN >12	WAD >12	NH3 <2	COD <2	FOG <2	MET <2	PHEN <2	PHOS <2	TKN <2	NO23 <2	TOC <2	S2 >9	DMET FLT	DOC FLT	PARAMETER	ADJUSTED TO	LOT NUMBER	AMOUNT ADDED	DATE/BY
08-32589 OC62A	PL2SC-W-EB2-120308						DIS							N						

OC62, OC62-32589

Checked By AV Date 12/5/08

Analytical Resources, Incorporated
Analytical Chemists and Consultants

Cooler Receipt Form

ARI Client: Boeing
COC No: _____
Assigned ARI Job No: _____

Project Name: _____
Delivered by: Hand
Tracking No: _____

Preliminary Examination Phase:

Were intact, properly signed and dated custody seals attached to the outside of to cooler?	YES	(NO)
Were custody papers included with the cooler?	(YES)	NO
Were custody papers properly filled out (ink, signed, etc.)	(YES)	NO
Record cooler temperature (recommended 2.0-6.0 °C for chemistry	12.8 °C	

Cooler Accepted by: JH Date: 12.2.08 Time: 13:53

Complete custody forms and attach all shipping documents

no cooler

Log-In Phase:

Was a temperature blank included in the cooler?	YES	(NO)
What kind of packing material was used?		
Was sufficient ice used (if appropriate)?	YES	(NO)
Were all bottles sealed in individual plastic bags?	(YES)	NO
Did all bottle arrive in good condition (unbroken)?	(YES)	NO
Were all bottle labels complete and legible?	(YES)	NO
Did all bottle labels and tags agree with custody papers?	(YES)	NO
Were all bottles used correct for the requested analyses?	(YES)	NO
Do any of the analyses (bottles) require preservation? (attach preservation checklist)	(YES)	NO
Were all VOC vials free of air bubbles? (NA)	YES	NO
Was sufficient amount of sample sent in each bottle?	(YES)	NO

Samples Logged by: AV Date: 12/15/08 Time: 1112

*** Notify Project Manager of discrepancies or concerns ***

Explain discrepancies or negative responses:

By: Date:

Case Narrative

prepared
for

THE BOEING COMPANY

Project: BPL Source Control

ARI JOB NOS.: OC61 & OC62

prepared
by

Analytical Resources, Inc.

ANALYTICAL
RESOURCES
INCORPORATED

Case Narrative

Project: Boeing Plant 2 Source Control
ARI ID: OC61 and OC62
Matrix: Filter Bag / Water
Date: December 31, 2008

Sample Receipt Information

One solid matrix sample and one Equipment Blank water sample were received in good condition at ARI on 12/03/08 under ARI sample delivery group OC61 and OC62. One cooler arrived at a temperature of 12.8°C.

PCBs by Method 8082:

The samples were extracted on 12/11/08 and 12/09/08 and analyzed on 12/16/08 and 12/10/08 within the method recommended holding times.

Initial calibration (s): All analytes of interest were within method acceptance criteria.

Continuing calibration (s): Are in control.

Samples: There were no anomalies associated with these samples.

Surrogates: All surrogate recoveries were in control.

LCS(s): All percent recoveries for the analytes of interest were within compliance.

Method Blank: The method blank was free of contamination.

Total and Dissolved Metals by Methods 6010B and 7000 series

The samples were digested on between 12/09/08 and 12/11/08. The digests were analyzed between 12/15/08 and 12/23/08 within the method recommended holding times.

Replicate(s): All percent recoveries were within compliance.

Samples: No anomalies were encountered for these samples.

LCS/Blank Spike(s): All percent recoveries were within compliance.

Method Blank(s): Are in control.

Standard Reference: All percent recoveries were within compliance.

Data Reporting Qualifiers

Effective 12/28/04

Inorganic Data

U	Indicates that the target analyte was not detected at the reported concentration
*	Duplicate RPD is not within established control limits
B	Reported value is less than the CRDL but ≥ the Reporting Limit
N	Matrix Spike recovery not within established control limits
NA	Not Applicable, analyte not spiked
H	The natural concentration of the spiked element is so much greater than the concentration spiked that an accurate determination of spike recovery is not possible
L	Analyte concentration is ≤5 times the Reporting Limit and the replicate control limit defaults to ±1 RL instead of the normal 20% RPD

Organic Data

U	Indicates that the target analyte was not detected at the reported concentration
*	Flagged value is not within established control limits
B	Analyte detected in an associated Method Blank at a concentration greater than one-half of ARI's Reporting Limit or 5% of the regulatory limit or 5% of the analyte concentration in the sample.
J	Estimated concentration when the value is less than ARI's established reporting limits
D	The spiked compound was not detected due to sample extract dilution
NR	Spiked compound recovery is not reported due to chromatographic interference
E	Estimated concentration calculated for an analyte response above the valid instrument calibration range. A dilution is required to obtain an accurate quantification of the analyte.
S	Indicates an analyte response that has saturated the detector. The calculated concentration is not valid; a dilution is required to obtain valid quantification of the analyte
NA	The flagged analyte was not analyzed for
NS	The flagged analyte was not spiked into the sample

M Estimated value for an analyte detected and confirmed by an analyst but with low spectral match parameters. This flag is used only for GC-MS analyses

M2 The sample contains PCB congeners that do not match any standard Aroclor pattern. The PCBs are identified and quantified as the Aroclor whose pattern most closely matches that of the sample. The reported value is an estimate.

N The analysis indicates the presence of an analyte for which there is presumptive evidence to make a "tentative identification"

Y The analyte is not detected at or above the reported concentration. The reporting limit is raised due to chromatographic interference. The Y flag is equivalent to the U flag with a raised reporting limit.

C The analyte was positively identified on only one of two chromatographic columns. Chromatographic interference prevented a positive identification on the second column

P The analyte was detected on both chromatographic columns but the quantified values differ by ≥40% RPD with no obvious chromatographic interference

Geotechnical Data

A The total of all fines fractions. This flag is used to report total fines when only sieve analysis is requested and balances total grain size with sample weight.

F Samples were frozen prior to particle size determination

SM Sample matrix was not appropriate for the requested analysis. This normally refers to samples contaminated with an organic product that interferes with the sieving process and/or moisture content, porosity and saturation calculations

SS Sample did not contain the proportion of "fines" required to perform the pipette portion of the grain size analysis

W Weight of sample in some pipette aliquots was below the level required for accurate weighting

LCS SOLUTIONS

11/08/08

LABE	SOLN ID	TEST	CONC. UG/ML	SOLVENT	EXP.
1	1549-3	PCB	20	ACETONE	10/10/09
2	1472-3	BCOC PEST	10	ACETONE	07/20/08
3	1517-1	PEST	02/04/20	ACETONE	05/15/09
4	1546-4	LOW PEST	0.2/0.4/2	ACETONE	05/15/09
5	1537-1	EPH	1500	MECL2	08/16/09
6	1559-2	PCP	12.5/125	ACETONE	11/05/09
7	1548-2	ABN	100	ACETONE	08/01/09
8	1487-2	TBT	10	MECL2	12/15/08
9	1493-3	PORE TBT	.25/.5	MECL2	12/15/08
10	1554-3	ABN ACID	100/200	MEOH	10/21/09
11	1556-1	TPHD	15000	ACETONE	10/23/09
12	1542-1	ABN BASE	200	ACETONE	07/01/09
13*	1427-3	LOW PCB	2	ACETONE	10/11/08
14	1547-1	LOW ABN ACID	10/20	MEOH	04/10/09
15*	1452-1	SIM PNA	15/75	MEOH	04/09/09
16	1502-2	DIOXANE	100	MEOH	02/20/09
17	1516-2	1248 PCB	20	ACETONE	05/07/09
18	1514-4	LOW SIM PNA	1.5/7.5	ACETONE	04/24/09
19	1517-3	AK103	7500	MECL2	12/29/08
20	1490-4	PNA	100	MEOH	01/10/09
21*	1414-4	SKY/BHT	100	MEOH	04/08/09
22	1539-1	HERB	12.5/12500	MEOH	08/31/09
23	1505-1	LOW ABN BASE	20	MEOH	03/20/09
24	1541-4	LOW ABN	10	ACETONE	08/01/09
25	1481-1	DIPHENYL	100	MEOH	07/20/08
26	1545-2	OP-PEST	25	MEOH	02/14/09
27	1495-1	STEROLS	200	MEOH	12/29/08
28	1494-1	ADD. PEST	4	ACETONE	01/23/09
29	1496-3	DECANES	100	MEOH	02/12/09
30	1497-2	EDB/DBCP	2	ACETONE	02/12/09
31	1510-3	TERPINEOL	100	MEOH	03/21/09

LCS SOLUTIONS

11/08/08

32	1545-3	GUAIACOL	50-200	ACETONE	06/05/09
33	1522-1	RESIN ACID	250	ACETONE	06/11/09
34	1530-2	CONGENERS	1	ACETONE	07/23/09
50	1523-1	FULL RESIN	250	ACETONE	06/10/09
*=REVERIFIED SOLUTION					

SURR SOLUTIONS

11/08/2008

LABEL	SOLN ID	TEST	CONC. UG/ML	SOLVENT	EXP.
A	1559-5	ABN	100/150	MEOH	03/13/09
B	1513-1	SIM PNA	15/75	MEOH	04/15/09
C	1559-1	SIM ABN	25/37.5	MEOH	03/13/09
D	1538-3	LOW PCB	0.2	ACETONE	07/31/09
E*	1478-1	HERB	62.5	MEOH	09/21/09
F	1520-3	PCP	12.5	ACETONE	04/18/09
G	1534-1	1,4DIOXANE	100	MEOH	02/20/09
H	1545-1	OP-PEST	25	MEOH	02/14/09
I	1559-4	LOW S. PNA	1.5	MEOH	08/28/09
J	1493-2	TBT-PORE	0.25	MECL2	12/15/08
K	1538-1	MED PCB	20	ACETONE	07/31/09
L	1486-5	TBT	10	MECL2	12/15/08
M	1558-2	EPH	1500	MECL2	09/24/09
N	1538-2	PCB	2	ACETONE	07/31/09
O	1544-3	TPH	450	MECL2	09/24/09
P	1544-2	HCID	2250	MECL2	09/24/09
Q	1497-3	EDB	2	ACETONE	02/12/09
R	1521-4	RESIN ACID	250	ACETONE	06/11/09
S	*reverified	solution			
T					
U					
V					
W					
X					
Y					
Z					

Data Summary Package

prepared
for

THE BOEING COMPANY

Project: BPL Source Control

ARI JOB NOS.: OC61 & OC62

prepared
by

Analytical Resources, Inc.

PCBS

Analytical Resources, Incorporated
Analytical Chemists and Consultants

Organic Extractions Laboratory Analyst Notes

ARI Job No.: QC61 Client ID: The Boeing Company

Parameter: PCB Client Project: BPL Source Control

SOP Number(s): 3505 **No Anomalies:**

List problems, concerns, corrective actions and any other pertinent information

Sample is a filter bag, grams as received ~~SH~~ 12/8/08
Wet weight w/ plastic ring = 662.83
Metals soil split wet = 6.52 g
Dry weight w/ plastic ring = 169.11 g
Plastic ring weight = 8.48
Dry weight without plastic ring = 160.73
Since SBdup was not ready, it was impossible to extract SBdup. 12/12/8 WC

Analyst Initials: **Date:**

3056F

Revision 006
1/12/07

QC61 QC62 : 00016

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PCB by GC/ECD Method SW8082
Page 1 of 1

Sample ID: PL2SC-SS-I-120308
SAMPLE

Lab Sample ID: OC61A
LIMS ID: 08-32586
Matrix: Filter Bag
Data Release Authorized:
Reported: 12/31/08

QC Report No: OC61-The Boeing Company
Project: BPL SOURCE CONTROL
LS
Date Sampled: 12/03/08
Date Received: 12/03/08

Date Extracted: 12/11/08
Date Analyzed: 12/16/08 23:23
Instrument/Analyst: ECD6/JGR
GPC Cleanup: No
Sulfur Cleanup: Yes
Acid Cleanup: Yes

Sample Amount: 1.00 Filter Bag
Final Extract Volume: 5.0 mL
Dilution Factor: 100
Silica Gel: Yes

CAS Number	Analyte	RL	Result
12674-11-2	Aroclor 1016	50	< 50 U
53469-21-9	Aroclor 1242	50	< 50 U
12672-29-6	Aroclor 1248	50	< 50 U
11097-69-1	Aroclor 1254	50	< 50 U
11096-82-5	**Aroclor 1260**	**50**	**99**
11104-28-2	Aroclor 1221	50	< 50 U
11141-16-5	Aroclor 1232	50	< 50 U

Reported in Total µg

PCB Surrogate Recovery

Decachlorobiphenyl	D
Tetrachlorometaxylene	D

FORM I

ANALYTICAL RESOURCES INCORPORATED

SW8082/PCB WIPES SURROGATE RECOVERY SUMMARY

Matrix: Filter Bag

QC Report No: OC61-The Boeing Company
Project: BPL SOURCE CONTROL
LS

Client ID	DCBP	TCMX	TOT OUT
MB-121108	75.2%	70.0%	0
LCS-121108	79.0%	71.0%	0
PL2SC-SS-I-120308	D	D	0

	LCS/MB LIMITS	QC LIMITS
(DCBP) = Decachlorobiphenyl	(30-160)	(30-160)
(TCMX) = Tetrachlorometaxylene	(30-160)	(30-160)

Prep Method: SW3580A
Log Number Range: 08-32586 to 08-32586

FORM-II SW8082

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PCB by GC/ECD Method SW8082
Page 1 of 1

Sample ID: LCS-121108
LAB CONTROL

Lab Sample ID: LCS-121108
LIMS ID: 08-32586
Matrix: Filter Bag
Data Release Authorized:
Reported: 12/31/08

QC Report No: OC61-The Boeing Company
Project: BPL SOURCE CONTROL
LS
Date Sampled: 12/03/08
Date Received: 12/03/08

Date Extracted: 12/11/08
Date Analyzed: 12/16/08 23:01
Instrument/Analyst: ECD6/JGR
GPC Cleanup: No
Sulfur Cleanup: Yes
Acid Cleanup: Yes

Sample Amount: 1.00 Filter Bag
Final Extract Volume: 5.0 mL
Dilution Factor: 1.00
Silica Gel: Yes

Percent Moisture: NA

Analyte	Lab Control	Spike Added	Recovery
Aroclor 1016	1.7	2.5	68.0%
Aroclor 1260	2.1	2.5	84.0%

PCB Surrogate Recovery

Decachlorobiphenyl	79.0%
Tetrachlorometaxylene	71.0%

Reported in Total µg

FORM III

PCB METHOD BLANK SUMMARY

BLANK NO.

OC61MB1

Lab Name: ANALYTICAL RESOURCES, INC
Client: THE BOEING COMPANY

ARI Job No.: OC61
Project: BPL SOURCE CONTROL

Lab Sample ID: OC61MB1
Lab File ID: 1216A040

Date Extracted: 12/11/08
Matrix: SOLID

Date Analyzed: 12/16/08
Instrument ID: ECD6

Time Analyzed: 2240
GC Columns: ZB5/ZB35

THIS METHOD BLANK APPLIES TO THE FOLLOWING SAMPLES, MS and MSD:

	CLIENT SAMPLE NO.	LAB SAMPLE ID	DATE ANALYZED
01	OC61LCS1	OC61LCS1	12/16/08
02	PL2SC-SS-I-120308	OC61A	12/16/08

ALL RUNS ARE DUAL COLUMN

FORM IV PCB

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PCB by GC/ECD Method SW8082
Page 1 of 1

Sample ID: MB-121108
METHOD BLANK

Lab Sample ID: MB-121108
LIMS ID: 08-32586
Matrix: Filter Bag
Data Release Authorized:
Reported: 12/31/08

QC Report No: OC61-The Boeing Company
Project: BPL SOURCE CONTROL
LS
Date Sampled: NA
Date Received: NA

Date Extracted: 12/11/08
Date Analyzed: 12/16/08 22:40
Instrument/Analyst: ECD6/JGR
GPC Cleanup: No
Sulfur Cleanup: Yes
Acid Cleanup: Yes

Sample Amount: 1.00 Filter Bag
Final Extract Volume: 5.0 mL
Dilution Factor: 1.00
Silica Gel: Yes

CAS Number	Analyte	RL	Result
12674-11-2	Aroclor 1016	0.5	< 0.5 U
53469-21-9	Aroclor 1242	0.5	< 0.5 U
12672-29-6	Aroclor 1248	0.5	< 0.5 U
11097-69-1	Aroclor 1254	0.5	< 0.5 U
11096-82-5	Aroclor 1260	0.5	< 0.5 U
11104-28-2	Aroclor 1221	0.5	< 0.5 U
11141-16-5	Aroclor 1232	0.5	< 0.5 U

Reported in Total µg

PCB Surrogate Recovery	
Decachlorobiphenyl	75.2%
Tetrachlorometaxylene	70.0%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PCB by GC/ECD Method SW8082
Page 1 of 1

Sample ID: PL2SC-W-EB2-120308
SAMPLE

Lab Sample ID: OC61C
LIMS ID: 08-32588
Matrix: Water
Data Release Authorized: VJS
Reported: 12/11/08

QC Report No: OC61-The Boeing Company
Project: BPL SOURCE CONTROL
LS
Date Sampled: 12/03/08
Date Received: 12/03/08

Date Extracted: 12/09/08
Date Analyzed: 12/10/08 12:14
Instrument/Analyst: ECD5/JGR
GPC Cleanup: No
Sulfur Cleanup: No

Sample Amount: 500 mL
Final Extract Volume: 5.0 mL
Dilution Factor: 1.00
Silica Gel: No
Acid Cleanup: No

CAS Number	Analyte	RL	Result
12674-11-2	Aroclor 1016	1.0	< 1.0 U
53469-21-9	Aroclor 1242	1.0	< 1.0 U
12672-29-6	Aroclor 1248	1.0	< 1.0 U
11097-69-1	Aroclor 1254	1.0	< 1.0 U
11096-82-5	Aroclor 1260	1.0	< 1.0 U
11104-28-2	Aroclor 1221	1.0	< 1.0 U
11141-16-5	Aroclor 1232	1.0	< 1.0 U

Reported in µg/L (ppb)

PCB Surrogate Recovery	
Decachlorobiphenyl	88.0%
Tetrachlorometaxylene	79.2%

FORM I

ANALYTICAL RESOURCES INCORPORATED

SW8082/PCB WATER SURROGATE RECOVERY SUMMARY

Matrix: Water

QC Report No: OC61-The Boeing Company
Project: BPL SOURCE CONTROL
LS

Client ID	DCBP % REC	DCBP LCL-UCL	TCMX % REC	TCMX LCL-UCL	TOT OUT
MB-120908	83.8%	47-101	65.0%	61-104	0
LCS-120908	85.0%	47-101	74.0%	61-104	0
LCSD-120908	90.8%	47-101	77.0%	61-104	0
PL2SC-W-EB2-120308	88.0%	42-120	79.2%	55-102	0

Prep Method: SW3510C
Log Number Range: 08-32588 to 08-32588

FORM-II SW8082

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PCB by GC/ECD Method SW8082
Page 1 of 1

Sample ID: LCS-120908
LCS/LCSD

Lab Sample ID: LCS-120908
LIMS ID: 08-32588
Matrix: Water
Data Release Authorized: VTS
Reported: 12/11/08

QC Report No: OC61-The Boeing Company
Project: BPL SOURCE CONTROL
LS
Date Sampled: NA
Date Received: NA

Date Extracted LCS/LCSD: 12/09/08

Date Analyzed LCS: 12/10/08 11:40
LCSD: 12/10/08 11:57
Instrument/Analyst LCS: ECD5/JGR
LCSD: ECD5/JGR
GPC Cleanup: No
Sulfur Cleanup: No

Sample Amount LCS: 500 mL
LCSD: 500 mL
Final Extract Volume LCS: 5.0 mL
LCSD: 5.0 mL
Dilution Factor LCS: 1.00
LCSD: 1.00
Silica Gel: No
Acid Cleanup: No

Analyte	LCS	Spike Added-LCS	LCS Recovery	LCSD	Spike Added-LCSD	LCSD Recovery	RPD
Aroclor 1016	4.45	5.00	89.0%	4.70	5.00	94.0%	5.5%
Aroclor 1260	4.72	5.00	94.4%	5.07	5.00	101%	7.2%

PCB Surrogate Recovery

	LCS	LCSD
Decachlorobiphenyl	85.0%	90.8%
Tetrachlorometaxylene	74.0%	77.0%

Results reported in µg/L
RPD calculated using sample concentrations per SW846.

PCB METHOD BLANK SUMMARY

BLANK NO.

OC61MBW1

Lab Name: ANALYTICAL RESOURCES, INC
Client: THE BOEING COMPANY

ARI Job No.: OC61
Project: BPL SOURCE CONTROL

Lab Sample ID: OC61MBW1
Lab File ID: 1210B017

Date Extracted: 12/09/08
Matrix: LIQUID

Date Analyzed: 12/10/08
Instrument ID: ECD5

Time Analyzed: 1123
GC Columns: ZB5/ZB35

THIS METHOD BLANK APPLIES TO THE FOLLOWING SAMPLES, MS and MSD:

	CLIENT SAMPLE NO.	LAB SAMPLE ID	DATE ANALYZED
01	OC61LCSW1	OC61LCSW1	12/10/08
02	OC61LCSDW1	OC61LCSDW1	12/10/08
03	PL2SC-W-EB2-120308	OC61C	12/10/08

ALL RUNS ARE DUAL COLUMN

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PCB by GC/ECD Method SW8082
Page 1 of 1

Sample ID: MB-120908
METHOD BLANK

Lab Sample ID: MB-120908
LIMS ID: 08-32588
Matrix: Water
Data Release Authorized: VTS
Reported: 12/11/08

QC Report No: OC61-The Boeing Company
Project: BPL SOURCE CONTROL
LS
Date Sampled: NA
Date Received: NA

Date Extracted: 12/09/08
Date Analyzed: 12/10/08 11:23
Instrument/Analyst: ECD5/JGR
GPC Cleanup: No
Sulfur Cleanup: No

Sample Amount: 500 mL
Final Extract Volume: 5.0 mL
Dilution Factor: 1.00
Silica Gel: No
Acid Cleanup: No

CAS Number	Analyte	RL	Result
12674-11-2	Aroclor 1016	1.0	< 1.0 U
53469-21-9	Aroclor 1242	1.0	< 1.0 U
12672-29-6	Aroclor 1248	1.0	< 1.0 U
11097-69-1	Aroclor 1254	1.0	< 1.0 U
11096-82-5	Aroclor 1260	1.0	< 1.0 U
11104-28-2	Aroclor 1221	1.0	< 1.0 U
11141-16-5	Aroclor 1232	1.0	< 1.0 U

Reported in µg/L (ppb)

PCB Surrogate Recovery

Decachlorobiphenyl	83.8%
Tetrachlorometaxylene	65.0%

METALS

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
TOTAL METALS
Page 1 of 1

Sample ID: PL2SC-SS-I-120308
SAMPLE

Lab Sample ID: OC61B
LIMS ID: 08-32587
Matrix: Filter Bag
Data Release Authorized:
Reported: 12/17/08

QC Report No: OC61-The Boeing Company
Project: BPL SOURCE CONTROL
LS
Date Sampled: 12/03/08
Date Received: 12/03/08

Percent Total Solids: 12.9%

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	RL	mg/kg-dry	Q
3050B	12/09/08	7060A	12/15/08	**7440-38-2**	**Arsenic**	2	**19**	
3050B	12/09/08	6010B	12/16/08	**7440-43-9**	**Cadmium**	2	**2**	
3050B	12/09/08	6010B	12/16/08	**7440-47-3**	**Chromium**	4	**103**	
3050B	12/09/08	6010B	12/16/08	**7440-50-8**	**Copper**	2	**113**	
3050B	12/09/08	7421	12/16/08	**7439-92-1**	**Lead**	20	**180**	
CLP	12/09/08	7471A	12/15/08	7439-97-6	Mercury	0.3	0.3	U
3050B	12/09/08	6010B	12/16/08	7440-22-4	Silver	2	2	U
3050B	12/09/08	6010B	12/16/08	**7440-66-6**	**Zinc**	8	**676**	

U-Analyte undetected at given RL
RL-Reporting Limit

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
TOTAL METALS

Sample ID: LAB CONTROL

Lab Sample ID: OC61LCS
LIMS ID: 08-32587
Matrix: Filter Bag
Data Release Authorized:
Reported: 12/17/08

QC Report No: OC61-The Boeing Company
Project: BPL SOURCE CONTROL
LS
Date Sampled: NA
Date Received: NA

BLANK SPIKE QUALITY CONTROL REPORT

Analyte	Analysis Method	Spike Found	Spike Added	% Recovery	Q
Arsenic	7060A	9.8	10.0	98.0%	
Cadmium	6010B	51.6	50.0	103%	
Chromium	6010B	49.1	50.0	98.2%	
Copper	6010B	49.4	50.0	98.8%	
Lead	7421	9.1	10.0	91.0%	
Mercury	7471A	1.07	1.00	107%	
Silver	6010B	53.3	50.0	107%	
Zinc	6010B	50	50	100%	

Reported in mg/kg-dry

N-Control limit not met
NA-Not Applicable, Analyte Not Spiked
Control Limits: 80-120%

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
TOTAL METALS

Sample ID: METHOD BLANK

Lab Sample ID: OC61MB
LIMS ID: 08-32587
Matrix: Filter Bag
Data Release Authorized:
Reported: 12/17/08

QC Report No: OC61-The Boeing Company
Project: BPL SOURCE CONTROL
LS
Date Sampled: NA
Date Received: NA

Percent Total Solids: NA

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	RL	mg/kg-dry	Q
3050B	12/09/08	7060A	12/15/08	7440-38-2	Arsenic	0.1	0.1	U
3050B	12/09/08	6010B	12/16/08	7440-43-9	Cadmium	0.2	0.2	U
3050B	12/09/08	6010B	12/16/08	7440-47-3	Chromium	0.5	0.5	U
3050B	12/09/08	6010B	12/16/08	7440-50-8	Copper	0.2	0.2	U
3050B	12/09/08	7421	12/16/08	7439-92-1	Lead	0.1	0.1	U
CLP	12/09/08	7471A	12/15/08	7439-97-6	Mercury	0.05	0.05	U
3050B	12/09/08	6010B	12/16/08	7440-22-4	Silver	0.3	0.3	U
3050B	12/09/08	6010B	12/16/08	7440-66-6	Zinc	1	1	U

U-Analyte undetected at given RL
RL-Reporting Limit

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
DISSOLVED METALS

Sample ID: PL2SC-W-EB2-120308
SAMPLE

Lab Sample ID: OC61C
LIMS ID: 08-32588
Matrix: Water
Data Release Authorized:
Reported: 12/17/08

QC Report No: OC61-The Boeing Company
Project: BPL SOURCE CONTROL
LS
Date Sampled: 12/03/08
Date Received: 12/03/08

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	RL	mg/L	Q
7000A	12/11/08	7060A	12/15/08	7440-38-2	Arsenic	0.001	0.001	U
6010B	12/11/08	6010B	12/16/08	7440-43-9	Cadmium	0.002	0.002	U
6010B	12/11/08	6010B	12/16/08	7440-47-3	Chromium	0.005	0.005	U
6010B	12/11/08	6010B	12/16/08	**7440-50-8**	**Copper**	0.002	**0.009**	
7000A	12/11/08	7421	12/16/08	7439-92-1	Lead	0.001	0.001	U
6010B	12/11/08	6010B	12/16/08	7440-22-4	Silver	0.003	0.003	U
6010B	12/11/08	6010B	12/16/08	7440-66-6	Zinc	0.01	0.01	U

U-Analyte undetected at given RL
RL-Reporting Limit

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
DISSOLVED METALS

Sample ID: LAB CONTROL

Lab Sample ID: OC61LCS
LIMS ID: 08-32588
Matrix: Water
Data Release Authorized:
Reported: 12/17/08

QC Report No: OC61-The Boeing Company
Project: BPL SOURCE CONTROL
LS
Date Sampled: NA
Date Received: NA

BLANK SPIKE QUALITY CONTROL REPORT

Analyte	Analysis Method	Spike Found	Spike Added	% Recovery	Q
Arsenic	7060A	0.020	0.020	100%	
Cadmium	6010B	0.538	0.500	108%	
Chromium	6010B	0.511	0.500	102%	
Copper	6010B	0.497	0.500	99.4%	
Lead	7421	0.019	0.020	95.0%	
Silver	6010B	0.518	0.500	104%	
Zinc	6010B	0.53	0.50	106%	

Reported in mg/L

N-Control limit not met
Control Limits: 80-120%

OC61 OC62:00032

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
DISSOLVED METALS

Sample ID: METHOD BLANK

Lab Sample ID: OC61MB
LIMS ID: 08-32588
Matrix: Water
Data Release Authorized:
Reported: 12/17/08

QC Report No: OC61-The Boeing Company
Project: BPL SOURCE CONTROL
LS
Date Sampled: NA
Date Received: NA

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	RL	mg/L	Q
7000A	12/11/08	7060A	12/15/08	7440-38-2	Arsenic	0.001	0.001	U
6010B	12/11/08	6010B	12/16/08	7440-43-9	Cadmium	0.002	0.002	U
6010B	12/11/08	6010B	12/16/08	7440-47-3	Chromium	0.005	0.005	U
6010B	12/11/08	6010B	12/16/08	7440-50-8	Copper	0.002	0.002	U
7000A	12/11/08	7421	12/16/08	7439-92-1	Lead	0.001	0.001	U
6010B	12/11/08	6010B	12/16/08	7440-22-4	Silver	0.003	0.003	U
6010B	12/11/08	6010B	12/16/08	7440-66-6	Zinc	0.01	0.01	U

U-Analyte undetected at given RL
RL-Reporting Limit

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
Dissolved Mercury by Method SW7470A

Data Release Authorized:
Reported: 12/26/08
Date Received: 12/05/08
Page 1 of 1

QC Report No: OC62-The Boeing Company
Project: BP2 SORCE CONTROL
LS

Client/ ARI ID	Date Sampled	Matrix	Prep Date Anal Date	RL	Result
PL2SC-W-EB2-120308 OC62A 08-32589	12/03/08	Water	12/11/08 12/23/08	20.0	20.0 U
MB-121108 Method Blank	NA	Water	12/11/08 12/23/08	20.0	20.0 U

Reported in ng/L

RL-Analytical reporting limit
U-Undetected at reported detection limit

FORM-I

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
DISSOLVED METALS

Sample ID: PL2SC-W-EB2-120308
MATRIX SPIKE

Lab Sample ID: OC62A
LIMS ID: 08-32589
Matrix: Water
Data Release Authorized:
Reported: 12/26/08

QC Report No: OC62-The Boeing Company
Project: BP2 SORCE CONTROL
LS
Date Sampled: 12/03/08
Date Received: 12/05/08

MATRIX SPIKE QUALITY CONTROL REPORT

Analyte	Analysis Method	Sample	Spike	Spike Added	% Recovery	Q
Mercury	7470A	20.0 U	109	100	109%	

Reported in ng/L

N-Control Limit Not Met
H-% Recovery Not Applicable, Sample Concentration Too High
NA-Not Applicable, Analyte Not Spiked

Percent Recovery Limits: 75-125%

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
DISSOLVED METALS

Sample ID: PL2SC-W-EB2-120308
DUPLICATE

Lab Sample ID: OC62A
LIMS ID: 08-32589
Matrix: Water
Data Release Authorized:
Reported: 12/26/08

QC Report No: OC62-The Boeing Company
Project: BP2 SORCE CONTROL
LS
Date Sampled: 12/03/08
Date Received: 12/05/08

MATRIX DUPLICATE QUALITY CONTROL REPORT

Analyte	Analysis Method	Sample	Duplicate	RPD	Control Limit	Q
Mercury	7470A	20.0 U	20.0 U	0.0%	+/- 20.0	L

Reported in ng/L

*-Control Limit Not Met
L-RPD Invalid, Limit = Detection Limit

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
DISSOLVED METALS

Sample ID: LAB CONTROL

Lab Sample ID: OC62LCS
LIMS ID: 08-32589
Matrix: Water
Data Release Authorized:
Reported: 12/26/08

QC Report No: OC62-The Boeing Company
Project: BP2 SORCE CONTROL
LS
Date Sampled: NA
Date Received: NA

BLANK SPIKE QUALITY CONTROL REPORT

Analyte	Analysis Method	Spike Found	Spike Added	% Recovery	Q
Mercury	7470A	203	200	102%	

Reported in ng/L

N-Control limit not met
Control Limits: 80-120%

TOTAL SOLIDS

Solids Data Entry Report Checked by: KM Date: 12/10/08
Date: 12/10/08 Data Analyst: DM

Solids Determination performed on 12/09/08 by DM

JOB	SAMPLE	CLIENTID	TAREWEIGHT	SAMPDISH	DRYWEIGHT	SOLIDS
OC61	B	PL2SC-SS-I-120308	0.977	5.166	1.516	12.87

Analytical Resources, Incorporated
Analytical Chemists and Consultants

January 26, 2009

Kent Angelos
Golder Associates, Inc.
18300 NE Union Hill Road, Suite 200
Redmond, WA 98052-3333

RE: Boeing Plant 2 Source Control
ARI ID: OG55 & OG57

Dear Kent:

Please find enclosed the original Chain-of-Custody (COC) records, sample receipt documentation, and the final data package for the project referenced above.

Sample receipt information and analytical details are addressed in the Case Narrative.

An electronic copy of this package will be kept on file at ARI. If you have any questions or require additional information, please contact me at your convenience.

Sincerely,
ANALYTICAL RESOURCES, INC.

Kelly Bottem
Client Services Manager
(206) 695-6211
kellyb@arilabs.com

KB/eb

Enclosures

cc: Kent Angelos, Golder Associates Inc., 18300 NE Union Hill Road, Suite 200, Redmond, WA 98052-3333

Chain of Custody
Documentation

prepared
for

THE BOEING COMPANY

Project: Plant 2 Source Control

ARI JOB NO: OG55 & OG57

prepared
by

Analytical Resources, Inc.

Chain of Custody Record & Laboratory Analysis Request

ARI Assigned Number: 0605S-0657	Turn-around Requested: Std	Page: 1 of 1	
ARI Client Company: BOEING	Phone:	Date: 1/7/08	Ice Present? Y
Client Contact: WILL ERNST		No. of Coolers: 1	Cooler Temps: 5.6
Client Project Name: BP2 SC			
Client Project #:	Samplers: Liz Shea, Jill Lamberts		

Analytical Resources, Incorporated
Analytical Chemists and Consultants
4611 South 134th Place, Suite 100
Tukwila, WA 98168
206-695-6200 206-695-6201 (fax)

Sample ID	Date	Time	Matrix	No. Containers	Analysis Requested: VOC	* DMHS Surr. in SMS	* SMS metals	LC/MS *	** pH				Notes/Comments
PL2SC-W-G-010609	1/6/09	1500	W	4	X	X			X				* field filtered
PL2SC-W-V-010609	1/6/09	1525	W	2			X	X	X				
PL2SC-W-DUP-010609	11	1525	W	2			X	X	X				

Comments/Special Instructions: SMS metals as per QAPP; ** pH meter broke collected unpreserved bottle for pH	Relinquished by: (Signature) Elizabeth Shea	Received by: (Signature)	Relinquished by: (Signature)	Received by: (Signature)	
	Printed Name: Liz Shea	Printed Name: A. Volgardsen	Printed Name:	Printed Name:	
	Company: Golder	Company: ARI	Company:	Company:	
	Date & Time: 1/7/09 0944	Date & Time: 1/7/09 944	Date & Time:	Date & Time:	

Limits of Liability: *ARI will perform all requested services in accordance with appropriate methodology following ARI Standard Operating Procedures and the ARI Quality Assurance Program. This program meets standards for the industry. The total liability of ARI, its officers, agents, employees, or successors, arising out of or in connection with the requested services, shall not exceed the Invoiced amount for said services. The acceptance by the client of a proposal for services by ARI release ARI from any liability in excess thereof, not withstanding any provision to the contrary in any contract, purchase order or co-signed agreement between ARI and the Client.*

Sample Retention Policy: All samples submitted to ARI will be appropriately discarded no sooner than 90 days after receipt or 60 days after submission of hardcopy data, whichever is longer, unless alternate retention schedules have been established by work-order or contract.

PRESERVATION VERIFICATION 01/07/09
Page 1 of 1

ANALYTICAL RESOURCES INCORPORATED

ARI Job No: **OG55**

Inquiry Number: NONE
Analysis Requested: 01/07/09
Contact: Ernst, Will
Client: The Boeing Company
Logged by: AV
Sample Set Used: Yes-481
Validatable Package: No
Deliverables:

PC: Kelly
VTSR: 01/07/09

Project #:
Project: BP2 SC
Sample Site:
SDG No:
Analytical Protocol: In-house

LOGNUM ARI ID	CLIENT ID	CN >12	WAD >12	NH3 <2	COD <2	FOG <2	MET <2	PHEN <2	PHOS <2	TKN <2	NO23 <2	TOC <2	S2 >9	DMET FLT	DOC FLT	PARAMETER	ADJUSTED TO	LOT NUMBER	AMOUNT ADDED	DATE/BY
09-399 **OG55A**	PL2SC-W-G-010609																			
09-400 **OG55B**	PL2SC-W-V-010609						DIS OK							Y	✓					
09-401 **OG55C**	PL2SC-W-DUP-010609						DIS OK							Y	✓					

Checked By MM Date 1-7-09

Analytical Resources, Incorporated
Analytical Chemists and Consultants

Cooler Receipt Form

ARI Client: Boeing Project Name: BP2 SC

COC No: _____ Delivered by: Hand

Assigned ARI Job No: 0655 Tracking No: _____

Preliminary Examination Phase:

Were intact, properly signed and dated custody seals attached to the outside of to cooler?	YES	(NO)
Were custody papers included with the cooler?	(YES)	NO
Were custody papers properly filled out (ink, signed, etc.)	(YES)	NO
Record cooler temperature (recommended 2.0-6.0 °C for chemistry	5.6 °C	

Cooler Accepted by: AV Date: 1/7/09 Time: 943

Complete custody forms and attach all shipping documents

Log-In Phase:

Was a temperature blank included in the cooler?	YES	(NO)
What kind of packing material was used?	BW/ICE	
Was sufficient ice used (if appropriate)?	(YES)	NO
Were all bottles sealed in individual plastic bags?	YES	(NO)
Did all bottle arrive in good condition (unbroken)?	(YES)	NO
Were all bottle labels complete and legible?	(YES)	NO
Did all bottle labels and tags agree with custody papers?	(YES)	NO
Were all bottles used correct for the requested analyses?	(YES)	NO
Do any of the analyses (bottles) require preservation? (attach preservation checklist)	(YES)	NO
Were all VOC vials free of air bubbles? (NA)	YES	NO
Was sufficient amount of sample sent in each bottle?	(YES)	NO

Samples Logged by: AV Date: 1/7/09 Time: 1028

***** Notify Project Manager of discrepancies or concerns *****

Explain discrepancies or negative responses:

By: Date:

PRESERVATION VERIFICATION 01/07/09
Page 1 of 1

ANALYTICAL RESOURCES INCORPORATED

ARI Job No: **OG57**

Inquiry Number: NONE
Analysis Requested: 01/07/09
Contact: Ernst, Will
Client: The Boeing Company
Logged by: AV
Sample Set Used: Yes-481
Validatable Package: No
Deliverables:

PC: Kelly
VTSR: 01/07/09

Project #:
Project: BP2 SC
Sample Site:
SDG No:
Analytical Protocol: In-house

LOGNUM ARI ID	CLIENT ID	CN >12	WAD >12	NH3 <2	COD <2	FOG <2	MET <2	PHEN <2	PHOS <2	TKN <2	NO23 <2	TOC <2	S2 >9	DMET FLT	DOC FLT	PARAMETER	ADJUSTED TO	LOT NUMBER	AMOUNT ADDED	DATE/BY
09-402 OG57A	PL2SC-W-V-010609						DIS OK							Y						
09-403 OG57B	PL2SC-W-DUP-010609						DIS OK							Y						

Checked By MM Date 1-7-09

Analytical Resources, Incorporated
Analytical Chemists and Consultants

Cooler Receipt Form

ARI Client: Boeing
COC No:
Assigned ARI Job No: OGS7

Project Name: BP2 SC
Delivered by: Hand
Tracking No:

Preliminary Examination Phase:

Were intact, properly signed and dated custody seals attached to the outside of to cooler?	YES	(NO)
Were custody papers included with the cooler?	(YES)	NO
Were custody papers properly filled out (ink, signed, etc.)	(YES)	NO
Record cooler temperature (recommended 2.0-6.0 °C for chemistry	5.6 °C	

Cooler Accepted by: AV Date: 1/7/09 Time: 943

Complete custody forms and attach all shipping documents

Log-In Phase:

Was a temperature blank included in the cooler?	YES	(NO)
What kind of packing material was used?	BW/ICE	
Was sufficient ice used (if appropriate)?	(YES)	NO
Were all bottles sealed in individual plastic bags?	YES	(NO)
Did all bottle arrive in good condition (unbroken)?	(YES)	NO
Were all bottle labels complete and legible?	(YES)	NO
Did all bottle labels and tags agree with custody papers?	(YES)	NO
Were all bottles used correct for the requested analyses?	(YES)	NO
Do any of the analyses (bottles) require preservation? (attach preservation checklist)	(YES)	NO
Were all VOC vials free of air bubbles? (NA)	YES	NO
Was sufficient amount of sample sent in each bottle?	(YES)	NO

Samples Logged by: AV Date: 1/7/09 Time: 1028

***** Notify Project Manager of discrepancies or concerns *****

Explain discrepancies or negative responses:

By: Date:

Case Narrative

prepared
for

THE BOEING COMPANY

Project: Plant 2 Source Control

ARI JOB NO: OG55 & OG57

prepared
by

Analytical Resources, Inc.

ANALYTICAL
RESOURCES
INCORPORATED

Case Narrative

Project: Boeing Plant 2 Source Control
ARI ID: OG55 & OG57
Matrix: Water
Date: January 21, 2009

Sample Receipt Information

Three water samples were received in good condition at Analytical Resources, Inc. (ARI) on January 7, 2009 under ARI sample delivery groups OG55 and OG57. The cooler temperature measured by IR thermometer was 5.6°C. For further details regarding sample receipt, please refer to the Cooler Receipt Form.

Select samples were analyzed for the parameters listed below, as requested on the Chain of Custody.

Semivolatiles by Method 8270D:

The sample was extracted on 1/7/09 and analyzed on 1/13/09 within the method recommended holding times.

Initial calibration (s): All analytes of interest were within method acceptance criteria.

Continuing calibration (s): Are in control.

Samples: There were no anomalies associated with these samples.

Surrogates: The surrogate percent recoveries were within control limits.

LCS(s): All LCS percent recoveries were within control limits.

Method Blank: The method blank was free of contamination.

SIM PNAs by Method 8270D SIM:

The sample was extracted on 1/8/09 and analyzed on 1/12/09 within the method recommended holding times.

Initial calibration (s): All analytes of interest were within method acceptance criteria.

Continuing calibration (s): Are in control.

Samples: There were no anomalies associated with these samples.

Surrogates: The surrogate percent recoveries were within control limits.

Case Narrative

Project: Boeing Plant 2 Source Control
ARI ID: OG55 & OG57
Matrix: Water
Date: January 21, 2009

LCS(s): All LCS percent recoveries were within control limits..

Method Blank: The method blank was free of contamination.

Dissolved Metals by Methods 6010B and 7000 series

The samples were digested on 1/8/09. The digests were analyzed between 1/13/09 and 1/20/09 within the method recommended holding times.

Replicate(s): All percent recoveries were within compliance.

Samples: No anomalies were encountered for these samples.

LCS/Blank Spike(s): All percent recoveries were within compliance.

Method Blank(s): Are in control.

Standard Reference: All percent recoveries were within compliance.

The sample duplicate RPD for copper on sample **PL2SC-W-V-010609** was outside of the control limits. All other QC is in control, therefore no further corrective action was taken.

Dissolved Low-Level Mercury by Method SW7470A

The samples were digested on 1/8/09. The digests were analyzed on 1/15/09 within the method recommended holding times.

Replicate(s): All percent recoveries were within compliance.

Samples: No anomalies were encountered for these samples.

LCS/Blank Spike(s): All percent recoveries were within compliance.

Method Blank(s): Are in control.

Standard Reference: All percent recoveries were within compliance.

Case Narrative

Project: Boeing Plant 2 Source Control
ARI ID: OG55 & OG57
Matrix: Water
Date: January 21, 2009

Conventional Chemistry Parameters

The samples were received on 1/7/09 outside of the method recommended holding time for pH.

Replicate(s): All percent recoveries were within compliance.

Samples: No anomalies were encountered for these samples.

LCS/Blank Spike(s): All percent recoveries were within compliance.

Standard Reference: All percent recoveries were within compliance.

LCS SOLUTIONS

12/30/08

LABE	SOLN ID	TEST	CONC. UG/ML	SOLVENT	EXP.
1	1549-3	PCB	20	ACETONE	10/10/09
2	1472-3	BCOC PEST	10	ACETONE	07/20/08
3	1517-1	PEST	02/04/20	ACETONE	05/15/09
4	1561-2	LOW PEST	0.2/0.4/2	ACETONE	05/15/09
5	1537-1	EPH	1500	MECL2	08/16/09
6	1559-2	PCP	12.5/125	ACETONE	11/05/09
7	1573-1	ABN	100	ACETONE	08/01/09
8	1566-1	TBT	2.5	MECL2	12/04/09
9	1567-3	PORE TBT	.125/.25	MECL2	12/04/09
10	1554-3	ABN ACID	100/200	MEOH	10/21/09
11	1563-3	TPHD	15000	ACETONE	11/20/09
12	1563-1	ABN BASE	200	ACETONE	06/30/09
13	1573-2	LOW PCB	2	ACETONE	10/10/09
14	1547-1	LOW ABN ACID	10/20	MEOH	04/10/09
15*	1452-1	SIM PNA	15/75	MEOH	04/09/09
16	1502-2	DIOXANE	100	MEOH	02/20/09
17	1516-2	1248 PCB	20	ACETONE	05/07/09
18	1514-4	LOW SIM PNA	1.5/7.5	ACETONE	04/24/09
19	1517-3	AK103	7500	MECL2	12/29/08
20	1572-2	PNA	100	ACETONE	12/26/09
21*	1414-4	SKY/BHT	100	MEOH	04/08/09
22	1570-1	HERB	12.5/12500	MEOH	02/19/09
23	1505-1	LOW ABN BASE	20	MEOH	03/20/09
24	1541-4	LOW ABN	10	ACETONE	08/01/09
25	1481-1	DIPHENYL	100	MEOH	07/20/08
26	1545-2	OP-PEST	25	MEOH	02/14/09
27	1495-1	STEROLS	200	MEOH	12/29/08
28	1494-1	ADD. PEST	4	ACETONE	01/23/09
29	1496-3	DECANES	100	MEOH	02/12/09
30	1497-2	EDB/DBCP	2	ACETONE	02/12/09
31	1510-3	TERPINEOL	100	MEOH	03/21/09

LCS SOLUTIONS

12/30/08

32	1545-3	GUAIACOL	50-200	ACETONE	06/05/09
33	1522-1	RESIN ACID	250	ACETONE	06/11/09
34	1530-2	CONGENERS	1	ACETONE	07/23/09
50	1571-1	FULL RESIN	250	ACETONE	06/10/09
*=REVERIFIED SOLUTION					

SURR SOLUTIONS

12/30/08

LABEL	SOLN ID	TEST	CONC. UG/ML	SOLVENT	EXP.
A	1559-5	ABN	100/150	MEOH	03/13/09
B	1572-1	SIM PNA	15/75	MEOH	08/28/09
C	1559-1	SIM ABN	25/37.5	MEOH	03/13/09
D	1561-3	LOW PCB	0.2	ACETONE	07/31/09
E*	1478-1	HERB	62.5	MEOH	09/21/09
F	1520-3	PCP	12.5	ACETONE	04/18/09
G	1534-1	1,4DIOXANE	100	MEOH	02/20/09
H	1545-1	OP-PEST	25	MEOH	02/14/09
I	1559-4	LOW S. PNA	1.5	MEOH	08/28/09
J	1566-5	TBT-PORE	0.125	MECL2	12/04/09
K	1538-1	MED PCB	20	ACETONE	07/31/09
L	1566-4	TBT	2.5	MECL2	12/04/09
M	1558-2	EPH	1500	MECL2	09/24/09
N	1538-2	PCB	2	ACETONE	07/31/09
O	1567-4	TPH	450	MECL2	09/24/09
P	1560-3	HCID	2250	MECL2	09/24/09
Q	1497-3	EDB	2	ACETONE	02/12/09
R	1521-4	RESIN ACID	250	ACETONE	06/11/09
S	1568-5	PBDE	.25	MEOH	12/11/09
T	*reverified	solution			
U					
V					
W					
X					
Y					
Z					

Data Reporting Qualifiers

Effective 12/28/04

Inorganic Data

U	Indicates that the target analyte was not detected at the reported concentration
*	Duplicate RPD is not within established control limits
B	Reported value is less than the CRDL but ≥ the Reporting Limit
N	Matrix Spike recovery not within established control limits
NA	Not Applicable, analyte not spiked
H	The natural concentration of the spiked element is so much greater than the concentration spiked that an accurate determination of spike recovery is not possible
L	Analyte concentration is ≤5 times the Reporting Limit and the replicate control limit defaults to ±1 RL instead of the normal 20% RPD

Organic Data

U	Indicates that the target analyte was not detected at the reported concentration
*	Flagged value is not within established control limits
B	Analyte detected in an associated Method Blank at a concentration greater than one-half of ARI's Reporting Limit or 5% of the regulatory limit or 5% of the analyte concentration in the sample.
J	Estimated concentration when the value is less than ARI's established reporting limits
D	The spiked compound was not detected due to sample extract dilution
NR	Spiked compound recovery is not reported due to chromatographic interference
E	Estimated concentration calculated for an analyte response above the valid instrument calibration range. A dilution is required to obtain an accurate quantification of the analyte.
S	Indicates an analyte response that has saturated the detector. The calculated concentration is not valid; a dilution is required to obtain valid quantification of the analyte
NA	The flagged analyte was not analyzed for
NS	The flagged analyte was not spiked into the sample

M Estimated value for an analyte detected and confirmed by an analyst but with low spectral match parameters. This flag is used only for GC-MS analyses

M2 The sample contains PCB congeners that do not match any standard Aroclor pattern. The PCBs are identified and quantified as the Aroclor whose pattern most closely matches that of the sample. The reported value is an estimate.

N The analysis indicates the presence of an analyte for which there is presumptive evidence to make a "tentative identification"

Y The analyte is not detected at or above the reported concentration. The reporting limit is raised due to chromatographic interference. The Y flag is equivalent to the U flag with a raised reporting limit.

C The analyte was positively identified on only one of two chromatographic columns. Chromatographic interference prevented a positive identification on the second column

P The analyte was detected on both chromatographic columns but the quantified values differ by ≥40% RPD with no obvious chromatographic interference

Geotechnical Data

A The total of all fines fractions. This flag is used to report total fines when only sieve analysis is requested and balances total grain size with sample weight.

F Samples were frozen prior to particle size determination

SM Sample matrix was not appropriate for the requested analysis. This normally refers to samples contaminated with an organic product that interferes with the sieving process and/or moisture content, porosity and saturation calculations

SS Sample did not contain the proportion of "fines" required to perform the pipette portion of the grain size analysis

W Weight of sample in some pipette aliquots was below the level required for accurate weighting

Data Summary Package

prepared
for

THE BOEING COMPANY

Project: Plant 2 Source Control

ARI JOB NO: OG55 & OG57

prepared
by

Analytical Resources, Inc.

SEMIVOLATILES

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Semivolatiles by SW8270D GC/MS
Page 1 of 2

Sample ID: PL2SC-W-G-010609
SAMPLE

Lab Sample ID: OG55A
LIMS ID: 09-399
Matrix: Water
Data Release Authorized:
Reported: 01/14/09

QC Report No: OG55-The Boeing Company
Project: BP2 SC
NA
Date Sampled: 01/06/09
Date Received: 01/07/09

Date Extracted: 01/07/09
Date Analyzed: 01/13/09 14:53
Instrument/Analyst: NT4/LJR

Sample Amount: 500 mL
Final Extract Volume: 0.50 mL
Dilution Factor: 1.00

CAS Number	Analyte	RL	Result
108-95-2	Phenol	1.0	< 1.0 U
111-44-4	Bis-(2-Chloroethyl) Ether	1.0	< 1.0 U
95-57-8	2-Chlorophenol	1.0	< 1.0 U
541-73-1	1,3-Dichlorobenzene	1.0	< 1.0 U
106-46-7	1,4-Dichlorobenzene	1.0	< 1.0 U
100-51-6	Benzyl Alcohol	5.0	< 5.0 U
95-50-1	1,2-Dichlorobenzene	1.0	< 1.0 U
95-48-7	2-Methylphenol	1.0	< 1.0 U
108-60-1	2,2'-Oxybis(1-Chloropropane)	1.0	< 1.0 U
106-44-5	4-Methylphenol	1.0	< 1.0 U
621-64-7	N-Nitroso-Di-N-Propylamine	5.0	< 5.0 U
67-72-1	Hexachloroethane	1.0	< 1.0 U
98-95-3	Nitrobenzene	1.0	< 1.0 U
78-59-1	Isophorone	1.0	< 1.0 U
88-75-5	2-Nitrophenol	5.0	< 5.0 U
105-67-9	2,4-Dimethylphenol	1.0	< 1.0 U
65-85-0	Benzoic Acid	10	< 10 U
111-91-1	bis(2-Chloroethoxy) Methane	1.0	< 1.0 U
120-83-2	2,4-Dichlorophenol	5.0	< 5.0 U
120-82-1	1,2,4-Trichlorobenzene	1.0	< 1.0 U
91-20-3	Naphthalene	1.0	< 1.0 U
106-47-8	4-Chloroaniline	5.0	< 5.0 U
87-68-3	Hexachlorobutadiene	1.0	< 1.0 U
59-50-7	4-Chloro-3-methylphenol	5.0	< 5.0 U
91-57-6	2-Methylnaphthalene	1.0	< 1.0 U
77-47-4	Hexachlorocyclopentadiene	5.0	< 5.0 U
88-06-2	2,4,6-Trichlorophenol	5.0	< 5.0 U
95-95-4	2,4,5-Trichlorophenol	5.0	< 5.0 U
91-58-7	2-Chloronaphthalene	1.0	< 1.0 U
88-74-4	2-Nitroaniline	5.0	< 5.0 U
131-11-3	Dimethylphthalate	1.0	< 1.0 U
208-96-8	Acenaphthylene	1.0	< 1.0 U
99-09-2	3-Nitroaniline	5.0	< 5.0 U
83-32-9	Acenaphthene	1.0	< 1.0 U
51-28-5	2,4-Dinitrophenol	10	< 10 U
100-02-7	4-Nitrophenol	5.0	< 5.0 U
132-64-9	Dibenzofuran	1.0	< 1.0 U
606-20-2	2,6-Dinitrotoluene	5.0	< 5.0 U
121-14-2	2,4-Dinitrotoluene	5.0	< 5.0 U
84-66-2	Diethylphthalate	1.0	< 1.0 U

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Semivolatiles by SW8270D GC/MS
Page 2 of 2

Sample ID: PL2SC-W-G-010609
SAMPLE

Lab Sample ID: OG55A
LIMS ID: 09-399
Matrix: Water
Date Analyzed: 01/13/09 14:53

QC Report No: OG55-The Boeing Company
Project: BP2 SC
NA

CAS Number	Analyte	RL	Result
7005-72-3	4-Chlorophenyl-phenylether	1.0	< 1.0 U
86-73-7	Fluorene	1.0	< 1.0 U
100-01-6	4-Nitroaniline	5.0	< 5.0 U
534-52-1	4,6-Dinitro-2-Methylphenol	10	< 10 U
86-30-6	N-Nitrosodiphenylamine	1.0	< 1.0 U
101-55-3	4-Bromophenyl-phenylether	1.0	< 1.0 U
118-74-1	Hexachlorobenzene	1.0	< 1.0 U
87-86-5	Pentachlorophenol	5.0	< 5.0 U
85-01-8	Phenanthrene	1.0	< 1.0 U
86-74-8	Carbazole	1.0	< 1.0 U
120-12-7	Anthracene	1.0	< 1.0 U
84-74-2	Di-n-Butylphthalate	1.0	< 1.0 U
206-44-0	Fluoranthene	1.0	< 1.0 U
129-00-0	Pyrene	1.0	< 1.0 U
85-68-7	Butylbenzylphthalate	1.0	< 1.0 U
91-94-1	3,3'-Dichlorobenzidine	5.0	< 5.0 U
56-55-3	Benzo(a)anthracene	1.0	< 1.0 U
117-81-7	**bis(2-Ethylhexyl)phthalate**	**1.0**	**2.4**
218-01-9	Chrysene	1.0	< 1.0 U
117-84-0	Di-n-Octyl phthalate	1.0	< 1.0 U
205-99-2	Benzo(b)fluoranthene	1.0	< 1.0 U
207-08-9	Benzo(k)fluoranthene	1.0	< 1.0 U
50-32-8	Benzo(a)pyrene	1.0	< 1.0 U
193-39-5	Indeno(1,2,3-cd)pyrene	1.0	< 1.0 U
53-70-3	Dibenz(a,h)anthracene	1.0	< 1.0 U
191-24-2	Benzo(g,h,i)perylene	1.0	< 1.0 U
90-12-0	1-Methylnaphthalene	1.0	< 1.0 U

Reported in µg/L (ppb)

Semivolatile Surrogate Recovery

d5-Nitrobenzene	84.8%	2-Fluorobiphenyl	81.6%
d14-p-Terphenyl	100%	d4-1,2-Dichlorobenzene	65.6%
d5-Phenol	78.7%	2-Fluorophenol	73.3%
2,4,6-Tribromophenol	106%	d4-2-Chlorophenol	77.9%

ANALYTICAL RESOURCES INCORPORATED

SW8270 SEMIVOLATILES WATER SURROGATE RECOVERY SUMMARY

Matrix: Water

QC Report No: OG55-The Boeing Company
Project: BP2 SC

Client ID	NBZ	FBP	TPH	DCB	PHL	2FP	TBP	2CP	TOT OUT
MB-010709	82.8%	78.0%	104%	66.8%	76.3%	73.6%	96.0%	77.9%	0
LCS-010709	86.4%	78.4%	100%	70.0%	86.4%	76.3%	101%	80.5%	0
LCSD-010709	80.4%	75.6%	98.4%	64.0%	77.6%	69.6%	99.2%	73.3%	0
PL2SC-W-G-010609	84.8%	81.6%	100%	65.6%	78.7%	73.3%	106%	77.9%	0

		LCS/MB LIMITS	QC LIMITS
(NBZ)	= d5-Nitrobenzene	(54-102)	(40-103)
(FBP)	= 2-Fluorobiphenyl	(47-99)	(35-98)
(TPH)	= d14-p-Terphenyl	(50-119)	(21-122)
(DCB)	= d4-1,2-Dichlorobenzene	(39-86)	(28-85)
(PHL)	= d5-Phenol	(45-100)	(32-99)
(2FP)	= 2-Fluorophenol	(49-94)	(36-93)
(TBP)	= 2,4,6-Tribromophenol	(49-117)	(37-120)
(2CP)	= d4-2-Chlorophenol	(54-99)	(40-98)

Prep Method: SW3520C
Log Number Range: 09-399 to 09-399

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Semivolatiles by SW8270D GC/MS
Page 1 of 2

Sample ID: LCS-010709
LCS/LCSD

Lab Sample ID: LCS-010709
LIMS ID: 09-399
Matrix: Water
Data Release Authorized:
Reported: 01/14/09

QC Report No: OG55-The Boeing Company
Project: BP2 SC

Date Sampled: 01/06/09
Date Received: 01/07/09

Date Extracted LCS/LCSD: 01/07/09

Date Analyzed LCS: 01/12/09 20:37
LCSD: 01/12/09 21:12
Instrument/Analyst LCS: NT4/LJR
LCSD: NT4/LJR
GPC Cleanup: NO

Sample Amount LCS: 500 mL
LCSD: 500 mL
Final Extract Volume LCS: 0.50 mL
LCSD: 0.50 mL
Dilution Factor LCS: 1.00
LCSD: 1.00

Analyte	LCS	Spike Added-LCS	LCS Recovery	LCSD	Spike Added-LCSD	LCSD Recovery	RPD
Phenol	18.3	25.0	73.2%	16.6	25.0	66.4%	9.7%
Bis-(2-Chloroethyl) Ether	19.1	25.0	76.4%	18.0	25.0	72.0%	5.9%
2-Chlorophenol	19.0	25.0	76.0%	17.6	25.0	70.4%	7.7%
1,3-Dichlorobenzene	13.0	25.0	52.0%	11.8	25.0	47.2%	9.7%
1,4-Dichlorobenzene	13.5	25.0	54.0%	12.2	25.0	48.8%	10.1%
Benzyl Alcohol	38.9	50.0	77.8%	36.8	50.0	73.6%	5.5%
1,2-Dichlorobenzene	14.6	25.0	58.4%	13.2	25.0	52.8%	10.1%
2-Methylphenol	19.4	25.0	77.6%	18.0	25.0	72.0%	7.5%
2,2'-Oxybis(1-Chloropropane)	19.8	25.0	79.2%	18.4	25.0	73.6%	7.3%
4-Methylphenol	42.5	50.0	85.0%	40.0	50.0	80.0%	6.1%
N-Nitroso-Di-N-Propylamine	20.3	25.0	81.2%	19.3	25.0	77.2%	5.1%
Hexachloroethane	12.0	25.0	48.0%	10.3	25.0	41.2%	15.2%
Nitrobenzene	20.6	25.0	82.4%	19.5	25.0	78.0%	5.5%
Isophorone	22.1	25.0	88.4%	21.4	25.0	85.6%	3.2%
2-Nitrophenol	19.3	25.0	77.2%	18.5	25.0	74.0%	4.2%
2,4-Dimethylphenol	16.4	25.0	65.6%	16.1	25.0	64.4%	1.8%
Benzoic Acid	63.5	75.0	84.7%	61.4	75.0	81.9%	3.4%
bis(2-Chloroethoxy) Methane	20.2	25.0	80.8%	19.3	25.0	77.2%	4.6%
2,4-Dichlorophenol	20.2	25.0	80.8%	19.3	25.0	77.2%	4.6%
1,2,4-Trichlorobenzene	14.7	25.0	58.8%	13.3	25.0	53.2%	10.0%
Naphthalene	18.0	25.0	72.0%	17.0	25.0	68.0%	5.7%
4-Chloroaniline	47.0	60.0	78.3%	40.3	60.0	67.2%	15.3%
Hexachlorobutadiene	13.4	25.0	53.6%	11.3	25.0	45.2%	17.0%
4-Chloro-3-methylphenol	22.2	25.0	88.8%	21.7	25.0	86.8%	2.3%
2-Methylnaphthalene	18.5	25.0	74.0%	17.3	25.0	69.2%	6.7%
Hexachlorocyclopentadiene	55.3	75.0	73.7%	48.1	75.0	64.1%	13.9%
2,4,6-Trichlorophenol	20.4	25.0	81.6%	20.2	25.0	80.8%	1.0%
2,4,5-Trichlorophenol	20.0	25.0	80.0%	19.6	25.0	78.4%	2.0%
2-Chloronaphthalene	18.2	25.0	72.8%	17.1	25.0	68.4%	6.2%
2-Nitroaniline	21.8	25.0	87.2%	21.7	25.0	86.8%	0.5%
Dimethylphthalate	21.8	25.0	87.2%	21.6	25.0	86.4%	0.9%
Acenaphthylene	19.2	25.0	76.8%	18.6	25.0	74.4%	3.2%
3-Nitroaniline	57.4	64.0	89.7%	57.0	64.0	89.1%	0.7%
Acenaphthene	20.0	25.0	80.0%	18.8	25.0	75.2%	6.2%
2,4-Dinitrophenol	73.4	75.0	97.9%	71.8	75.0	95.7%	2.2%
4-Nitrophenol	26.6	25.0	106%	25.6	25.0	102%	3.8%
Dibenzofuran	20.4	25.0	81.6%	19.4	25.0	77.6%	5.0%
2,6-Dinitrotoluene	21.2	25.0	84.8%	21.0	25.0	84.0%	0.9%
2,4-Dinitrotoluene	21.4	25.0	85.6%	20.4	25.0	81.6%	4.8%
Diethylphthalate	22.4	25.0	89.6%	22.5	25.0	90.0%	0.4%
4-Chlorophenyl-phenylether	21.2	25.0	84.8%	19.4	25.0	77.6%	8.9%
Fluorene	21.6	25.0	86.4%	20.6	25.0	82.4%	4.7%
4-Nitroaniline	18.6	25.0	74.4%	18.8	25.0	75.2%	1.1%
4,6-Dinitro-2-Methylphenol	40.3	75.0	53.7%	39.8	75.0	53.1%	1.2%
N-Nitrosodiphenylamine	19.6	25.0	78.4%	19.3	25.0	77.2%	1.5%

FORM III

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Semivolatiles by SW8270D GC/MS
Page 2 of 2

Sample ID: LCS-010709
LCS/LCSD

Lab Sample ID: LCS-010709
LIMS ID: 09-399
Matrix: Water
Date Analyzed: 01/12/09 20:37

QC Report No: OG55-The Boeing Company
Project: BP2 SC

Analyte	LCS	Spike Added-LCS	LCS Recovery	LCSD	Spike Added-LCSD	LCSD Recovery	RPD
4-Bromophenyl-phenylether	20.8	25.0	83.2%	18.9	25.0	75.6%	9.6%
Hexachlorobenzene	21.5	25.0	86.0%	19.7	25.0	78.8%	8.7%
Pentachlorophenol	24.1	25.0	96.4%	23.5	25.0	94.0%	2.5%
Phenanthrene	22.3	28.0	79.6%	21.0	28.0	75.0%	6.0%
Carbazole	22.0	25.0	88.0%	21.9	25.0	87.6%	0.5%
Anthracene	21.4	25.0	85.6%	19.9	25.0	79.6%	7.3%
Di-n-Butylphthalate	22.8	25.0	91.2%	21.2	25.0	84.8%	7.3%
Fluoranthene	22.4	25.0	89.6%	20.9	25.0	83.6%	6.9%
Pyrene	24.1	25.0	96.4%	22.2	25.0	88.8%	8.2%
Butylbenzylphthalate	23.4	25.0	93.6%	22.0	25.0	88.0%	6.2%
3,3'-Dichlorobenzidine	45.7	64.0	71.4%	43.9	64.0	68.6%	4.0%
Benzo(a)anthracene	22.7	25.0	90.8%	20.8	25.0	83.2%	8.7%
bis(2-Ethylhexyl)phthalate	24.4	25.0	97.6%	22.7	25.0	90.8%	7.2%
Chrysene	20.8	28.0	74.3%	19.1	28.0	68.2%	8.5%
Di-n-Octyl phthalate	21.7	25.0	86.8%	20.0	25.0	80.0%	8.2%
Benzo(b)fluoranthene	21.9	25.0	87.6%	22.7	25.0	90.8%	3.6%
Benzo(k)fluoranthene	24.1	28.0	86.1%	20.3	28.0	72.5%	17.1%
Benzo(a)pyrene	18.2	25.0	72.8%	16.6	25.0	66.4%	9.2%
Indeno(1,2,3-cd)pyrene	23.0	25.0	92.0%	20.4	25.0	81.6%	12.0%
Dibenz(a,h)anthracene	22.7	25.0	90.8%	20.2	25.0	80.8%	11.7%
Benzo(g,h,i)perylene	21.5	25.0	86.0%	19.0	25.0	76.0%	12.3%
1-Methylnaphthalene	20.4	25.0	81.6%	19.1	25.0	76.4%	6.6%

Semivolatile Surrogate Recovery

	LCS	LCSD
d5-Nitrobenzene	86.4%	80.4%
2-Fluorobiphenyl	78.4%	75.6%
d14-p-Terphenyl	100%	98.4%
d4-1,2-Dichlorobenzene	70.0%	64.0%
d5-Phenol	86.4%	77.6%
2-Fluorophenol	76.3%	69.6%
2,4,6-Tribromophenol	101%	99.2%
d4-2-Chlorophenol	80.5%	73.3%

Results reported in µg/L
RPD calculated using sample concentrations per SW846.

4B

SEMIVOLATILE METHOD BLANK SUMMARY

BLANK NO.

OG55MBW1

Lab Name: ANALYTICAL RESOURCES, INC

Client: THE BOEING COMPANY

ARI Job No: OG55

Project: BP2 SC

Lab File ID: OG55MB

Date Extracted: 01/07/09

Instrument ID: NT4

Date Analyzed: 01/12/09

Matrix: LIQUID

Time Analyzed: 2003

THIS METHOD BLANK APPLIES TO THE FOLLOWING SAMPLES, MS and MSD:

	CLIENT SAMPLE NO.	LAB SAMPLE ID	LAB FILE ID	DATE ANALYZED
01	OG55LCSW1	OG55LCSW1	OG55SB	01/12/09
02	OG55LCSDW1	OG55LCSDW1	OG55SBD	01/12/09
03	PL2SC-W-G-010609	OG55A	OG55A2	01/13/09
04				
05				
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COMMENTS:

FORM IV SV

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Semivolatiles by SW8270D GC/MS

Sample ID: MB-010709
METHOD BLANK

Lab Sample ID: MB-010709
LIMS ID: 09-399
Matrix: Water
Data Release Authorized:
Reported: 01/14/09

QC Report No: OG55-The Boeing Company
Project: BP2 SC
NA
Date Sampled: NA
Date Received: NA

Date Extracted: 01/07/09
Date Analyzed: 01/12/09 20:03
Instrument/Analyst: NT4/LJR

Sample Amount: 500 mL
Final Extract Volume: 0.50 mL
Dilution Factor: 1.00

CAS Number	Analyte	RL	Result
108-95-2	Phenol	1.0	< 1.0 U
111-44-4	Bis-(2-Chloroethyl) Ether	1.0	< 1.0 U
95-57-8	2-Chlorophenol	1.0	< 1.0 U
541-73-1	1,3-Dichlorobenzene	1.0	< 1.0 U
106-46-7	1,4-Dichlorobenzene	1.0	< 1.0 U
100-51-6	Benzyl Alcohol	5.0	< 5.0 U
95-50-1	1,2-Dichlorobenzene	1.0	< 1.0 U
95-48-7	2-Methylphenol	1.0	< 1.0 U
108-60-1	2,2'-Oxybis(1-Chloropropane)	1.0	< 1.0 U
106-44-5	4-Methylphenol	1.0	< 1.0 U
621-64-7	N-Nitroso-Di-N-Propylamine	5.0	< 5.0 U
67-72-1	Hexachloroethane	1.0	< 1.0 U
98-95-3	Nitrobenzene	1.0	< 1.0 U
78-59-1	Isophorone	1.0	< 1.0 U
88-75-5	2-Nitrophenol	5.0	< 5.0 U
105-67-9	2,4-Dimethylphenol	1.0	< 1.0 U
65-85-0	Benzoic Acid	10	< 10 U
111-91-1	bis(2-Chloroethoxy) Methane	1.0	< 1.0 U
120-83-2	2,4-Dichlorophenol	5.0	< 5.0 U
120-82-1	1,2,4-Trichlorobenzene	1.0	< 1.0 U
91-20-3	Naphthalene	1.0	< 1.0 U
106-47-8	4-Chloroaniline	5.0	< 5.0 U
87-68-3	Hexachlorobutadiene	1.0	< 1.0 U
59-50-7	4-Chloro-3-methylphenol	5.0	< 5.0 U
91-57-6	2-Methylnaphthalene	1.0	< 1.0 U
77-47-4	Hexachlorocyclopentadiene	5.0	< 5.0 U
88-06-2	2,4,6-Trichlorophenol	5.0	< 5.0 U
95-95-4	2,4,5-Trichlorophenol	5.0	< 5.0 U
91-58-7	2-Chloronaphthalene	1.0	< 1.0 U
88-74-4	2-Nitroaniline	5.0	< 5.0 U
131-11-3	Dimethylphthalate	1.0	< 1.0 U
208-96-8	Acenaphthylene	1.0	< 1.0 U
99-09-2	3-Nitroaniline	5.0	< 5.0 U
83-32-9	Acenaphthene	1.0	< 1.0 U
51-28-5	2,4-Dinitrophenol	10	< 10 U
100-02-7	4-Nitrophenol	5.0	< 5.0 U
132-64-9	Dibenzofuran	1.0	< 1.0 U
606-20-2	2,6-Dinitrotoluene	5.0	< 5.0 U
121-14-2	2,4-Dinitrotoluene	5.0	< 5.0 U
84-66-2	Diethylphthalate	1.0	< 1.0 U

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
Semivolatiles by SW8270D GC/MS

Sample ID: MB-010709
METHOD BLANK

Lab Sample ID: MB-010709
LIMS ID: 09-399
Matrix: Water
Date Analyzed: 01/12/09 20:03

QC Report No: OG55-The Boeing Company
Project: BP2 SC
NA

CAS Number	Analyte	RL	Result
7005-72-3	4-Chlorophenyl-phenylether	1.0	< 1.0 U
86-73-7	Fluorene	1.0	< 1.0 U
100-01-6	4-Nitroaniline	5.0	< 5.0 U
534-52-1	4,6-Dinitro-2-Methylphenol	10	< 10 U
86-30-6	N-Nitrosodiphenylamine	1.0	< 1.0 U
101-55-3	4-Bromophenyl-phenylether	1.0	< 1.0 U
118-74-1	Hexachlorobenzene	1.0	< 1.0 U
87-86-5	Pentachlorophenol	5.0	< 5.0 U
85-01-8	Phenanthrene	1.0	< 1.0 U
86-74-8	Carbazole	1.0	< 1.0 U
120-12-7	Anthracene	1.0	< 1.0 U
84-74-2	Di-n-Butylphthalate	1.0	< 1.0 U
206-44-0	Fluoranthene	1.0	< 1.0 U
129-00-0	Pyrene	1.0	< 1.0 U
85-68-7	Butylbenzylphthalate	1.0	< 1.0 U
91-94-1	3,3'-Dichlorobenzidine	5.0	< 5.0 U
56-55-3	Benzo(a)anthracene	1.0	< 1.0 U
117-81-7	bis(2-Ethylhexyl)phthalate	1.0	< 1.0 U
218-01-9	Chrysene	1.0	< 1.0 U
117-84-0	Di-n-Octyl phthalate	1.0	< 1.0 U
205-99-2	Benzo(b)fluoranthene	1.0	< 1.0 U
207-08-9	Benzo(k)fluoranthene	1.0	< 1.0 U
50-32-8	Benzo(a)pyrene	1.0	< 1.0 U
193-39-5	Indeno(1,2,3-cd)pyrene	1.0	< 1.0 U
53-70-3	Dibenz(a,h)anthracene	1.0	< 1.0 U
191-24-2	Benzo(g,h,i)perylene	1.0	< 1.0 U
90-12-0	1-Methylnaphthalene	1.0	< 1.0 U

Reported in µg/L (ppb)

Semivolatile Surrogate Recovery

d5-Nitrobenzene	82.8%	2-Fluorobiphenyl	78.0%
d14-p-Terphenyl	104%	d4-1,2-Dichlorobenzene	66.8%
d5-Phenol	76.3%	2-Fluorophenol	73.6%
2,4,6-Tribromophenol	96.0%	d4-2-Chlorophenol	77.9%

SIM PNA

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PNAs by SW8270D-SIM GC/MS
Page 1 of 1

Sample ID: PL2SC-W-G-010609
SAMPLE

Lab Sample ID: OG55A
LIMS ID: 09-399
Matrix: Water
Data Release Authorized: MW
Reported: 01/13/09

QC Report No: OG55-The Boeing Company
Project: BP2 SC
Event: NA
Date Sampled: 01/06/09
Date Received: 01/07/09

Date Extracted: 01/08/09
Date Analyzed: 01/12/09 14:39
Instrument/Analyst: NT1/VTS

Sample Amount: 500 mL
Final Extract Volume: 0.5 mL
Dilution Factor: 1.00

CAS Number	Analyte	RL	Result
91-20-3	Naphthalene	0.10	< 0.10 U
91-57-6	2-Methylnaphthalene	0.10	< 0.10 U
90-12-0	1-Methylnaphthalene	0.10	< 0.10 U
208-96-8	Acenaphthylene	0.10	< 0.10 U
83-32-9	Acenaphthene	0.10	< 0.10 U
86-73-7	Fluorene	0.10	< 0.10 U
85-01-8	**Phenanthrene**	**0.10**	**0.12**
120-12-7	Anthracene	0.10	< 0.10 U
206-44-0	Fluoranthene	0.10	< 0.10 U
129-00-0	Pyrene	0.10	< 0.10 U
56-55-3	Benzo(a)anthracene	0.10	< 0.10 U
218-01-9	Chrysene	0.10	< 0.10 U
205-99-2	Benzo(b)fluoranthene	0.10	< 0.10 U
207-08-9	Benzo(k)fluoranthene	0.10	< 0.10 U
50-32-8	Benzo(a)pyrene	0.10	< 0.10 U
193-39-5	Indeno(1,2,3-cd)pyrene	0.10	< 0.10 U
53-70-3	Dibenz(a,h)anthracene	0.10	< 0.10 U
191-24-2	Benzo(g,h,i)perylene	0.10	< 0.10 U
132-64-9	Dibenzofuran	0.10	< 0.10 U

Reported in µg/L (ppb)

SIM Semivolatile Surrogate Recovery

d10-2-Methylnaphthalene	73.7%
d14-Dibenzo(a,h)anthracene	50.3%

ANALYTICAL RESOURCES INCORPORATED

SIM SW8270 SURROGATE RECOVERY SUMMARY

Matrix: Water

QC Report No: OG55-The Boeing Company
Project: BP2 SC

Client ID	MNP	DBA	TOT OUT
MB-010809	74.7%	93.0%	0
LCS-010809	71.0%	90.3%	0
LCSD-010809	66.3%	84.0%	0
PL2SC-W-G-010609	73.7%	50.3%	0

	LCS/MB LIMITS	QC LIMITS
(MNP) = d10-2-Methylnaphthalene	(48-101)	(40-114)
(DBA) = d14-Dibenzo(a,h)anthracene	(52-108)	(17-122)

Prep Method: SW3520C
Log Number Range: 09-399 to 09-399

ORGANICS ANALYSIS DATA SHEET
PNAs by SW8270D-SIM GC/MS

ANALYTICAL RESOURCES INCORPORATED

Sample ID: LCS-010809
LAB CONTROL SAMPLE

Lab Sample ID: LCS-010809
LIMS ID: 09-399
Matrix: Water
Data Release Authorized: MW
Reported: 01/13/09

QC Report No: OG55-The Boeing Company
Project: BP2 SC
Event: NA
Date Sampled: NA
Date Received: NA

Date Extracted LCS/LCSD: 01/08/09

Date Analyzed LCS: 01/12/09 13:09
LCSD: 01/12/09 13:31
Instrument/Analyst LCS: NT1/VTS
LCSD: NT1/VTS

Sample Amount LCS: 500 mL
LCSD: 500 mL
Final Extract Volume LCS: 0.50 mL
LCSD: 0.50 mL
Dilution Factor LCS: 1.00
LCSD: 1.00

Analyte	LCS	Spike Added-LCS	LCS Recovery	LCSD	Spike Added-LCSD	LCSD Recovery	RPD
Naphthalene	2.13	3.00	71.0%	2.09	3.00	69.7%	1.9%
2-Methylnaphthalene	2.24	3.00	74.7%	2.15	3.00	71.7%	4.1%
1-Methylnaphthalene	2.07	3.00	69.0%	2.06	3.00	68.7%	0.5%
Acenaphthylene	2.13	3.00	71.0%	2.01	3.00	67.0%	5.8%
Acenaphthene	2.25	3.00	75.0%	2.13	3.00	71.0%	5.5%
Fluorene	2.19	3.00	73.0%	2.03	3.00	67.7%	7.6%
Phenanthrene	2.42	3.00	80.7%	2.34	3.00	78.0%	3.4%
Anthracene	2.35	3.00	78.3%	2.35	3.00	78.3%	0.0%
Fluoranthene	2.73	3.00	91.0%	2.61	3.00	87.0%	4.5%
Pyrene	2.61	3.00	87.0%	2.67	3.00	89.0%	2.3%
Benzo(a)anthracene	2.48	3.00	82.7%	2.48	3.00	82.7%	0.0%
Chrysene	2.70	3.00	90.0%	2.68	3.00	89.3%	0.7%
Benzo(b)fluoranthene	2.99	3.00	99.7%	2.94	3.00	98.0%	1.7%
Benzo(k)fluoranthene	2.98	3.00	99.3%	3.00	3.00	100%	0.7%
Benzo(a)pyrene	2.47	3.00	82.3%	2.06	3.00	68.7%	18.1%
Indeno(1,2,3-cd)pyrene	2.68	3.00	89.3%	2.49	3.00	83.0%	7.4%
Dibenz(a,h)anthracene	2.72	3.00	90.7%	2.63	3.00	87.7%	3.4%
Benzo(g,h,i)perylene	2.56	3.00	85.3%	2.49	3.00	83.0%	2.8%
Dibenzofuran	2.13	3.00	71.0%	2.07	3.00	69.0%	2.9%

Reported in µg/L (ppb)

RPD calculated using sample concentrations per SW846.

SIM Semivolatile Surrogate Recovery

	LCS	LCSD
d10-2-Methylnaphthalene	71.0%	66.3%
d14-Dibenzo(a,h)anthracene	90.3%	84.0%

4B

SEMIVOLATILE METHOD BLANK SUMMARY

BLANK NO. OG69MBW1

Lab Name: ANALYTICAL RESOURCES, INC

Client: THE BOEING COMPANY

ARI Job No: OG55

Project: BP2 SC

Lab File ID: OG69MB

Date Extracted: 01/08/09

Instrument ID: NT1

Date Analyzed: 01/12/09

Matrix: LIQUID

Time Analyzed: 1246

THIS METHOD BLANK APPLIES TO THE FOLLOWING SAMPLES, MS and MSD:

	CLIENT SAMPLE NO.	LAB SAMPLE ID	LAB FILE ID	DATE ANALYZED
01	OG69LCSW1	OG69LCSW1	OG69SB	01/12/09
02	OG69LCSDW1	OG69LCSDW1	OG69SBD	01/12/09
03	PL2SC-W-G-010609	OG55A	OG55A	01/12/09
04				
05				
06				
07				
08				
09				
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11				
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COMMENTS:

FORM IV SV

ORGANICS ANALYSIS DATA SHEET
PNAs by SW8270D-SIM GC/MS

ANALYTICAL RESOURCES INCORPORATED

Sample ID: MB-010809
METHOD BLANK

Lab Sample ID: MB-010809
LIMS ID: 09-399
Matrix: Water
Data Release Authorized: MW
Reported: 01/13/09

QC Report No: OG55-The Boeing Company
Project: BP2 SC
Event: NA
Date Sampled: NA
Date Received: NA

Date Extracted: 01/08/09
Date Analyzed: 01/12/09 12:46
Instrument/Analyst: NT1/VTS

Sample Amount: 500 mL
Final Extract Volume: 0.5 mL
Dilution Factor: 1.00

CAS Number	Analyte	RL	Result
91-20-3	Naphthalene	0.10	< 0.10 U
91-57-6	2-Methylnaphthalene	0.10	< 0.10 U
90-12-0	1-Methylnaphthalene	0.10	< 0.10 U
208-96-8	Acenaphthylene	0.10	< 0.10 U
83-32-9	Acenaphthene	0.10	< 0.10 U
86-73-7	Fluorene	0.10	< 0.10 U
85-01-8	Phenanthrene	0.10	< 0.10 U
120-12-7	Anthracene	0.10	< 0.10 U
206-44-0	Fluoranthene	0.10	< 0.10 U
129-00-0	Pyrene	0.10	< 0.10 U
56-55-3	Benzo(a)anthracene	0.10	< 0.10 U
218-01-9	Chrysene	0.10	< 0.10 U
205-99-2	Benzo(b)fluoranthene	0.10	< 0.10 U
207-08-9	Benzo(k)fluoranthene	0.10	< 0.10 U
50-32-8	Benzo(a)pyrene	0.10	< 0.10 U
193-39-5	Indeno(1,2,3-cd)pyrene	0.10	< 0.10 U
53-70-3	Dibenz(a,h)anthracene	0.10	< 0.10 U
191-24-2	Benzo(g,h,i)perylene	0.10	< 0.10 U
132-64-9	Dibenzofuran	0.10	< 0.10 U

Reported in µg/L (ppb)

SIM Semivolatile Surrogate Recovery	
d10-2-Methylnaphthalene	74.7%
d14-Dibenzo(a,h)anthracene	93.0%

METALS

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
DISSOLVED METALS
Page 1 of 1

Sample ID: PL2SC-W-V-010609
SAMPLE

Lab Sample ID: OG55B
LIMS ID: 09-400
Matrix: Water
Data Release Authorized:
Reported: 01/21/09

QC Report No: OG55-The Boeing Company
Project: BP2 SC

Date Sampled: 01/06/09
Date Received: 01/07/09

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	RL	µg/L	Q
7000A	01/08/09	7060A	01/15/09	**7440-38-2**	**Arsenic**	1	**2**	
6010B	01/08/09	6010B	01/20/09	7440-43-9	Cadmium	2	2	U
6010B	01/08/09	6010B	01/20/09	7440-47-3	Chromium	5	5	U
6010B	01/08/09	6010B	01/20/09	**7440-50-8**	**Copper**	2	**4**	
7000A	01/08/09	7421	01/13/09	7439-92-1	Lead	1	1	U
6010B	01/08/09	6010B	01/20/09	7440-22-4	Silver	3	3	U
6010B	01/08/09	6010B	01/20/09	**7440-66-6**	**Zinc**	10	**230**	

U-Analyte undetected at given RL
RL-Reporting Limit

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
DISSOLVED METALS

Sample ID: PL2SC-W-DUP-010609
SAMPLE

Lab Sample ID: OG55C
LIMS ID: 09-401
Matrix: Water
Data Release Authorized
Reported: 01/21/09

QC Report No: OG55-The Boeing Company
Project: BP2 SC

Date Sampled: 01/06/09
Date Received: 01/07/09

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	RL	µg/L	Q
7000A	01/08/09	7060A	01/15/09	**7440-38-2**	**Arsenic**	1	**1**	
6010B	01/08/09	6010B	01/20/09	7440-43-9	Cadmium	2	2	U
6010B	01/08/09	6010B	01/20/09	7440-47-3	Chromium	5	5	U
6010B	01/08/09	6010B	01/20/09	**7440-50-8**	**Copper**	2	**3**	
7000A	01/08/09	7421	01/13/09	7439-92-1	Lead	1	1	U
6010B	01/08/09	6010B	01/20/09	7440-22-4	Silver	3	3	U
6010B	01/08/09	6010B	01/20/09	**7440-66-6**	**Zinc**	10	**230**	

U-Analyte undetected at given RL
RL-Reporting Limit

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
DISSOLVED METALS

Sample ID: PL2SC-W-V-010609
MATRIX SPIKE

Lab Sample ID: OG55B
LIMS ID: 09-400
Matrix: Water
Data Release Authorized:
Reported: 01/21/09

QC Report No: OG55-The Boeing Company
Project: BP2 SC

Date Sampled: 01/06/09
Date Received: 01/07/09

MATRIX SPIKE QUALITY CONTROL REPORT

Analyte	Analysis Method	Sample	Spike	Spike Added	% Recovery	Q
Arsenic	7060A	1.62	23.0	20.0	107%	
Cadmium	6010B	2.00 U	502	500	100%	
Chromium	6010B	5.00 U	476	500	95.2%	
Copper	6010B	3.55	465	500	92.3%	
Lead	7421	1.00 U	21.0	20.0	105%	
Silver	6010B	3.00 U	462	500	92.4%	
Zinc	6010B	227	701	500	94.8%	

Reported in µg/L

N-Control Limit Not Met
H-% Recovery Not Applicable, Sample Concentration Too High
NA-Not Applicable, Analyte Not Spiked

Percent Recovery Limits: 75-125%

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
DISSOLVED METALS

Sample ID: PL2SC-W-V-010609
DUPLICATE

Lab Sample ID: OG55B
LIMS ID: 09-400
Matrix: Water
Data Release Authorized:
Reported: 01/21/09

QC Report No: OG55-The Boeing Company
Project: BP2 SC

Date Sampled: 01/06/09
Date Received: 01/07/09

MATRIX DUPLICATE QUALITY CONTROL REPORT

Analyte	Analysis Method	Sample	Duplicate	RPD	Control Limit	Q
Arsenic	7060A	2	2	0.0%	+/- 1	L
Cadmium	6010B	2 U	2 U	0.0%	+/- 2	L
Chromium	6010B	5 U	5 U	0.0%	+/- 5	L
Copper	6010B	4	3	28.6%	+/- 2	L
Lead	7421	1 U	1 U	0.0%	+/- 1	L
Silver	6010B	3 U	3 U	0.0%	+/- 3	L
Zinc	6010B	230	230	0.0%	+/- 20%	

Reported in µg/L

*-Control Limit Not Met
L-RPD Invalid, Limit = Detection Limit

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
DISSOLVED METALS

Sample ID: LAB CONTROL

Lab Sample ID: OG55LCS
LIMS ID: 09-401
Matrix: Water
Data Release Authorized:
Reported: 01/21/09

QC Report No: OG55-The Boeing Company
Project: BP2 SC

Date Sampled: NA
Date Received: NA

BLANK SPIKE QUALITY CONTROL REPORT

Analyte	Analysis Method	Spike Found	Spike Added	% Recovery	Q
Arsenic	7060A	21	20	105%	
Cadmium	6010B	501	500	100%	
Chromium	6010B	465	500	93.0%	
Copper	6010B	461	500	92.2%	
Lead	7421	20	20	100%	
Silver	6010B	424	500	84.8%	
Zinc	6010B	480	500	96.0%	

Reported in µg/L

N-Control limit not met
Control Limits: 80-120%

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
DISSOLVED METALS

Sample ID: METHOD BLANK

Lab Sample ID: OG55MB
LIMS ID: 09-401
Matrix: Water
Data Release Authorized:
Reported: 01/21/09

QC Report No: OG55-The Boeing Company
Project: BP2 SC

Date Sampled: NA
Date Received: NA

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	RL	µg/L	Q
7000A	01/08/09	7060A	01/15/09	7440-38-2	Arsenic	1	1	U
6010B	01/08/09	6010B	01/20/09	7440-43-9	Cadmium	2	2	U
6010B	01/08/09	6010B	01/20/09	7440-47-3	Chromium	5	5	U
6010B	01/08/09	6010B	01/20/09	7440-50-8	Copper	2	2	U
7000A	01/08/09	7421	01/13/09	7439-92-1	Lead	1	1	U
6010B	01/08/09	6010B	01/20/09	7440-22-4	Silver	3	3	U
6010B	01/08/09	6010B	01/20/09	7440-66-6	Zinc	10	10	U

U-Analyte undetected at given RL
RL-Reporting Limit

LOW-LEVEL MERCURY

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
Dissolved Mercury by Method SW7470A

Data Release Authorized:
Reported: 01/16/09
Date Received: 01/07/09
Page 1 of 1

QC Report No: OG57-The Boeing Company
Project: BP2 SC

Client/ ARI ID	Date Sampled	Matrix	Prep Date Anal Date	RL	Result
PL2SC-W-V-010609 OG57A 09-402	01/06/09	Water	01/08/09 01/15/09	20.0	20.0 U
PL2SC-W-DUP-010609 OG57B 09-403	01/06/09	Water	01/08/09 01/15/09	20.0	20.0 U
MB-010809 Method Blank	NA	Water	01/08/09 01/15/09	20.0	20.0 U

Reported in ng/L

RL-Analytical reporting limit
U-Undetected at reported detection limit

FORM-I

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
DISSOLVED METALS

Sample ID: PL2SC-W-V-010609
MATRIX SPIKE

Lab Sample ID: OG57A
LIMS ID: 09-402
Matrix: Water
Data Release Authorized:
Reported: 01/16/09

QC Report No: OG57-The Boeing Company
Project: BP2 SC

Date Sampled: 01/06/09
Date Received: 01/07/09

MATRIX SPIKE QUALITY CONTROL REPORT

Analyte	Analysis Method	Sample	Spike	Spike Added	% Recovery	Q
Mercury	7470A	20.0 U	96.8	100	96.8%	

Reported in ng/L

N-Control Limit Not Met
H-% Recovery Not Applicable, Sample Concentration Too High
NA-Not Applicable, Analyte Not Spiked

Percent Recovery Limits: 75-125%

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
DISSOLVED METALS

Sample ID: PL2SC-W-V-010609
DUPLICATE

Lab Sample ID: OG57A
LIMS ID: 09-402
Matrix: Water
Data Release Authorized:
Reported: 01/16/09

QC Report No: OG57-The Boeing Company
Project: BP2 SC

Date Sampled: 01/06/09
Date Received: 01/07/09

MATRIX DUPLICATE QUALITY CONTROL REPORT

Analyte	Analysis Method	Sample	Duplicate	RPD	Control Limit	Q
Mercury	7470A	20.0 U	20.0 U	0.0%	+/- 20.0	L

Reported in ng/L

*-Control Limit Not Met
L-RPD Invalid, Limit = Detection Limit

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
DISSOLVED METALS

Sample ID: LAB CONTROL

Lab Sample ID: OG57LCS
LIMS ID: 09-403
Matrix: Water
Data Release Authorized:
Reported: 01/16/09

QC Report No: OG57-The Boeing Company
Project: BP2 SC

Date Sampled: NA
Date Received: NA

BLANK SPIKE QUALITY CONTROL REPORT

Analyte	Analysis Method	Spike Found	Spike Added	% Recovery	Q
Mercury	7470A	167	200	83.5%	

Reported in ng/L

N-Control limit not met
Control Limits: 80-120%

GENERAL CHEMISTRY

SAMPLE RESULTS-CONVENTIONALS
OG55-The Boeing Company

ANALYTICAL RESOURCES INCORPORATED

Matrix: Water
Data Release Authorized:
Reported: 01/13/09

Project: BP2 SC
Event: NA
Date Sampled: 01/06/09
Date Received: 01/07/09

Client ID: PL2SC-W-G-010609
ARI ID: 09-399 OG55A

Analyte	Date Batch	Method	Units	RL	Sample
pH	01/07/09 010709#1	EPA 150.1	std units	0.01	5.84

RL Analytical reporting limit
U Undetected at reported detection limit

SAMPLE RESULTS-CONVENTIONALS
OG55-The Boeing Company

ANALYTICAL RESOURCES INCORPORATED

Matrix: Water
Data Release Authorized:
Reported: 01/13/09

Project: BP2 SC
Event: NA
Date Sampled: 01/06/09
Date Received: 01/07/09

Client ID: PL2SC-W-V-010609
ARI ID: 09-400 OG55B

Analyte	Date Batch	Method	Units	RL	Sample
pH	01/07/09 010709#1	EPA 150.1	std units	0.01	6.47

RL Analytical reporting limit
U Undetected at reported detection limit

OG55 : 09040

REPLICATE RESULTS-CONVENTIONALS
OG55-The Boeing Company

ANALYTICAL RESOURCES INCORPORATED

Matrix: Water
Data Release Authorized:
Reported: 01/13/09

Project: BP2 SC
Event: NA
Date Sampled: 01/06/09
Date Received: 01/07/09

Analyte	Method	Date	Units	Sample	Replicate(s)	RPD/RSD
ARI ID: OG55A Client ID: PL2SC-W-G-010609						
pH	EPA 150.1	01/07/09	std units	5.84	5.85	0.01

pH is evaluated as the Absolute Difference between the values rather than Relative Percent Difference

LAB CONTROL RESULTS-CONVENTIONALS
OG55-The Boeing Company

ANALYTICAL RESOURCES INCORPORATED

Matrix: Water
Data Release Authorized:
Reported: 01/13/09

Project: BP2 SC
Event: NA
Date Sampled: NA
Date Received: NA

Analyte	Method	Date	Units	LCS	Spike Added	Recovery
pH	EPA 150.1	01/07/09	std units	7.02	7.00	0.02

pH is evaluated as the Absolute Difference between the values rather than Percent Recovery.

Analytical Resources, Incorporated
Analytical Chemists and Consultants

January 26, 2009

Kent Angelos
Golder Associates, Inc.
18300 NE Union Hill Road, Suite 200
Redmond, WA 98052-3333

RE: Boeing Plant 2 Source Control
ARI ID: OG70 & OG74

Dear Kent:

Please find enclosed the original Chain-of-Custody (COC) records, sample receipt documentation, and the final data package for the project referenced above.

Sample receipt information and analytical details are addressed in the Case Narrative.

An electronic copy of this package will be kept on file at ARI. If you have any questions or require additional information, please contact me at your convenience.

Sincerely,
ANALYTICAL RESOURCES, INC.

Kelly Bottem
Client Services Manager
(206) 695-6211
kellyb@arilabs.com

KB/eb

Enclosures

cc: Kent Angelos, Golder Associates Inc., 18300 NE Union Hill Road, Suite 200, Redmond, WA 98052-3333

Chain of Custody
Documentation

prepared
for

THE BOEING COMPANY

Project: Plant 2 Source Control

ARI JOB NO: OG70 & OG74

prepared
by

Analytical Resources, Inc.

Chain of Custody Record & Laboratory Analysis Request

ARI Assigned Number: OG70+OG74	Turn-around Requested: Std	Page: 1 of 1	
ARI Client Company: BOEING	Phone:	Date: 1/7/09	Ice Present?
Client Contact: WILL ERNST		No. of Coolers:	Cooler Temps:
Client Project Name: BP2SC			
Client Project #:	Samplers: Liz Shea		

Analytical Resources, Incorporated
Analytical Chemists and Consultants
4611 South 134th Place, Suite 100
Tukwila, WA 98168
206-695-6200 206-695-6201 (fax)

Sample ID	Date	Time	Matrix	No. Containers	Analysis Requested: SMS Metals *	Analysis Requested: cl Hg *	Analysis Requested: pH	Notes/Comments
P2SC-W-Z-010709	1/7/09	1540	W	3	x	x	x	* field filtered

Comments/Special Instructions	Relinquished by: (Signature) / Printed Name / Company / Date & Time	Received by: (Signature) / Printed Name / Company / Date & Time	Relinquished by: (Signature) / Printed Name / Company / Date & Time	Received by: (Signature) / Printed Name / Company / Date & Time
SMS Metals as per QAPP unpreserved bottles for pH	Liz Shea / Liz Shea / Golder / 1/7/09 1720	Jami Hayes / Jami Hayes / ARI / 1/7/09 1720		

Limits of Liability: *ARI will perform all requested services in accordance with appropriate methodology following ARI Standard Operating Procedures and the ARI Quality Assurance Program. This program meets standards for the industry. The total liability of ARI, its officers, agents, employees, or successors, arising out of or in connection with the requested services, shall not exceed the Invoiced amount for said services. The acceptance by the client of a proposal for services by ARI release ARI from any liability in excess thereof, not withstanding any provision to the contrary in any contract, purchase order or co-signed agreement between ARI and the Client.*

Sample Retention Policy: All samples submitted to ARI will be appropriately discarded no sooner than 90 days after receipt or 60 days after submission of hardcopy data, whichever is longer, unless alternate retention schedules have been established by work-order or contract.

PRESERVATION VERIFICATION 01/08/09
Page 1 of 1

ANALYTICAL RESOURCES INCORPORATED

ARI Job No: **OG70**

Inquiry Number: NONE
Analysis Requested: 01/08/09
Contact: Ernst, Will
Client: The Boeing Company
Logged by: JW
Sample Set Used: Yes-481
Validatable Package: No
Deliverables:

PC: Kelly
VTSR: 01/07/09

Project #:
Project: BP2SC
Sample Site:
SDG No:
Analytical Protocol: In-house

LOGNUM ARI ID	CLIENT ID	CN >12	WAD >12	NH3 <2	COD <2	FOG <2	MET <2	PHEN <2	PHOS <2	TKN <2	NO23 <2	TOC <2	S2 >9	DMET FLT	DOC FLT	PARAMETER	ADJUSTED TO	LOT NUMBER	AMOUNT ADDED	DATE/BY
09-462 **OG70A**	PL2SC-W-Z-010709						DIS ok							Y						

Checked By JW Date 1/8/09

Analytical Resources, Incorporated
Analytical Chemists and Consultants

Cooler Receipt Form

ARI Client: Boeing Project Name: BP2SC

COC No: _____ Delivered by: Hand

Assigned ARI Job No: OG70 Tracking No: _____

Preliminary Examination Phase:

Were intact, properly signed and dated custody seals attached to the outside of to cooler?	YES	(NO)
Were custody papers included with the cooler?	(YES)	NO
Were custody papers properly filled out (ink, signed, etc.)	(YES)	NO
Record cooler temperature (recommended 2.0-6.0 °C for chemistry	7.2 °C	

Cooler Accepted by: JH Date: 1/7/09 Time: 1720

Complete custody forms and attach all shipping documents

Log-In Phase:

Was a temperature blank included in the cooler?	YES	(NO)
What kind of packing material was used?	Ice-Bag	
Was sufficient ice used (if appropriate)?	YES	(NO)
Were all bottles sealed in individual plastic bags?	YES	(NO)
Did all bottle arrive in good condition (unbroken)?	(YES)	NO
Were all bottle labels complete and legible?	(YES)	NO
Did all bottle labels and tags agree with custody papers?	(YES)	NO
Were all bottles used correct for the requested analyses?	(YES)	NO
Do any of the analyses (bottles) require preservation? (attach preservation checklist)	(YES)	NO
Were all VOC vials free of air bubbles? (NA)	YES	NO
Was sufficient amount of sample sent in each bottle?	(YES)	NO

Samples Logged by: JW Date: 1/8/09 Time: 735

***** Notify Project Manager of discrepancies or concerns *****

Explain discrepancies or negative responses:

By: Date:

Chain of Custody Record & Laboratory Analysis Request

ARI Assigned Number: OG74	Turn-around Requested: STD	Page: 1 of 1	
ARI Client Company: BOEING	Phone:	Date: 1/7/09	Ice Present?
Client Contact: WILL ERNST		No. of Coolers:	Cooler Temps:
Client Project Name: BP2SC			
Client Project #:	Samplers: Liz Shea		

Analytical Resources, Incorporated
Analytical Chemists and Consultants
4611 South 134th Place, Suite 100
Tukwila, WA 98168
206-695-6200 206-695-6201 (fax)

Sample ID	Date	Time	Matrix	No. Containers	Analysis Requested: * SMS metals	* VOCs	pH						Notes/Comments
P2SC-W-Z-010709	1/7/09	1540	W	3	X	X	X						* field filtered

Comments/Special Instructions	Relinquished by: (Signature)	Printed Name:	Company:	Date & Time:	Received by: (Signature)	Printed Name:	Company:	Date & Time:	Relinquished by: (Signature)	Printed Name:	Company:	Date & Time:	Received by: (Signature)	Printed Name:	Company:	Date & Time:
SMS Metals as per QAPP unpreserved bottles for pH	Elizabeth Shea	Liz Shea	Golder	1/7/09 1720	Jami Hayes	Jami Hayes	ARI	1/7/09 1720								

PRESERVATION VERIFICATION 01/08/09
Page 1 of 1

ANALYTICAL RESOURCES INCORPORATED

ARI Job No: **OG74**

PC: Kelly
VTSR: 01/08/09

Inquiry Number: NONE
Analysis Requested: 01/08/09
Contact: Ernst, Will
Client: The Boeing Company
Logged by: JW
Sample Set Used: Yes-481
Validatable Package: No
Deliverables:

Project #:
Project: BP2SC
Sample Site:
SDG No:
Analytical Protocol: In-house

LOGNUM ART ID	CLIENT ID	CN >12	WAD >12	NH3 <2	COD <2	FOG <2	MET <2	PHEN <2	PHOS <2	TKN <2	NO23 <2	TOC <2	S2 >9	DMET FLT	DOC FLT	PARAMETER	ADJUSTED TO	LOT NUMBER	AMOUNT ADDED	DATE/BY
C9-525 **OG74A**	PL2SC-W-%-010709						DIS ok							Y						

Checked By JW Date 1/8/09

Analytical Resources, Incorporated
Analytical Chemists and Consultants

Cooler Receipt Form

ARI Client: Boeing Project Name: BP2SC
COC No: _____ Delivered by: Hand
Assigned ARI Job No: 0674 Tracking No: _____

Preliminary Examination Phase:

Were intact, properly signed and dated custody seals attached to the outside of to cooler?	YES	(NO)
Were custody papers included with the cooler?	(YES)	NO
Were custody papers properly filled out (ink, signed, etc.)	(YES)	NO
Record cooler temperature (recommended 2.0-6.0 °C for chemistry	7.2 °C	

Cooler Accepted by: JH Date: 1/7/09 Time: 1720

Complete custody forms and attach all shipping documents

Log-In Phase:

Was a temperature blank included in the cooler?	YES	(NO)
What kind of packing material was used?	ICE/Bu	
Was sufficient ice used (if appropriate)?	YES	(NO)
Were all bottles sealed in individual plastic bags?	YES	(NO)
Did all bottle arrive in good condition (unbroken)?	(YES)	NO
Were all bottle labels complete and legible?	(YES)	NO
Did all bottle labels and tags agree with custody papers?	(YES)	NO
Were all bottles used correct for the requested analyses?	(YES)	NO
Do any of the analyses (bottles) require preservation? (attach preservation checklist)	(YES)	NO
Were all VOC vials free of air bubbles? (NA)	YES	NO
Was sufficient amount of sample sent in each bottle?	(YES)	NO

Samples Logged by: JW Date: 1/8/09 Time: 750

***** Notify Project Manager of discrepancies or concerns *****

Explain discrepancies or negative responses:

By: Date:

Case Narrative

prepared
for

THE BOEING COMPANY

Project: Plant 2 Source Control

ARI JOB NO: OG70 & OG74

prepared
by

Analytical Resources, Inc.

Case Narrative

Project: Boeing Plant 2 Source Control
ARI ID: OG70 & OG74
Matrix: Water
Date: January 22, 2009

Sample Receipt Information

One water sample was received in good condition at Analytical Resources, Inc. (ARI) on January 7, 2009 under ARI sample delivery groups OG70 and OG74. The cooler temperature measured by IR thermometer was 7.2°C. For further details regarding sample receipt, please refer to the Cooler Receipt Form.

The sample was analyzed for the parameters listed below, as requested on the Chain of Custody.

Dissolved Metals by Methods 6010B and 7000 series

The samples were digested on 1/9/09. The digests were analyzed between 1/13/09 and 1/20/09 within the method recommended holding times.

Replicate(s): All percent recoveries were within compliance.

Samples: No anomalies were encountered for these samples.

LCS/Blank Spike(s): All percent recoveries were within compliance.

Method Blank(s): Are in control.

Standard Reference: All percent recoveries were within compliance.

Dissolved Low-Level Mercury by Method SW7470A

The samples were digested on 1/9/09. The digests were analyzed between on 1/15/09 within the method recommended holding times.

Replicate(s): All percent recoveries were within compliance.

Samples: No anomalies were encountered for these samples.

LCS/Blank Spike(s): All percent recoveries were within compliance.

Method Blank(s): Are in control.

Standard Reference: All percent recoveries were within compliance.

Case Narrative

Project: Boeing Plant 2 Source Control
ARI ID: OG70 & OG74
Matrix: Water
Date: January 22, 2009

Conventional Chemistry Parameters

The digests were analyzed on 1/7/09 within the method recommended holding times.

Replicate(s): All percent recoveries were within compliance.

Samples: No anomalies were encountered for these samples.

LCS/Blank Spike(s): All percent recoveries were within compliance.

Standard Reference: All percent recoveries were within compliance.

Data Reporting Qualifiers

Effective 12/28/04

Inorganic Data

U	Indicates that the target analyte was not detected at the reported concentration
*	Duplicate RPD is not within established control limits
B	Reported value is less than the CRDL but ≥ the Reporting Limit
N	Matrix Spike recovery not within established control limits
NA	Not Applicable, analyte not spiked
H	The natural concentration of the spiked element is so much greater than the concentration spiked that an accurate determination of spike recovery is not possible
L	Analyte concentration is ≤5 times the Reporting Limit and the replicate control limit defaults to ±1 RL instead of the normal 20% RPD

Organic Data

U	Indicates that the target analyte was not detected at the reported concentration
*	Flagged value is not within established control limits
B	Analyte detected in an associated Method Blank at a concentration greater than one-half of ARI's Reporting Limit or 5% of the regulatory limit or 5% of the analyte concentration in the sample.
J	Estimated concentration when the value is less than ARI's established reporting limits
D	The spiked compound was not detected due to sample extract dilution
NR	Spiked compound recovery is not reported due to chromatographic interference
E	Estimated concentration calculated for an analyte response above the valid instrument calibration range. A dilution is required to obtain an accurate quantification of the analyte.
S	Indicates an analyte response that has saturated the detector. The calculated concentration is not valid; a dilution is required to obtain valid quantification of the analyte
NA	The flagged analyte was not analyzed for
NS	The flagged analyte was not spiked into the sample

M Estimated value for an analyte detected and confirmed by an analyst but with low spectral match parameters. This flag is used only for GC-MS analyses

M2 The sample contains PCB congeners that do not match any standard Aroclor pattern. The PCBs are identified and quantified as the Aroclor whose pattern most closely matches that of the sample. The reported value is an estimate.

N The analysis indicates the presence of an analyte for which there is presumptive evidence to make a "tentative identification"

Y The analyte is not detected at or above the reported concentration. The reporting limit is raised due to chromatographic interference. The Y flag is equivalent to the U flag with a raised reporting limit.

C The analyte was positively identified on only one of two chromatographic columns. Chromatographic interference prevented a positive identification on the second column

P The analyte was detected on both chromatographic columns but the quantified values differ by ≥40% RPD with no obvious chromatographic interference

Geotechnical Data

A The total of all fines fractions. This flag is used to report total fines when only sieve analysis is requested and balances total grain size with sample weight.

F Samples were frozen prior to particle size determination

SM Sample matrix was not appropriate for the requested analysis. This normally refers to samples contaminated with an organic product that interferes with the sieving process and/or moisture content, porosity and saturation calculations

SS Sample did not contain the proportion of "fines" required to perform the pipette portion of the grain size analysis

W Weight of sample in some pipette aliquots was below the level required for accurate weighting

Data Summary Package

prepared
for

THE BOEING COMPANY

Project: Plant 2 Source Control

ARI JOB NO: OG70 & OG74

prepared
by

Analytical Resources, Inc.

METALS

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
DISSOLVED METALS
Page 1 of 1

Sample ID: PL2SC-W-Z-010709
SAMPLE

Lab Sample ID: OG70A
LIMS ID: 09-462
Matrix: Water
Data Release Authorized:
Reported: 01/21/09

QC Report No: OG70-The Boeing Company
Project: BP2SC

Date Sampled: 01/07/09
Date Received: 01/07/09

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	RL	µg/L	Q
7000A	01/09/09	7060A	01/15/09	**7440-38-2**	**Arsenic**	1	2	
6010B	01/09/09	6010B	01/20/09	7440-43-9	Cadmium	2	2	U
6010B	01/09/09	6010B	01/20/09	7440-47-3	Chromium	5	5	U
6010B	01/09/09	6010B	01/20/09	7440-50-8	Copper	2	2	U
7000A	01/09/09	7421	01/13/09	7439-92-1	Lead	1	1	U
6010B	01/09/09	6010B	01/20/09	7440-22-4	Silver	3	3	U
200.8	01/09/09	200.8	01/14/09	**7440-66-6**	**Zinc**	4	32	

U-Analyte undetected at given RL
RL-Reporting Limit

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
DISSOLVED METALS

Sample ID: LAB CONTROL

Lab Sample ID: OG70LCS
LIMS ID: 09-462
Matrix: Water
Data Release Authorized:
Reported: 01/21/09

QC Report No: OG70-The Boeing Company
Project: BP2SC

Date Sampled: NA
Date Received: NA

BLANK SPIKE QUALITY CONTROL REPORT

Analyte	Analysis Method	Spike Found	Spike Added	% Recovery	Q
Arsenic	7060A	21	20	105%	
Cadmium	6010B	495	500	99.0%	
Chromium	6010B	483	500	96.6%	
Copper	6010B	462	500	92.4%	
Lead	7421	21	20	105%	
Silver	6010B	514	500	103%	
Zinc	200.8	91	80	114%	

Reported in µg/L

N-Control limit not met
Control Limits: 80-120%

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
DISSOLVED METALS
Page 1 of 1

Sample ID: METHOD BLANK

Lab Sample ID: OG70MB
LIMS ID: 09-462
Matrix: Water
Data Release Authorized:
Reported: 01/21/09

QC Report No: OG70-The Boeing Company
Project: BP2SC

Date Sampled: NA
Date Received: NA

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	RL	µg/L	Q
7000A	01/09/09	7060A	01/15/09	7440-38-2	Arsenic	1	1	U
6010B	01/09/09	6010B	01/20/09	7440-43-9	Cadmium	2	2	U
6010B	01/09/09	6010B	01/20/09	7440-47-3	Chromium	5	5	U
6010B	01/09/09	6010B	01/20/09	7440-50-8	Copper	2	2	U
7000A	01/09/09	7421	01/13/09	7439-92-1	Lead	1	1	U
6010B	01/09/09	6010B	01/20/09	7440-22-4	Silver	3	3	U
200.8	01/09/09	200.8	01/14/09	7440-66-6	Zinc	4	4	U

U-Analyte undetected at given RL
RL-Reporting Limit

LOW-LEVEL MERCURY

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
Dissolved Mercury by Method SW7470A

Data Release Authorized:
Reported: 01/16/09
Date Received: 01/08/09
Page 1 of 1

QC Report No: OG74-The Boeing Company
Project: BP2SC

Client/ ARI ID	Date Sampled	Matrix	Prep Date Anal Date	RL	Result
PL2SC-W-Z-010709 OG74A 09-525	01/07/09	Water	01/09/09 01/15/09	20.0	20.0 U
MB-010909 Method Blank	NA	Water	01/09/09 01/15/09	20.0	20.0 U

Reported in ng/L

RL-Analytical reporting limit
U-Undetected at reported detection limit

FORM-I

OG74:00515

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
DISSOLVED METALS

Sample ID: PL2SC-W-Z-010709
MATRIX SPIKE

Lab Sample ID: OG74A
LIMS ID: 09-525
Matrix: Water
Data Release Authorized:
Reported: 01/16/09

QC Report No: OG74-The Boeing Company
Project: BP2SC

Date Sampled: 01/07/09
Date Received: 01/08/09

MATRIX SPIKE QUALITY CONTROL REPORT

Analyte	Analysis Method	Sample	Spike	Spike Added	% Recovery	Q
Mercury	7470A	20.0 U	86.5	100	86.5%	

Reported in ng/L

N-Control Limit Not Met
H-% Recovery Not Applicable, Sample Concentration Too High
NA-Not Applicable, Analyte Not Spiked

Percent Recovery Limits: 75-125%

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
DISSOLVED METALS

Sample ID: PL2SC-W-Z-010709
DUPLICATE

Lab Sample ID: OG74A
LIMS ID: 09-525
Matrix: Water
Data Release Authorized:
Reported: 01/16/09

QC Report No: OG74-The Boeing Company
Project: BP2SC

Date Sampled: 01/07/09
Date Received: 01/08/09

MATRIX DUPLICATE QUALITY CONTROL REPORT

Analyte	Analysis Method	Sample	Duplicate	RPD	Control Limit	Q
Mercury	7470A	20.0 U	20.0 U	0.0%	+/- 20.0	L

Reported in ng/L

*-Control Limit Not Met
L-RPD Invalid, Limit = Detection Limit

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
DISSOLVED METALS

Sample ID: LAB CONTROL

Lab Sample ID: OG74LCS
LIMS ID: 09-525
Matrix: Water
Data Release Authorized:
Reported: 01/16/09

QC Report No: OG74-The Boeing Company
Project: BP2SC

Date Sampled: NA
Date Received: NA

BLANK SPIKE QUALITY CONTROL REPORT

Analyte	Analysis Method	Spike Found	Spike Added	% Recovery	Q
Mercury	7470A	168	200	84.0%	

Reported in ng/L

N-Control limit not met
Control Limits: 80-120%

GENERAL CHEMISTRY

SAMPLE RESULTS-CONVENTIONALS
OG70-The Boeing Company

ANALYTICAL RESOURCES INCORPORATED

Matrix: Water
Data Release Authorized:
Reported: 01/22/09

Project: BP2SC
Event: NA
Date Sampled: 01/07/09
Date Received: 01/07/09

Client ID: PL2SC-W-Z-010709
ARI ID: 09-462 OG70A

Analyte	Date Batch	Method	Units	RL	Sample
pH	01/07/09 010709#2	EPA 150.1	std units	0.01	6.45

RL Analytical reporting limit
U Undetected at reported detection limit

REPLICATE RESULTS-CONVENTIONALS
OG70-The Boeing Company

ANALYTICAL RESOURCES INCORPORATED

Matrix: Water
Data Release Authorized:
Reported: 01/22/09

Project: BP2SC
Event: NA
Date Sampled: 01/07/09
Date Received: 01/07/09

Analyte	Method	Date	Units	Sample	Replicate(s)	RPD/RSD
ARI ID: OG70A Client ID: PL2SC-W-Z-010709						
pH	EPA 150.1	01/07/09	std units	6.45	6.45	0.00

pH is evaluated as the Absolute Difference between the values rather than Relative Percent Difference

LAB CONTROL RESULTS-CONVENTIONALS
OG70-The Boeing Company

ANALYTICAL RESOURCES INCORPORATED

Matrix: Water
Data Release Authorized:
Reported: 01/22/09

Project: BP2SC
Event: NA
Date Sampled: NA
Date Received: NA

Analyte	Method	Date	Units	LCS	Spike Added	Recovery
pH	EPA 150.1	01/07/09	std units	7.02	7.00	0.02

pH is evaluated as the Absolute Difference between the values rather than Percent Recovery.

Analytical Resources, Incorporated
Analytical Chemists and Consultants

January 26, 2009

Will Ernst
The Boeing Company
Energy and Environmental Affairs
P.O. Box 3707, M/S 7A-WH
Seattle, WA 98124-2207

RE: Boeing Plant 2 Source Control
ARI ID: OG77

Dear Will:

Please find enclosed the original *Chain of Custody* (COC) record and final data package for the project referenced above.

Sample receipt information and analytical details are addressed in the *Case Narrative*.

Copies of the reports and all associated raw data will be kept on file at ARI. If you have any questions or require additional information, please contact me at your convenience.

Sincerely,
ANALYTICAL RESOURCES, INC.

Kelly Bottem
Client Services Manager
(206) 695-6211
kellyb@arilabs.com

KB/eb

Enclosures

cc: Kent Angelos, Golder Associates Inc., 18300 NE Union Hill Road, Suite 200, Redmond, WA 98052-3333

Chain of Custody
Documentation

prepared
for

THE BOEING COMPANY

Project: Plant 2 Source Control

ARI JOB NO: OG77

prepared
by

Analytical Resources, Inc.

Chain of Custody Record & Laboratory Analysis Request

ARI Assigned Number: 0677	Turn-around Requested: Std	Page: 1	of 1
ARI Client Company: BOEING	Phone:	Date: 1/8/09	Ice Present?
Client Contact: WILL ERNST		No. of Coolers:	Cooler Temps:
Client Project Name: BP2 SC			
Client Project #:	Samplers: Liz Shea		

Analytical Resources, Incorporated
Analytical Chemists and Consultants
4611 South 134th Place, Suite 100
Tukwila, WA 98168
206-695-6200 206-695-6201 (fax)

Sample ID	Date	Time	Matrix	No. Containers	Analysis Requested: PCBs	Analysis Requested: SMS metals	Notes/Comments
P12SC-SS-Z-010809	1/8/09	0830	FILTER BAG	1	X	X	

Comments/Special Instructions	Relinquished by: (Signature)	Received by: (Signature)	Relinquished by: (Signature)	Received by: (Signature)
SMS metals as per source control QAPP	Printed Name: Liz Shea	Printed Name: Jonathon Walter	Printed Name:	Printed Name:
	Company: Golder Associates	Company: ARI	Company:	Company:
	Date & Time: 1/8/09 0910	Date & Time: 1/8/09 910	Date & Time:	Date & Time:

Analytical Resources, Incorporated
Analytical Chemists and Consultants

Cooler Receipt Form

ARI Client: Boeing Project Name: BP2SC
COC No: NA Delivered by: Hand
Assigned ARI Job No: OG77 Tracking No: NA

Preliminary Examination Phase:

Were intact, properly signed and dated custody seals attached to the outside of to cooler?	YES	(NO)
Were custody papers included with the cooler?	(YES)	NO
Were custody papers properly filled out (ink, signed, etc.)	(YES)	NO
Record cooler temperature (recommended 2.0-6.0 °C for chemistry	AMB °C	

Cooler Accepted by: JW Date: 1/8/09 Time: 910

Complete custody forms and attach all shipping documents

Log-In Phase:

Was a temperature blank included in the cooler?	YES	(NO)
What kind of packing material was used?	Bag	
Was sufficient ice used (if appropriate)?	YES	NO
Were all bottles sealed in individual plastic bags?	(YES)	NO
Did all bottle arrive in good condition (unbroken)?	(YES)	NO
Were all bottle labels complete and legible?	(YES)	NO
Did all bottle labels and tags agree with custody papers?	(YES)	NO
Were all bottles used correct for the requested analyses?	(YES)	NO
Do any of the analyses (bottles) require preservation? (attach preservation checklist)	YES	(NO)
Were all VOC vials free of air bubbles? (NA)	YES	NO
Was sufficient amount of sample sent in each bottle?	(YES)	NO

Samples Logged by: AV Date: 1/8/09 Time: 1065

***** Notify Project Manager of discrepancies or concerns *****

Explain discrepancies or negative responses:

By: Date:

Case Narrative

prepared
for

THE BOEING COMPANY

Project: Plant 2 Source Control

ARI JOB NO: OG77

prepared
by

Analytical Resources, Inc.

ANALYTICAL
RESOURCES
INCORPORATED

Case Narrative

Project: Boeing Plant 2 Source Control
ARI ID: OG77
Matrix: Filter Bag / Soil
Date: January 22, 2009

Sample Receipt Information

One solid matrix sample and one soil sample were received in good condition at ARI on 01/08/09 under ARI sample delivery group OG77. One cooler arrived at an ambient temperature.

Select samples were analyzed for the parameters listed below, as requested on the COC.

PCBs by Method 8082:

The sample was extracted on 1/15/09 and analyzed on 1/18/09 within the method recommended holding times.

Initial calibration (s): All analytes of interest were within method acceptance criteria.

Continuing calibration (s): Are in control.

Samples: There were no anomalies associated with these samples.

Surrogates: All surrogate recoveries were in control.

LCS(s): All percent recoveries for the analytes of interest were within compliance.

Method Blank: The method blank was free of contamination.

Total Metals by Methods 6010B and 7000 series

The samples were digested on 1/13/09. The digests were analyzed between 1/16/09 and 1/20/09 within the method recommended holding times.

Replicate(s): All percent recoveries were within compliance.

Samples: No anomalies were encountered for these samples.

LCS/Blank Spike(s): All percent recoveries were within compliance.

Method Blank(s): Are in control.

Standard Reference: All percent recoveries were within compliance.

Data Reporting Qualifiers

Effective 12/28/04

Inorganic Data

U	Indicates that the target analyte was not detected at the reported concentration
*	Duplicate RPD is not within established control limits
B	Reported value is less than the CRDL but ≥ the Reporting Limit
N	Matrix Spike recovery not within established control limits
NA	Not Applicable, analyte not spiked
H	The natural concentration of the spiked element is so much greater than the concentration spiked that an accurate determination of spike recovery is not possible
L	Analyte concentration is ≤5 times the Reporting Limit and the replicate control limit defaults to ±1 RL instead of the normal 20% RPD

Organic Data

U	Indicates that the target analyte was not detected at the reported concentration
*	Flagged value is not within established control limits
B	Analyte detected in an associated Method Blank at a concentration greater than one-half of ARI's Reporting Limit or 5% of the regulatory limit or 5% of the analyte concentration in the sample.
J	Estimated concentration when the value is less than ARI's established reporting limits
D	The spiked compound was not detected due to sample extract dilution
NR	Spiked compound recovery is not reported due to chromatographic interference
E	Estimated concentration calculated for an analyte response above the valid instrument calibration range. A dilution is required to obtain an accurate quantification of the analyte.
S	Indicates an analyte response that has saturated the detector. The calculated concentration is not valid; a dilution is required to obtain valid quantification of the analyte
NA	The flagged analyte was not analyzed for
NS	The flagged analyte was not spiked into the sample

M Estimated value for an analyte detected and confirmed by an analyst but with low spectral match parameters. This flag is used only for GC-MS analyses

M2 The sample contains PCB congeners that do not match any standard Aroclor pattern. The PCBs are identified and quantified as the Aroclor whose pattern most closely matches that of the sample. The reported value is an estimate.

N The analysis indicates the presence of an analyte for which there is presumptive evidence to make a "tentative identification"

Y The analyte is not detected at or above the reported concentration. The reporting limit is raised due to chromatographic interference. The Y flag is equivalent to the U flag with a raised reporting limit.

C The analyte was positively identified on only one of two chromatographic columns. Chromatographic interference prevented a positive identification on the second column

P The analyte was detected on both chromatographic columns but the quantified values differ by ≥40% RPD with no obvious chromatographic interference

Geotechnical Data

A The total of all fines fractions. This flag is used to report total fines when only sieve analysis is requested and balances total grain size with sample weight.

F Samples were frozen prior to particle size determination

SM Sample matrix was not appropriate for the requested analysis. This normally refers to samples contaminated with an organic product that interferes with the sieving process and/or moisture content, porosity and saturation calculations

SS Sample did not contain the proportion of "fines" required to perform the pipette portion of the grain size analysis

W Weight of sample in some pipette aliquots was below the level required for accurate weighting

LCS SOLUTIONS

12/30/08

LABE	SOLN ID	TEST	CONC. UG/ML	SOLVENT	EXP.
1	1549-3	PCB	20	ACETONE	10/10/09
2	1472-3	BCOC PEST	10	ACETONE	07/20/08
3	1517-1	PEST	02/04/20	ACETONE	05/15/09
4	1561-2	LOW PEST	0.2/0.4/2	ACETONE	05/15/09
5	1537-1	EPH	1500	MECL2	08/16/09
6	1559-2	PCP	12.5/125	ACETONE	11/05/09
7	1573-1	ABN	100	ACETONE	08/01/09
8	1566-1	TBT	2.5	MECL2	12/04/09
9	1567-3	PORE TBT	.125/.25	MECL2	12/04/09
10	1554-3	ABN ACID	100/200	MEOH	10/21/09
11	1563-3	TPHD	15000	ACETONE	11/20/09
12	1563-1	ABN BASE	200	ACETONE	06/30/09
13	1573-2	LOW PCB	2	ACETONE	10/10/09
14	1547-1	LOW ABN ACID	10/20	MEOH	04/10/09
15*	1452-1	SIM PNA	15/75	MEOH	04/09/09
16	1502-2	DIOXANE	100	MEOH	02/20/09
17	1516-2	1248 PCB	20	ACETONE	05/07/09
18	1514-4	LOW SIM PNA	1.5/7.5	ACETONE	04/24/09
19	1517-3	AK103	7500	MECL2	12/29/08
20	1572-2	PNA	100	ACETONE	12/26/09
21*	1414-4	SKY/BHT	100	MEOH	04/08/09
22	1570-1	HERB	12.5/12500	MEOH	02/19/09
23	1505-1	LOW ABN BASE	20	MEOH	03/20/09
24	1541-4	LOW ABN	10	ACETONE	08/01/09
25	1481-1	DIPHENYL	100	MEOH	07/20/08
26	1545-2	OP-PEST	25	MEOH	02/14/09
27	1495-1	STEROLS	200	MEOH	12/29/08
28	1494-1	ADD. PEST	4	ACETONE	01/23/09
29	1496-3	DECANES	100	MEOH	02/12/09
30	1497-2	EDB/DBCP	2	ACETONE	02/12/09
31	1510-3	TERPINEOL	100	MEOH	03/21/09

LCS SOLUTIONS

12/30/08

32	1545-3	GUAIACOL	50-200	ACETONE	06/05/09
33	1522-1	RESIN ACID	250	ACETONE	06/11/09
34	1530-2	CONGENERS	1	ACETONE	07/23/09
50	1571-1	FULL RESIN	250	ACETONE	06/10/09
*=REVERIFIED SOLUTION					

SURR SOLUTIONS

12/30/08

LABEL	SOLN ID	TEST	CONC. UG/ML	SOLVENT	EXP.
A	1559-5	ABN	100/150	MEOH	03/13/09
B	1572-1	SIM PNA	15/75	MEOH	08/28/09
C	1559-1	SIM ABN	25/37.5	MEOH	03/13/09
D	1561-3	LOW PCB	0.2	ACETONE	07/31/09
E*	1478-1	HERB	62.5	MEOH	09/21/09
F	1520-3	PCP	12.5	ACETONE	04/18/09
G	1534-1	1,4DIOXANE	100	MEOH	02/20/09
H	1545-1	OP-PEST	25	MEOH	02/14/09
I	1559-4	LOW S. PNA	1.5	MEOH	08/28/09
J	1566-5	TBT-PORE	0.125	MECL2	12/04/09
K	1538-1	MED PCB	20	ACETONE	07/31/09
L	1566-4	TBT	2.5	MECL2	12/04/09
M	1558-2	EPH	1500	MECL2	09/24/09
N	1538-2	PCB	2	ACETONE	07/31/09
O	1567-4	TPH	450	MECL2	09/24/09
P	1560-3	HCID	2250	MECL2	09/24/09
Q	1497-3	EDB	2	ACETONE	02/12/09
R	1521-4	RESIN ACID	250	ACETONE	06/11/09
S	1568-5	PBDE	.25	MEOH	12/11/09
T	*reverified solution				
U					
V					
W					
X					
Y					
Z					

Data Summary Package

prepared
for

THE BOEING COMPANY

Project: Plant 2 Source Control

ARI JOB NO: OG77

prepared
by

Analytical Resources, Inc.

PCBS

Analytical Resources, Incorporated
Analytical Chemists and Consultants

Organic Extractions Laboratory
Analyst Notes

ARI Job No.: 0677 Client ID: The Boeing

Parameter: PCB Client Project: BP2 SC

SOP Number(s): No Anomalies:

List problems, concerns, corrective actions and any other pertinent information
Total ~~Weight~~ Wet Weight = 613.84g WC 1/9/09
Metals Split = 14.21g WC 1/9/09
Dry Weight w/ Ring = 168.67g WC 1/15/09
Plastic Ring Weight = 2.47g
Dry Weight w/o Ring = 166.20g WC 1/15/09
SAMPLE B = ARCHIVED 4mL (NOT ACID cleaned) - A/C 1:5 WITH Transfer Rinse 1/16/09 TH

Analyst Initials:		Date:	

3056F

Revision 006
1/12/07

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PCB by GC/ECD Method SW8082

Sample ID: PL2SC-SS-Z-010809
SAMPLE

Lab Sample ID: OG77B
LIMS ID: 09-547
Matrix: Filter Bag
Data Release Authorized:
Reported: 01/19/09

QC Report No: OG77-The Boeing Company
Project: BP2 SC

Date Sampled: 01/08/09
Date Received: 01/08/09

Date Extracted: 01/15/09
Date Analyzed: 01/18/09 02:18
Instrument/Analyst: ECD5/JGR
GPC Cleanup: No
Sulfur Cleanup: Yes
Acid Cleanup: Yes

Sample Amount: 1.00 Filter Bag
Final Extract Volume: 5.0 mL
Dilution Factor: 100
Silica Gel: Yes

CAS Number	Analyte	RL	Result
12674-11-2	Aroclor 1016	10	< 10 U
53469-21-9	Aroclor 1242	10	< 10 U
12672-29-6	**Aroclor 1248**	**10**	**12**
11097-69-1	**Aroclor 1254**	**10**	**23**
11096-82-5	**Aroclor 1260**	**10**	**30**
11104-28-2	Aroclor 1221	10	< 10 U
11141-16-5	Aroclor 1232	10	< 10 U

Reported in Total µg

PCB Surrogate Recovery	
Decachlorobiphenyl	D
Tetrachlorometaxylene	D

ANALYTICAL RESOURCES INCORPORATED

SW8082/PCB WIPES SURROGATE RECOVERY SUMMARY

Matrix: Filter Bag

QC Report No: OG77-The Boeing Company
Project: BP2 SC

Client ID	DCBP	TCMX	TOT OUT
MB-011509	88.8%	79.2%	0
LCS-011509	95.2%	84.5%	0
LCSD-011509	91.5%	81.2%	0
PL2SC-SS-Z-010809	D	D	0

	LCS/MB LIMITS	QC LIMITS
(DCBP) = Decachlorobiphenyl	(30-160)	(30-160)
(TCMX) = Tetrachlorometaxylene	(30-160)	(30-160)

Prep Method: SW3580A
Log Number Range: 09-547 to 09-547

FORM-II SW8082

OG77:00015

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PCB by GC/ECD Method SW8082
Page 1 of 1

Sample ID: LCS-011509
LCS/LCSD

Lab Sample ID: LCS-011509
LIMS ID: 09-547
Matrix: Filter Bag
Data Release Authorized:
Reported: 01/19/09

QC Report No: OG77-The Boeing Company
Project: BP2 SC

Date Sampled: 01/08/09
Date Received: 01/08/09

Date Extracted LCS/LCSD: 01/15/09

Sample Amount LCS: 1.00 Filter Bag
LCSD: 1.00 Filter Bag

Date Analyzed LCS: 01/18/09 01:44
LCSD: 01/18/09 02:01

Final Extract Volume LCS: 5.0 mL
LCSD: 5.0 mL

Instrument/Analyst LCS: ECD5/JGR
LCSD: ECD5/JGR

Dilution Factor LCS: 1.00
LCSD: 1.00

GPC Cleanup: No
Sulfur Cleanup: Yes

Silica Gel: Yes
Acid Cleanup: Yes

Analyte	LCS	Spike Added-LCS	LCS Recovery	LCSD	Spike Added-LCSD	LCSD Recovery	RPD
Aroclor 1016	2.3	2.5	92.0%	2.2	2.5	88.0%	4.4%
Aroclor 1260	2.6	2.5	104%	2.6	2.5	104%	0.0%

PCB Surrogate Recovery

	LCS	LCSD
Decachlorobiphenyl	95.2%	91.5%
Tetrachlorometaxylene	84.5%	81.2%

Reported in Total µg
RPD calculated using sample concentrations per SW846.

PCB METHOD BLANK SUMMARY

BLANK NO.

OG77MB1

Lab Name: ANALYTICAL RESOURCES, INC
Client: THE BOEING COMPANY

ARI Job No.: OG77
Project: BP2 SC

Lab Sample ID: OG77MB1
Lab File ID: 0117B040

Date Extracted: 01/15/09
Matrix: SOLID

Date Analyzed: 01/18/09
Instrument ID: ECD5

Time Analyzed: 0127
GC Columns: ZB5/ZB35

THIS METHOD BLANK APPLIES TO THE FOLLOWING SAMPLES, MS and MSD:

	CLIENT SAMPLE NO.	LAB SAMPLE ID	DATE ANALYZED
01	OG77LCS1	OG77LCS1	01/18/09
02	OG77LCSD1	OG77LCSD1	01/18/09
03	PL2SC-SS-Z-010809	OG77B	01/18/09

ALL RUNS ARE DUAL COLUMN

FORM IV PCB

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PCB by GC/ECD Method SW8082

Sample ID: MB-011509
METHOD BLANK

Lab Sample ID: MB-011509
LIMS ID: 09-547
Matrix: Filter Bag
Data Release Authorized:
Reported: 01/19/09

QC Report No: OG77-The Boeing Company
Project: BP2 SC

Date Sampled: NA
Date Received: NA

Date Extracted: 01/15/09
Date Analyzed: 01/18/09 01:27
Instrument/Analyst: ECD5/JGR
GPC Cleanup: No
Sulfur Cleanup: Yes
Acid Cleanup: Yes

Sample Amount: 1.00 Filter Bag
Final Extract Volume: 5.0 mL
Dilution Factor: 1.00
Silica Gel: Yes

CAS Number	Analyte	RL	Result
12674-11-2	Aroclor 1016	0.5	< 0.5 U
53469-21-9	Aroclor 1242	0.5	< 0.5 U
12672-29-6	Aroclor 1248	0.5	< 0.5 U
11097-69-1	Aroclor 1254	0.5	< 0.5 U
11096-82-5	Aroclor 1260	0.5	< 0.5 U
11104-28-2	Aroclor 1221	0.5	< 0.5 U
11141-16-5	Aroclor 1232	0.5	< 0.5 U

Reported in Total µg

PCB Surrogate Recovery	
Decachlorobiphenyl	88.8%
Tetrachlorometaxylene	79.2%

METALS

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
TOTAL METALS

Sample ID: PL2SC-SS-Z-010809
SAMPLE

Lab Sample ID: OG77A
LIMS ID: 09-524
Matrix: Soil
Data Release Authorized:
Reported: 01/21/09

QC Report No: OG77-The Boeing Company
Project: BP2 SC

Date Sampled: 01/08/09
Date Received: 01/08/09

Percent Total Solids: 22.5%

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	RL	mg/kg-dry	Q
3050B	01/13/09	7060A	01/19/09	7440-38-2	Arsenic	2	35	
3050B	01/13/09	6010B	01/20/09	7440-43-9	Cadmium	0.9	3.4	
3050B	01/13/09	6010B	01/20/09	7440-47-3	Chromium	2	164	
3050B	01/13/09	6010B	01/20/09	7440-50-8	Copper	0.9	137	
3050B	01/13/09	7421	01/20/09	7439-92-1	Lead	9	251	
CLP	01/13/09	7471A	01/16/09	7439-97-6	Mercury	0.2	0.3	
3050B	01/13/09	6010B	01/20/09	7440-22-4	Silver	1	1	U
3050B	01/13/09	6010B	01/20/09	7440-66-6	Zinc	4	836	

U-Analyte undetected at given RL
RL-Reporting Limit

OG77 : 000025

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
TOTAL METALS

Sample ID: LAB CONTROL

Lab Sample ID: OG77LCS
LIMS ID: 09-524
Matrix: Soil
Data Release Authorized:
Reported: 01/21/09

QC Report No: OG77-The Boeing Company
Project: BP2 SC

Date Sampled: NA
Date Received: NA

BLANK SPIKE QUALITY CONTROL REPORT

Analyte	Analysis Method	Spike Found	Spike Added	% Recovery	Q
Arsenic	7060A	10.6	10.0	106%	
Cadmium	6010B	50.1	50.0	100%	
Chromium	6010B	49.1	50.0	98.2%	
Copper	6010B	49.9	50.0	99.8%	
Lead	7421	10.6	10.0	106%	
Mercury	7471A	1.10	1.00	110%	
Silver	6010B	54.2	50.0	108%	
Zinc	6010B	49	50	98.0%	

Reported in mg/kg-dry

N-Control limit not met
NA-Not Applicable, Analyte Not Spiked
Control Limits: 80-120%

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
TOTAL METALS **Sample ID: METHOD BLANK**

Lab Sample ID: OG77MB
LIMS ID: 09-524
Matrix: Soil
Data Release Authorized:
Reported: 01/21/09

QC Report No: OG77-The Boeing Company
Project: BP2 SC

Date Sampled: NA
Date Received: NA

Percent Total Solids: NA

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	RL	mg/kg-dry	Q
3050B	01/13/09	7060A	01/19/09	7440-38-2	Arsenic	0.1	0.1	U
3050B	01/13/09	6010B	01/20/09	7440-43-9	Cadmium	0.2	0.2	U
3050B	01/13/09	6010B	01/20/09	7440-47-3	Chromium	0.5	0.5	U
3050B	01/13/09	6010B	01/20/09	7440-50-8	Copper	0.2	0.2	U
3050B	01/13/09	7421	01/20/09	7439-92-1	Lead	0.1	0.1	U
CLP	01/13/09	7471A	01/16/09	7439-97-6	Mercury	0.05	0.05	U
3050B	01/13/09	6010B	01/20/09	7440-22-4	Silver	0.3	0.3	U
3050B	01/13/09	6010B	01/20/09	7440-66-6	Zinc	1	1	U

U-Analyte undetected at given RL
RL-Reporting Limit

TOTAL SOLIDS

Solids Data Entry Report Checked by: MH Date: 01/15/09
Date: 01/15/09 Data Analyst: KM

Solids Determination performed on 01/13/09 by MH

JOB	SAMPLE	CLIENTID	TAREWEIGHT	SAMPDISH	DRYWEIGHT	SOLIDS
OG77	A	PL2SC-SS-Z-010809	1.020	5.049	1.926	22.49

OG77 : 60025

Analytical Resources, Incorporated
Analytical Chemists and Consultants

January 27, 2009

Kent Angelos
Golder Associates, Inc.
18300 NE Union Hill Road, Suite 200
Redmond, WA 98052-3333

RE: Boeing Plant 2 Source Control
ARI ID: OH84 & OH86

Dear Kent:

Please find enclosed the original Chain-of-Custody (COC) records, sample receipt documentation, and the final data package for the project referenced above.

Sample receipt information and analytical details are addressed in the Case Narrative.

An electronic copy of this package will be kept on file at ARI. If you have any questions or require additional information, please contact me at your convenience.

Sincerely,
ANALYTICAL RESOURCES, INC.

Kelly Bottem
Client Services Manager
(206) 695-6211
kellyb@arilabs.com

KB/eb

Enclosures

cc: Kent Angelos, Golder Associates Inc., 18300 NE Union Hill Road, Suite 200, Redmond, WA 98052-3333

Chain of Custody
Documentation

prepared
for

THE BOEING COMPANY

Project: Plant 2 Source Control

ARI JOB NO: OH84 & OH86

prepared
by

Analytical Resources, Inc.

Chain of Custody Record & Laboratory Analysis Request

ARI Assigned Number: 0484	Turn-around Requested: STD	Page: 1 of 1	
ARI Client Company: BOEING	Phone:	Date: 1/13/09	Ice Present? Y
Client Contact: WILL ERNST		No. of Coolers: 1	Cooler Temps: 6.0
Client Project Name: Boeing Plant 2 Source Control			
Client Project #:	Samplers: Liz Shea Jill Lambotts		

Analytical Resources, Incorporated
Analytical Chemists and Consultants
4611 South 134th Place, Suite 100
Tukwila, WA 98168
206-695-6200 206-695-6201 (fax)

Sample ID	Date	Time	Matrix	No. Containers	Analysis Requested: SMS Metals *	LL Hg dissolved *	PCBs						Notes/Comments
PL2SC-EB1-011309	1/13/09	9:40	W	3	X	X	X						* field filtered
PL2SC-EB3-011309	1/13/09	11:30	W	3	X	X	X						

Comments/Special Instructions	Relinquished by: (Signature)	Printed Name:	Company:	Date & Time:	Received by: (Signature)	Printed Name:	Company:	Date & Time:	Relinquished by: (Signature)	Printed Name:	Company:	Date & Time:	Received by: (Signature)	Printed Name:	Company:	Date & Time:
SMS Metals as per QAPP		Liz Shea	Golder	1/13/09 3:15 pm		A. Volgardsen	ARI	1/13/09 1515								

Sample Retention Policy: All samples submitted to ARI will be appropriately discarded no sooner than 90 days after receipt or 60 days after submission of hardcopy data, whichever is longer, unless alternate retention schedules have been established by work-order or contract.

PRESERVATION VERIFICATION 01/14/09
Page 1 of 1

ANALYTICAL RESOURCES INCORPORATED

ARI Job No: **OH84**

PC: Kelly
VTSR: 01/13/09

Inquiry Number: NONE
Analysis Requested: 01/14/09
Contact: Ernst, Will
Client: The Boeing Company
Logged by: AV
Sample Set Used: Yes-481
Validatable Package: ~~No~~ Yes
Deliverables:

Project #:
Project: BOEING PLANT 2 SOURCE CONTROL
Sample Site:
SDG No:
Analytical Protocol: In-house

LOGNUM ARI ID	CLIENT ID	CN >12	WAD >12	NH3 <2	COD <2	FOG <2	MET <2	PHEN <2	PHOS <2	TKN <2	NO23 <2	TOC <2	S2 >9	DMET FLT	DOC FLT	PARAMETER	ADJUSTED TO	LOT NUMBER	AMOUNT ADDED	DATE/BY
09-1413 **OH84A**	PL2SC-EB1-011309						DIS OK							Y						
09-1414 **OH84B**	PL2SC-EB3-011309						DIS OK							Y						

Checked By AV Date 1/14/09

Analytical Resources, Incorporated
Analytical Chemists and Consultants

Cooler Receipt Form

ARI Client: Boeing
COC No: _____
Assigned ARI Job No: OH84

Project Name: Boeing Plant 2 Source Contr.
Delivered by: Hand
Tracking No: _____

Preliminary Examination Phase:

Were intact, properly signed and dated custody seals attached to the outside of to cooler?	YES	(NO)
Were custody papers included with the cooler?	(YES)	NO
Were custody papers properly filled out (ink, signed, etc.)	(YES)	NO
Record cooler temperature (recommended 2.0-6.0 °C for chemistry	6.8 °C	

Cooler Accepted by: AV Date: 1/13/09 Time: 1515

Complete custody forms and attach all shipping documents

Log-In Phase:

Was a temperature blank included in the cooler?	YES	(NO)
What kind of packing material was used?	BW	
Was sufficient ice used (if appropriate)?	(YES)	NO
Were all bottles sealed in individual plastic bags?	YES	(NO)
Did all bottle arrive in good condition (unbroken)?	(YES)	NO
Were all bottle labels complete and legible?	(YES)	NO
Did all bottle labels and tags agree with custody papers?	(YES)	NO
Were all bottles used correct for the requested analyses?	(YES)	NO
Do any of the analyses (bottles) require preservation? (attach preservation checklist)	(YES)	NO
Were all VOC vials free of air bubbles? (NA)	YES	NO
Was sufficient amount of sample sent in each bottle?	(YES)	NO

Samples Logged by: AV Date: 1/14/09 Time: 845

***** Notify Project Manager of discrepancies or concerns *****

Explain discrepancies or negative responses:

By: Date:

Chain of Custody Record & Laboratory Analysis Request

ARI Assigned Number: OH80	Turn-around Requested: Std	Page: 1 of 1	
ARI Client Company: BOEING	Phone:	Date: 1/13/09	Ice Present? Y
Client Contact: WILL ERNST		No. of Coolers: 1	Cooler Temps: 6.8
Client Project Name: Boeing Plant 2 Source Control			
Client Project #:	Samplers: Liz Shea Jill Lamberts		

Analytical Resources, Incorporated
Analytical Chemists and Consultants
4611 South 134th Place, Suite 100
Tukwila, WA 98168
206-695-6200 206-695-6201 (fax)

Sample ID	Date	Time	Matrix	No. Containers	Analysis Requested: * SMS Metals	* LL Hg dissolved	PCBs						Notes/Comments
PL2SC-EB1-011309	1/13/09	9:40	W	3	x	x	x						* field filtered
PL2SC-EB3-011309	1/13/09	11:30	W	3	x	x	x						

Comments/Special Instructions	Relinquished by: (Signature)	Printed Name:	Company:	Date & Time:	Received by: (Signature)	Printed Name:	Company:	Date & Time:	Relinquished by: (Signature)	Printed Name:	Company:	Date & Time:	Received by: (Signature)	Printed Name:	Company:	Date & Time:
SMS Metals as per QAPP	Elizabeth Shea	Liz Shea	Golder	1/13/09 3:15 pm		A. Voigardsen	ARI	1/13/09 1515								

Limits of Liability: *ARI will perform all requested services in accordance with appropriate methodology following ARI Standard Operating Procedures and the ARI Quality Assurance Program. This program meets standards for the industry. The total liability of ARI, its officers, agents, employees, or successors, arising out of or in connection with the requested services, shall not exceed the Invoiced amount for said services. The acceptance by the client of a proposal for services by ARI release ARI from any liability in excess thereof, not withstanding any provision to the contrary in any contract, purchase order or co-signed agreement between ARI and the Client.*

Sample Retention Policy: All samples submitted to ARI will be appropriately discarded no sooner than 90 days after receipt or 60 days after submission of hardcopy data, whichever is longer, unless alternate retention schedules have been established by work-order or contract.

PRESERVATION VERIFICATION 01/14/09
Page 1 of 1

ANALYTICAL RESOURCES INCORPORATED

ARI Job No: **OH86**

Inquiry Number: NONE
Analysis Requested: 01/14/09
Contact: Ernst, Will
Client: The Boeing Company
Logged by: JH
Sample Set Used: Yes-481
Validatable Package: ~~No~~ Yes
Deliverables:

PC: Kelly
VTSR: 01/13/09

Project #:
Project: BOEING PLANT 2 SOURCE CONTROL
Sample Site:
SDG No:
Analytical Protocol: In-house

LOGNUM ARI ID	CLIENT ID	CN >12	WAD >12	NH3 <2	COD <2	FOG <2	MET <2	PHEN <2	PHOS <2	TKN <2	NO23 <2	TOC <2	S2 >9	DMET FLT	DOC FLT	PARAMETER	ADJUSTED TO	LOT NUMBER	AMOUNT ADDED	DATE/BY
09-1415 **OH86A**	PL2SC-EB1-011309						DIS OK							Y	✓					
09-1416 **OH86B**	PL2SC-EB3-011309						DIS OK							Y	✓					

Checked By JH Date 1/14/09

Analytical Resources, Incorporated
Analytical Chemists and Consultants

Cooler Receipt Form

ARI Client: Boeing
COC No: _____
Assigned ARI Job No: OHE&E

Project Name: Boeing Plant 2 Source Control
Delivered by: Hand
Tracking No: _____

Preliminary Examination Phase:

Were intact, properly signed and dated custody seals attached to the outside of to cooler?	YES	(NO)
Were custody papers included with the cooler?	(YES)	NO
Were custody papers properly filled out (ink, signed, etc.)	(YES)	NO
Record cooler temperature (recommended 2.0-6.0 °C for chemistry	6.8 °C	

Cooler Accepted by: AV Date: 1/13/09 Time: 1515

Complete custody forms and attach all shipping documents

Log-In Phase:

Was a temperature blank included in the cooler?		YES	(NO)
What kind of packing material was used?		wrap	
Was sufficient ice used (if appropriate)?		YES	(NO)
Were all bottles sealed in individual plastic bags?		(YES)	NO
Did all bottle arrive in good condition (unbroken)?		(YES)	NO
Were all bottle labels complete and legible?		(YES)	NO
Did all bottle labels and tags agree with custody papers?		(YES)	NO
Were all bottles used correct for the requested analyses?		(YES)	NO
Do any of the analyses (bottles) require preservation? (attach preservation checklist)		(YES)	NO
Were all VOC vials free of air bubbles?	(NA)	YES	NO
Was sufficient amount of sample sent in each bottle?		(YES)	NO

Samples Logged by: JH Date: 1/14/09 Time: 9:35

***** Notify Project Manager of discrepancies or concerns *****

Explain discrepancies or negative responses:

By: Date:

Case Narrative

prepared
for

THE BOEING COMPANY

Project: Plant 2 Source Control

ARI JOB NO: OH84 & OH86

prepared
by

Analytical Resources, Inc.

Case Narrative

Project: Boeing Plant 2 Source Control
ARI ID: OH84 & OH86
Matrix: Water
Date: January 27, 2009

Sample Receipt Information

Two water samples were received in good condition at Analytical Resources, Inc. (ARI) on January 13, 2009 under ARI sample delivery groups OH84 and OH86. The cooler temperature measured by IR thermometer was 6.8°C. For further details regarding sample receipt, please refer to the Cooler Receipt Form.

Select samples were analyzed for the parameters listed below, as requested on the Chain of Custody.

PCBs by Method 8082:

The sample was extracted on 1/15/09 and analyzed on 1/17/09 within the method recommended holding times.

Initial calibration (s): All analytes of interest were within method acceptance criteria.

Continuing calibration (s): Are in control.

Samples: There were no anomalies associated with these samples.

Surrogates: The surrogate percent recoveries were within control limits.

LCS(s): All LCS percent recoveries were within control limits..

Method Blank: The method blank was free of contamination.

Dissolved Metals by Methods 6010B and 7000 series

The samples were digested on 1/19/09. The digests were analyzed between 1/20/09 and 1/23/09 within the method recommended holding times.

Replicate(s): All percent recoveries were within compliance.

Samples: No anomalies were encountered for these samples.

LCS/Blank Spike(s): All percent recoveries were within compliance.

Method Blank(s): Are in control.

Case Narrative

Project: Boeing Plant 2 Source Control
ARI ID: OH84 & OH86
Matrix: Water
Date: January 27, 2009

Dissolved Low-Level Mercury by Method SW7470A

The samples were digested on 1/15/09. The digests were analyzed on 1/15/09 within the method recommended holding times.

Replicate(s): All percent recoveries were within compliance.

Samples: No anomalies were encountered for these samples.

LCS/Blank Spike(s): All percent recoveries were within compliance.

Method Blank(s): Are in control.

Standard Reference: All percent recoveries were within compliance.

Data Reporting Qualifiers

Effective 12/28/04

Inorganic Data

U	Indicates that the target analyte was not detected at the reported concentration
*	Duplicate RPD is not within established control limits
B	Reported value is less than the CRDL but ≥ the Reporting Limit
N	Matrix Spike recovery not within established control limits
NA	Not Applicable, analyte not spiked
H	The natural concentration of the spiked element is so much greater than the concentration spiked that an accurate determination of spike recovery is not possible
L	Analyte concentration is ≤5 times the Reporting Limit and the replicate control limit defaults to ±1 RL instead of the normal 20% RPD

Organic Data

U	Indicates that the target analyte was not detected at the reported concentration
*	Flagged value is not within established control limits
B	Analyte detected in an associated Method Blank at a concentration greater than one-half of ARI's Reporting Limit or 5% of the regulatory limit or 5% of the analyte concentration in the sample.
J	Estimated concentration when the value is less than ARI's established reporting limits
D	The spiked compound was not detected due to sample extract dilution
NR	Spiked compound recovery is not reported due to chromatographic interference
E	Estimated concentration calculated for an analyte response above the valid instrument calibration range. A dilution is required to obtain an accurate quantification of the analyte.
S	Indicates an analyte response that has saturated the detector. The calculated concentration is not valid; a dilution is required to obtain valid quantification of the analyte
NA	The flagged analyte was not analyzed for
NS	The flagged analyte was not spiked into the sample

M Estimated value for an analyte detected and confirmed by an analyst but with low spectral match parameters. This flag is used only for GC-MS analyses

M2 The sample contains PCB congeners that do not match any standard Aroclor pattern. The PCBs are identified and quantified as the Aroclor whose pattern most closely matches that of the sample. The reported value is an estimate.

N The analysis indicates the presence of an analyte for which there is presumptive evidence to make a "tentative identification"

Y The analyte is not detected at or above the reported concentration. The reporting limit is raised due to chromatographic interference. The Y flag is equivalent to the U flag with a raised reporting limit.

C The analyte was positively identified on only one of two chromatographic columns. Chromatographic interference prevented a positive identification on the second column

P The analyte was detected on both chromatographic columns but the quantified values differ by ≥40% RPD with no obvious chromatographic interference

Geotechnical Data

A The total of all fines fractions. This flag is used to report total fines when only sieve analysis is requested and balances total grain size with sample weight.

F Samples were frozen prior to particle size determination

SM Sample matrix was not appropriate for the requested analysis. This normally refers to samples contaminated with an organic product that interferes with the sieving process and/or moisture content, porosity and saturation calculations

SS Sample did not contain the proportion of "fines" required to perform the pipette portion of the grain size analysis

W Weight of sample in some pipette aliquots was below the level required for accurate weighting

LCS SOLUTIONS

12/30/08

LABE	SOLN ID	TEST	CONC. UG/ML	SOLVENT	EXP.
1	1549-3	PCB	20	ACETONE	10/10/09
2	1472-3	BCOC PEST	10	ACETONE	07/20/08
3	1517-1	PEST	02/04/20	ACETONE	05/15/09
4	1561-2	LOW PEST	0.2/0.4/2	ACETONE	05/15/09
5	1537-1	EPH	1500	MECL2	08/16/09
6	1559-2	PCP	12.5/125	ACETONE	11/05/09
7	1573-1	ABN	100	ACETONE	08/01/09
8	1566-1	TBT	2.5	MECL2	12/04/09
9	1567-3	PORE TBT	.125/.25	MECL2	12/04/09
10	1554-3	ABN ACID	100/200	MEOH	10/21/09
11	1563-3	TPHD	15000	ACETONE	11/20/09
12	1563-1	ABN BASE	200	ACETONE	06/30/09
13	1573-2	LOW PCB	2	ACETONE	10/10/09
14	1547-1	LOW ABN ACID	10/20	MEOH	04/10/09
15*	1452-1	SIM PNA	15/75	MEOH	04/09/09
16	1502-2	DIOXANE	100	MEOH	02/20/09
17	1516-2	1248 PCB	20	ACETONE	05/07/09
18	1514-4	LOW SIM PNA	1.5/7.5	ACETONE	04/24/09
19	1517-3	AK103	7500	MECL2	12/29/08
20	1572-2	PNA	100	ACETONE	12/26/09
21*	1414-4	SKY/BHT	100	MEOH	04/08/09
22	1570-1	HERB	12.5/12500	MEOH	02/19/09
23	1505-1	LOW ABN BASE	20	MEOH	03/20/09
24	1541-4	LOW ABN	10	ACETONE	08/01/09
25	1481-1	DIPHENYL	100	MEOH	07/20/08
26	1545-2	OP-PEST	25	MEOH	02/14/09
27	1495-1	STEROLS	200	MEOH	12/29/08
28	1494-1	ADD. PEST	4	ACETONE	01/23/09
29	1496-3	DECANES	100	MEOH	02/12/09
30	1497-2	EDB/DBCP	2	ACETONE	02/12/09
31	1510-3	TERPINEOL	100	MEOH	03/21/09

LCS SOLUTIONS

12/30/08

32	1545-3	GUAIACOL	50-200	ACETONE	06/05/09
33	1522-1	RESIN ACID	250	ACETONE	06/11/09
34	1530-2	CONGENERS	1	ACETONE	07/23/09
50	1571-1	FULL RESIN	250	ACETONE	06/10/09
*=REVERIFIED SOLUTION					

SURR SOLUTIONS

12/30/08

LABEL	SOLN ID	TEST	CONC. UG/ML	SOLVENT	EXP.
A	1559-5	ABN	100/150	MEOH	03/13/09
B	1572-1	SIM PNA	15/75	MEOH	08/28/09
C	1559-1	SIM ABN	25/37.5	MEOH	03/13/09
D	1561-3	LOW PCB	0.2	ACETONE	07/31/09
E*	1478-1	HERB	62.5	MEOH	09/21/09
F	1520-3	PCP	12.5	ACETONE	04/18/09
G	1534-1	1,4DIOXANE	100	MEOH	02/20/09
H	1545-1	OP-PEST	25	MEOH	02/14/09
I	1559-4	LOW S. PNA	1.5	MEOH	08/28/09
J	1566-5	TBT-PORE	0.125	MECL2	12/04/09
K	1538-1	MED PCB	20	ACETONE	07/31/09
L	1566-4	TBT	2.5	MECL2	12/04/09
M	1558-2	EPH	1500	MECL2	09/24/09
N	1538-2	PCB	2	ACETONE	07/31/09
O	1567-4	TPH	450	MECL2	09/24/09
P	1560-3	HCID	2250	MECL2	09/24/09
Q	1497-3	EDB	2	ACETONE	02/12/09
R	1521-4	RESIN ACID	250	ACETONE	06/11/09
S	1568-5	PBDE	.25	MEOH	12/11/09
T	*reverified solution				
U					
V					
W					
X					
Y					
Z					

Data Summary Package

prepared
for

THE BOEING COMPANY

Project: Plant 2 Source Control

ARI JOB NO: OH84 & OH86

prepared
by

Analytical Resources, Inc.

PCBS

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PCB by GC/ECD Method SW8082
Page 1 of 1

Sample ID: PL2SC-EB1-011309
SAMPLE

Lab Sample ID: OH86A
LIMS ID: 09-1415
Matrix: Water
Data Release Authorized:
Reported: 01/21/09

QC Report No: OH86-The Boeing Company
Project: BOEING PLANT 2 SOURCE CONTROL

Date Sampled: 01/13/09
Date Received: 01/13/09

Date Extracted: 01/15/09
Date Analyzed: 01/17/09 19:26
Instrument/Analyst: ECD5/JGR
GPC Cleanup: No
Sulfur Cleanup: Yes

Sample Amount: 500 mL
Final Extract Volume: 5.0 mL
Dilution Factor: 1.00
Silica Gel: Yes
Acid Cleanup: Yes

CAS Number	Analyte	RL	Result
12674-11-2	Aroclor 1016	1.0	< 1.0 U
53469-21-9	Aroclor 1242	1.0	< 1.0 U
12672-29-6	Aroclor 1248	1.0	< 1.0 U
11097-69-1	Aroclor 1254	1.0	< 1.0 U
11096-82-5	Aroclor 1260	1.0	< 1.0 U
11104-28-2	Aroclor 1221	1.0	< 1.0 U
11141-16-5	Aroclor 1232	1.0	< 1.0 U

Reported in µg/L (ppb)

PCB Surrogate Recovery	
Decachlorobiphenyl	94.8%
Tetrachlorometaxylene	84.5%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PCB by GC/ECD Method SW8082
Page 1 of 1

Sample ID: PL2SC-EB3-011309
SAMPLE

Lab Sample ID: OH86B
LIMS ID: 09-1416
Matrix: Water
Data Release Authorized:
Reported: 01/21/09

QC Report No: OH86-The Boeing Company
Project: BOEING PLANT 2 SOURCE CONTROL

Date Sampled: 01/13/09
Date Received: 01/13/09

Date Extracted: 01/15/09
Date Analyzed: 01/17/09 19:43
Instrument/Analyst: ECD5/JGR
GPC Cleanup: No
Sulfur Cleanup: Yes

Sample Amount: 500 mL
Final Extract Volume: 5.0 mL
Dilution Factor: 1.00
Silica Gel: Yes
Acid Cleanup: Yes

CAS Number	Analyte	RL	Result
12674-11-2	Aroclor 1016	1.0	< 1.0 U
53469-21-9	Aroclor 1242	1.0	< 1.0 U
12672-29-6	Aroclor 1248	1.0	< 1.0 U
11097-69-1	Aroclor 1254	1.0	< 1.0 U
11096-82-5	Aroclor 1260	1.0	< 1.0 U
11104-28-2	Aroclor 1221	1.0	< 1.0 U
11141-16-5	Aroclor 1232	1.0	< 1.0 U

Reported in µg/L (ppb)

PCB Surrogate Recovery

Decachlorobiphenyl	95.8%
Tetrachlorometaxylene	82.2%

ANALYTICAL RESOURCES INCORPORATED

SW8082/PCB WATER SURROGATE RECOVERY SUMMARY

Matrix: Water

QC Report No: OH86-The Boeing Company
Project: BOEING PLANT 2 SOURCE CONTROL

Client ID	DCBP % REC	DCBP LCL-UCL	TCMX % REC	TCMX LCL-UCL	TOT OUT
MB-011509	94.2%	47-101	67.5%	61-104	0
LCS-011509	100%	47-101	77.2%	61-104	0
LCSD-011509	98.8%	47-101	75.0%	61-104	0
PL2SC-EB1-011309	94.8%	42-120	84.5%	55-102	0
PL2SC-EB3-011309	95.8%	42-120	82.2%	55-102	0

Prep Method: SW3510C
Log Number Range: 09-1415 to 09-1416

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PCB by GC/ECD Method SW8082

Sample ID: LCS-011509
LCS/LCSD

Lab Sample ID: LCS-011509
LIMS ID: 09-1415
Matrix: Water
Data Release Authorized:
Reported: 01/21/09

QC Report No: OH86-The Boeing Company
Project: BOEING PLANT 2 SOURCE CONTROL

Date Sampled: NA
Date Received: NA

Date Extracted LCS/LCSD: 01/15/09

Date Analyzed LCS: 01/17/09 18:34
LCSD: 01/17/09 18:51

Instrument/Analyst LCS: ECD5/JGR
LCSD: ECD5/JGR

GPC Cleanup: No
Sulfur Cleanup: Yes

Sample Amount LCS: 500 mL
LCSD: 500 mL
Final Extract Volume LCS: 5.0 mL
LCSD: 5.0 mL
Dilution Factor LCS: 1.00
LCSD: 1.00
Silica Gel: Yes
Acid Cleanup: Yes

Analyte	LCS	Spike Added-LCS	LCS Recovery	LCSD	Spike Added-LCSD	LCSD Recovery	RPD
Aroclor 1016	4.62	5.00	92.4%	4.60	5.00	92.0%	0.4%
Aroclor 1260	5.06	5.00	101%	4.86	5.00	97.2%	4.0%

PCB Surrogate Recovery

	LCS	LCSD
Decachlorobiphenyl	100%	98.8%
Tetrachlorometaxylene	77.2%	75.0%

Results reported in µg/L
RPD calculated using sample concentrations per SW846.

PCB METHOD BLANK SUMMARY

BLANK NO.

OH66MBW1

Lab Name: ANALYTICAL RESOURCES, INC
Client: THE BOEING COMPANY

ARI Job No.: OH66
Project: A09002

Lab Sample ID: OH66MBW1
Lab File ID: 0117B015

Date Extracted: 01/15/09
Matrix: LIQUID

Date Analyzed: 01/17/09
Instrument ID: ECD5

Time Analyzed: 1817
GC Columns: ZB5/ZB35

THIS METHOD BLANK APPLIES TO THE FOLLOWING SAMPLES, MS and MSD:

	CLIENT SAMPLE NO.	LAB SAMPLE ID	DATE ANALYZED
01	OH66LCSW1	OH66LCSW1	01/17/09
02	OH66LCSDW1	OH66LCSDW1	01/17/09
03	EAL#124382	OH66A	01/17/09
04	PL2SC-EB1-011309	OH86A	01/17/09
05	PL2SC-EB3-011309	OH86B	01/17/09

ALL RUNS ARE DUAL COLUMN

FORM IV PCB

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PCB by GC/ECD Method SW8082
Page 1 of 1

Sample ID: MB-011509
METHOD BLANK

Lab Sample ID: MB-011509
LIMS ID: 09-1415
Matrix: Water
Data Release Authorized:
Reported: 01/21/09

QC Report No: OH86-The Boeing Company
Project: BOEING PLANT 2 SOURCE CONTROL

Date Sampled: NA
Date Received: NA

Date Extracted: 01/15/09
Date Analyzed: 01/17/09 18:17
Instrument/Analyst: ECD5/JGR
GPC Cleanup: No
Sulfur Cleanup: Yes

Sample Amount: 500 mL
Final Extract Volume: 5.0 mL
Dilution Factor: 1.00
Silica Gel: Yes
Acid Cleanup: Yes

CAS Number	Analyte	RL	Result
12674-11-2	Aroclor 1016	1.0	< 1.0 U
53469-21-9	Aroclor 1242	1.0	< 1.0 U
12672-29-6	Aroclor 1248	1.0	< 1.0 U
11097-69-1	Aroclor 1254	1.0	< 1.0 U
11096-82-5	Aroclor 1260	1.0	< 1.0 U
11104-28-2	Aroclor 1221	1.0	< 1.0 U
11141-16-5	Aroclor 1232	1.0	< 1.0 U

Reported in µg/L (ppb)

PCB Surrogate Recovery	
Decachlorobiphenyl	94.2%
Tetrachlorometaxylene	67.5%

METALS

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
DISSOLVED METALS
Page 1 of 1

Sample ID: PL2SC-EB1-011309
SAMPLE

Lab Sample ID: OH86A
LIMS ID: 09-1415
Matrix: Water
Data Release Authorized:
Reported: 01/27/09

QC Report No: OH86-The Boeing Company
Project: BOEING PLANT 2 SOURCE CONTROL

Date Sampled: 01/13/09
Date Received: 01/13/09

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	RL	µg/L	Q
7000A	01/19/09	7060A	01/20/09	7440-38-2	Arsenic	1	1	U
6010B	01/19/09	6010B	01/23/09	7440-43-9	Cadmium	2	2	U
6010B	01/19/09	6010B	01/23/09	7440-47-3	Chromium	5	5	U
6010B	01/19/09	6010B	01/23/09	**7440-50-8**	**Copper**	2	**3**	
7000A	01/19/09	7421	01/20/09	7439-92-1	Lead	1	1	U
6010B	01/19/09	6010B	01/23/09	7440-22-4	Silver	3	3	U
6010B	01/19/09	6010B	01/23/09	7440-66-6	Zinc	10	10	U

U-Analyte undetected at given RL
RL-Reporting Limit

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
DISSOLVED METALS
Page 1 of 1

Sample ID: PL2SC-EB3-011309
SAMPLE

Lab Sample ID: OH86B
LIMS ID: 09-1416
Matrix: Water
Data Release Authorized:
Reported: 01/27/09

QC Report No: OH86-The Boeing Company
Project: BOEING PLANT 2 SOURCE CONTROL

Date Sampled: 01/13/09
Date Received: 01/13/09

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	RL	µg/L	Q
7000A	01/19/09	7060A	01/20/09	7440-38-2	Arsenic	1	1	U
6010B	01/19/09	6010B	01/23/09	7440-43-9	Cadmium	2	2	U
6010B	01/19/09	6010B	01/23/09	7440-47-3	Chromium	5	5	U
6010B	01/19/09	6010B	01/23/09	**7440-50-8**	**Copper**	2	**6**	
7000A	01/19/09	7421	01/20/09	7439-92-1	Lead	1	1	U
6010B	01/19/09	6010B	01/23/09	7440-22-4	Silver	3	3	U
6010B	01/19/09	6010B	01/23/09	**7440-66-6**	**Zinc**	10	**30**	

U-Analyte undetected at given RL
RL-Reporting Limit

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
DISSOLVED METALS

Sample ID: LAB CONTROL

Lab Sample ID: OH86LCS
LIMS ID: 09-1415
Matrix: Water
Data Release Authorized:
Reported: 01/27/09

QC Report No: OH86-The Boeing Company
Project: BOEING PLANT 2 SOURCE CONTROL

Date Sampled: NA
Date Received: NA

BLANK SPIKE QUALITY CONTROL REPORT

Analyte	Analysis Method	Spike Found	Spike Added	% Recovery	Q
Arsenic	7060A	21	20	105%	
Cadmium	6010B	503	500	101%	
Chromium	6010B	485	500	97.0%	
Copper	6010B	491	500	98.2%	
Lead	7421	19	20	95.0%	
Silver	6010B	517	500	103%	
Zinc	6010B	500	500	100%	

Reported in µg/L

N-Control limit not met
Control Limits: 80-120%

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
DISSOLVED METALS
Page 1 of 1

Sample ID: METHOD BLANK

Lab Sample ID: OH86MB
LIMS ID: 09-1415
Matrix: Water
Data Release Authorized:
Reported: 01/27/09

QC Report No: OH86-The Boeing Company
Project: BOEING PLANT 2 SOURCE CONTROL

Date Sampled: NA
Date Received: NA

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	RL	µg/L	Q
7000A	01/19/09	7060A	01/20/09	7440-38-2	Arsenic	1	1	U
6010B	01/19/09	6010B	01/23/09	7440-43-9	Cadmium	2	2	U
6010B	01/19/09	6010B	01/23/09	7440-47-3	Chromium	5	5	U
6010B	01/19/09	6010B	01/23/09	7440-50-8	Copper	2	2	U
7000A	01/19/09	7421	01/20/09	7439-92-1	Lead	1	1	U
6010B	01/19/09	6010B	01/23/09	7440-22-4	Silver	3	3	U
6010B	01/19/09	6010B	01/23/09	7440-66-6	Zinc	10	10	U

U-Analyte undetected at given RL
RL-Reporting Limit

LOW-LEVEL MERCURY

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
Dissolved Mercury by Method SW7470A

Data Release Authorized:
Reported: 01/16/09
Date Received: 01/13/09
Page 1 of 1

QC Report No: OH84-The Boeing Company
Project: BOEING PLANT 2 SOURCE CONTROL

Client/ ARI ID	Date Sampled	Matrix	Prep Date Anal Date	RL	Result
PL2SC-EB1-011309 OH84A 09-1413	01/13/09	Water	01/15/09 01/15/09	20.0	20.0 U
PL2SC-EB3-011309 OH84B 09-1414	01/13/09	Water	01/15/09 01/15/09	20.0	20.0 U
MB-011509 Method Blank	NA	Water	01/15/09 01/15/09	20.0	20.0 U

Reported in ng/L

RL-Analytical reporting limit
U-Undetected at reported detection limit

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
DISSOLVED METALS

Sample ID: PL2SC-EB1-011309
MATRIX SPIKE

Lab Sample ID: OH84A
LIMS ID: 09-1413
Matrix: Water
Data Release Authorized:
Reported: 01/16/09

QC Report No: OH84-The Boeing Company
Project: BOEING PLANT 2 SOURCE CONTROL

Date Sampled: 01/13/09
Date Received: 01/13/09

MATRIX SPIKE QUALITY CONTROL REPORT

Analyte	Analysis Method	Sample	Spike	Spike Added	% Recovery	Q
Mercury	7470A	20.0 U	82.9	100	82.9%	

Reported in ng/L

N-Control Limit Not Met
H-% Recovery Not Applicable, Sample Concentration Too High
NA-Not Applicable, Analyte Not Spiked

Percent Recovery Limits: 75-125%

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
DISSOLVED METALS

Sample ID: PL2SC-EB1-011309
DUPLICATE

Lab Sample ID: OH84A
LIMS ID: 09-1413
Matrix: Water
Data Release Authorized:
Reported: 01/16/09

QC Report No: OH84-The Boeing Company
Project: BOEING PLANT 2 SOURCE CONTROL

Date Sampled: 01/13/09
Date Received: 01/13/09

MATRIX DUPLICATE QUALITY CONTROL REPORT

Analyte	Analysis Method	Sample	Duplicate	RPD	Control Limit	Q
Mercury	7470A	20.0 U	20.0 U	0.0%	+/- 20.0	L

Reported in ng/L

*-Control Limit Not Met
L-RPD Invalid, Limit = Detection Limit

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
DISSOLVED METALS

Sample ID: LAB CONTROL

Lab Sample ID: OH84LCS
LIMS ID: 09-1414
Matrix: Water
Data Release Authorized:
Reported: 01/16/09

QC Report No: OH84-The Boeing Company
Project: BOEING PLANT 2 SOURCE CONTROL

Date Sampled: NA
Date Received: NA

BLANK SPIKE QUALITY CONTROL REPORT

Analyte	Analysis Method	Spike Found	Spike Added	% Recovery	Q
Mercury	7470A	167	200	83.5%	

Reported in ng/L

N-Control limit not met
Control Limits: 80-120%

Analytical Resources, Incorporated
Analytical Chemists and Consultants

March 3, 2009

Will Ernst
The Boeing Company
Energy and Environmental Affairs
P.O. Box 3707, M/S 7A-WH
Seattle, WA 98124-2207

RE: Boeing Plant 2 Source Control
ARI ID: OM42

Dear Will:

Please find enclosed the original *Chain of Custody* (COC) record and final data package for the project referenced above.

Sample receipt information and analytical details are addressed in the *Case Narrative*.

Copies of the reports and all associated raw data will be kept on file at ARI. If you have any questions or require additional information, please contact me at your convenience.

Sincerely,
ANALYTICAL RESOURCES, INC.

Kelly Bottem
Client Services Manager
(206) 695-6211
kellyb@arilabs.com

KB/eb

Enclosures

cc: Kent Angelos, Golder Associates Inc., 18300 NE Union Hill Road, Suite 200, Redmond, WA 98052-3333

Chain of Custody
Documentation

prepared
for

THE BOEING COMPANY

Project: Plant 2 Source Control

ARI JOB NO: OM42

prepared
by

Analytical Resources, Inc.

Chain of Custody Record & Laboratory Analysis Request

ARI Assigned Number:	Turn-around Requested:	Page: 1 of 1	
ARI Client Company: BOEING	Phone:	Date: 2/12/09	Ice Present?
Client Contact: WILL ERNST		No. of Coolers:	Cooler Temps:
Client Project Name: BP2 Source Control			
Client Project #:	Samplers: Liz Shea		

Analytical Resources, Incorporated
Analytical Chemists and Consultants
4611 South 134th Place, Suite 100
Tukwila, WA 98168
206-695-6200 206-695-6201 (fax)

Sample ID	Date	Time	Matrix	No. Containers	Analysis Requested: PCBs	Analysis Requested: SMS Metals	Notes/Comments
PL2SC-SS-J249-021209	2/12/09	1100	filter 6qg	1	X	X	

Comments/Special Instructions: SMS metals as per QAPP (8 metals)	Relinquished by: (Signature) Elizabeth Shea	Received by: (Signature) Danni Hayes	Relinquished by: (Signature)	Received by: (Signature)
	Printed Name: Liz Shea	Printed Name: Danni Hayes	Printed Name:	Printed Name:
	Company: Golder	Company: ARI	Company:	Company:
	Date & Time: 2/12/09 1237	Date & Time: 2/12/09 1237	Date & Time:	Date & Time:

CM12.00002

Limits of Liability: *ARI will perform all requested services in accordance with appropriate methodology following ARI Standard Operating Procedures and the ARI Quality Assurance Program. This program meets standards for the industry. The total liability of ARI, its officers, agents, employees, or successors, arising out of or in connection with the requested services, shall not exceed the Invoiced amount for said services. The acceptance by the client of a proposal for services by ARI release ARI from any liability in excess thereof, not withstanding any provision to the contrary in any contract, purchase order or co-signed agreement between ARI and the Client.*

Sample Retention Policy: All samples submitted to ARI will be appropriately discarded no sooner than 90 days after receipt or 60 days after submission of hardcopy data, whichever is longer, unless alternate retention schedules have been established by work-order or contract.

Analytical Resources, Incorporated
Analytical Chemists and Consultants

Cooler Receipt Form

ARI Client: Boeing Project Name: _____

COC No: _____ Delivered by: Hand

Assigned ARI Job No: _____ Tracking No: _____

Preliminary Examination Phase:

Were intact, properly signed and dated custody seals attached to the outside of to cooler?	YES	(NO)
Were custody papers included with the cooler?	(YES)	NO
Were custody papers properly filled out (ink, signed, etc.)	(YES)	NO
Record cooler temperature (recommended 2.0-6.0 °C for chemistry	AMB	°C

Cooler Accepted by: JH Date: 2/12/09 Time: 1235

Complete custody forms and attach all shipping documents

Log-In Phase:

Was a temperature blank included in the cooler?		(YES)	(NO)
What kind of packing material was used?		Bubble	
Was sufficient ice used (if appropriate)?	NA	YES	NO
Were all bottles sealed in individual plastic bags?		(YES)	NO
Did all bottle arrive in good condition (unbroken)?		(YES)	NO
Were all bottle labels complete and legible?		(YES)	NO
Did all bottle labels and tags agree with custody papers?		(YES)	NO
Were all bottles used correct for the requested analyses?		(YES)	NO
Do any of the analyses (bottles) require preservation? (attach preservation checklist)		YES	(NO)
Were all VOC vials free of air bubbles?	(NA)	YES	NO
Was sufficient amount of sample sent in each bottle?		(YES)	NO

Samples Logged by: _____ Date: 2/13/09 Time: 852

***** Notify Project Manager of discrepancies or concerns *****

Explain discrepancies or negative responses:

By: Date:

Case Narrative

prepared
for

THE BOEING COMPANY

Project: Plant 2 Source Control

ARI JOB NO: OM42

prepared
by

Analytical Resources, Inc.

Case Narrative

Project: Boeing Plant 2 Source Control
ARI ID: OM42
Matrix: Filter Bag / Soil
Date: March 3, 2009

Sample Receipt Information

One solid matrix sample and one soil sample were received in good condition at ARI on 02/12/09 under ARI sample delivery group OM42. One cooler arrived at an ambient temperature.

Select samples were analyzed for the parameters listed below, as requested on the COC.

PCBs by Method 8082:

The sample was extracted on 2/19/09 and analyzed on 2/23/09 within the method recommended holding times.

Initial calibration (s): All analytes of interest were within method acceptance criteria.

Continuing calibration (s): Are in control.

Samples: There were no anomalies associated with these samples.

Surrogates: All surrogate recoveries were in control.

LCS(s): All percent recoveries for the analytes of interest were within compliance.

Method Blank: The method blank was free of contamination.

Total Metals by Methods 6010B and 7000 series

The samples were digested on 2/17/09. The digests were analyzed between 2/20/09 and 2/27/09 within the method recommended holding times.

Replicate(s): All percent recoveries were within compliance.

Samples: No anomalies were encountered for these samples.

LCS/Blank Spike(s): All percent recoveries were within compliance.

Method Blank(s): Are in control.

Standard Reference: All percent recoveries were within compliance.

ARI Data Reporting Qualifiers

Effective 11/22/04

Inorganic Data

U Indicates that the target analyte was not detected at the reported concentration

* Duplicate RPD is not within established control limits

B Reported value is less than the CRDL but ≥ the Reporting Limit

N Matrix Spike recovery not within established control limits

NA Not Applicable, analyte not spiked

H The natural concentration of the spiked element is so much greater than the concentration spiked that an accurate determination of spike recovery is not possible

L Analyte concentration is ≤5 times the Reporting Limit and the replicate control limit defaults to ±1 RL instead of the normal 20% RPD

Organic Data

U Indicates that the target analyte was not detected at the reported concentration

* Flagged value is not within established control limits

B Analyte detected in an associated Method Blank at a concentration greater than one-half of ARI's Reporting Limit or 5% of the regulatory limit or 5% of the analyte concentration in the sample.

J Estimated concentration when the value is less than ARI's established reporting limits

D The spiked compound was not detected due to sample extract dilution

NR Spiked compound recovery is not reported due to chromatographic interference

E Estimated concentration calculated for an analyte response above the valid instrument calibration range. A dilution is required to obtain an accurate quantification of the analyte.

S Indicates an analyte response that has saturated the detector. The calculated concentration is not valid; a dilution is required to obtain valid quantification of the analyte

NA The flagged analyte was not analyzed for

NS The flagged analyte was not spiked into the sample

M Estimated value for an analyte detected and confirmed by an analyst but with low spectral match parameters. This flag is used only for GC-MS analyses

N The analysis indicates the presence of an analyte for which there is presumptive evidence to make a "tentative identification"

Y The analyte reporting limit is raised due to a positive chromatographic interference. The compound is not detected above the raised limit but may be present at or below the limit

C The analyte was positively identified on only one of two chromatographic columns. Chromatographic interference prevented a positive identification on the second column

P The analyte was detected on both chromatographic columns but the quantified values differ by ≥40% RPD with no obvious chromatographic interference

Geotechnical Data

SM Sample matrix was not appropriate for the requested analysis. This normally refers to samples contaminated with an organic product that interferes with the sieving process and/or moisture content, porosity and saturation calculations

SS Sample did not contain the proportion of "fines" required to perform the pipette portion of the grain size analysis

W Weight of sample in some pipette aliquots was below the level required for accurate weighing

F Samples were frozen prior to particle size determination

LCS SOLUTIONS

02/27/09

LABE	SOLN ID	TEST	CONC. UG/ML	SOLVENT	EXP.
1	1549-3	PCB	20	ACETONE	10/10/09
2#	1472-3	BCOC PEST	10	ACETONE	07/20/08
3	1579-3	PEST	02/04/20	ACETONE	09/23/09
4	1576-3	LOW PEST	0.2/0.4/2	ACETONE	07/31/09
5	1580-2	EPH	1500	MECL2	01/29/10
6	1559-2	PCP	12.5/125	ACETONE	11/05/09
7	1581-4	ABN	100	ACETONE	08/01/09
8	1566-1	TBT	2.5	MECL2	12/04/09
9	1567-3	PORE TBT	.125/.25	MECL2	12/04/09
10	1578-3	ABN ACID	100/200	MEOH	10/21/09
11	1563-3	TPHD	15000	ACETONE	11/20/09
12	1583-1	ABN BASE	200	ACETONE	02/05/10
13	1573-2	LOW PCB	2	ACETONE	10/10/09
14	1547-1	LOW ABN ACID	10/20	MEOH	04/10/09
15*	1452-1	SIM PNA	15/75	MEOH	04/09/09
16*	1502-2	DIOXANE	100	MEOH	02/26/10
17	1516-2	1248 PCB	20	ACETONE	05/07/09
18	1514-4	LOW SIM PNA	1.5/7.5	ACETONE	04/24/09
19	1574-4	AK103	7500	MECL2	12/02/09
20	1572-2	PNA	100	ACETONE	12/26/09
21*	1414-4	SKY/BHT	100	MEOH	04/08/09
22	1570-1	HERB	12.5/12500	MEOH	12/22/09
23	1505-1	LOW ABN BASE	20	MEOH	03/20/09
24	1573-4	LOW ABN	10	ACETONE	08/01/09
25#	1481-1	DIPHENYL	100	MEOH	07/20/08
26*	1545-2	OP-PEST	25	MEOH	02/16/10
27#	1495-1	STEROLS	200	MEOH	12/29/08
28#	1494-1	ADD. PEST	4	ACETONE	01/23/09
29#	1496-3	DECANES	100	MEOH	02/12/09
30	1497-2	EDB/DBCP	2	ACETONE	02/12/09
31	1510-3	TERPINEOL	100	MEOH	03/21/09

LCS SOLUTIONS

02/27/09

32	1576-2	GUAIACOL	50-200	ACETONE	06/05/09
33	1522-1	RESIN ACID	250	ACETONE	06/11/09
34	1530-2	CONGENERS	1	ACETONE	07/23/09
50	1571-1	FULL RESIN	250	ACETONE	06/10/09
*=REVERIFIED SOLUTION					
#=PROJECT SPECIFIC					

SURR SOLUTIONS

02/27/09

LABEL	SOLN ID	TEST	CONC. UG/ML	SOLVENT	EXP.
A	1584-5	ABN	100/150	MEOH	02/18/10
B	1572-1	SIM PNA	15/75	MEOH	08/28/09
C	1559-1	SIM ABN	25/37.5	MEOH	03/13/09
D	1573-3	LOW PCB	0.2	ACETONE	07/31/09
E*	1478-1	HERB	62.5	MEOH	09/21/09
F	1574-3	PCP	12.5	ACETONE	01/06/10
G*	1534-1	1,4DIOXANE	100	MEOH	02/26/10
H*	1545-1	OP-PEST	25	MEOH	02/16/10
I	1559-4	LOW S. PNA	1.5	MEOH	08/28/09
J	1566-5	TBT-PORE	0.125	MECL2	12/04/09
K	1538-1	MED PCB	20	ACETONE	07/31/09
L	1584-4	TBT	2.5	MECL2	12/04/09
M	1578-1	EPH	1500	MECL2	12/09/09
N	1538-2	PCB	2	ACETONE	07/31/09
O	1567-4	TPH	450	MECL2	09/24/09
P	1560-3	HCID	2250	MECL2	09/24/09
Q	1497-3	EDB	2	ACETONE	02/12/09
R	1521-4	RESIN ACID	250	ACETONE	06/11/09
S	1568-5	PBDE	.25	MEOH	12/11/09
T	*reverified solution				
U					
V					
W					
X					
Y					
Z					

Data Summary Package

prepared
for

THE BOEING COMPANY

Project: Plant 2 Source Control

ARI JOB NO: OM42

prepared
by

Analytical Resources, Inc.

PCBS

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PCB by GC/ECD Method SW8082
Page 1 of 1

Sample ID: PL2SC-SS-J249-021209
SAMPLE

Lab Sample ID: OM42A
LIMS ID: 09-4248
Matrix: Filter Bag
Data Release Authorized:
Reported: 02/24/09

QC Report No: OM42-The Boeing Company
Project: BP2 SOURCE CONTROL

Date Sampled: 02/12/09
Date Received: 02/12/09

Date Extracted: 02/19/09
Date Analyzed: 02/23/09 18:06
Instrument/Analyst: ECD5/JGR
GPC Cleanup: No
Sulfur Cleanup: Yes
Acid Cleanup: Yes

Sample Amount: 1.00 Filter Bag
Final Extract Volume: 10 mL
Dilution Factor: 100
Silica Gel: Yes

CAS Number	Analyte	RL	Result
12674-11-2	Aroclor 1016	100	< 100 U
53469-21-9	Aroclor 1242	100	< 100 U
12672-29-6	Aroclor 1248	100	< 100 U
11097-69-1	Aroclor 1254	100	< 100 U
11096-82-5	**Aroclor 1260**	**100**	**190**
11104-28-2	Aroclor 1221	100	< 100 U
11141-16-5	Aroclor 1232	100	< 100 U

Reported in Total µg

PCB Surrogate Recovery

Decachlorobiphenyl	D
Tetrachlorometaxylene	D

ANALYTICAL RESOURCES INCORPORATED

SW8082/PCB WIPES SURROGATE RECOVERY SUMMARY

Matrix: Filter Bag

QC Report No: OM42-The Boeing Company
Project: BP2 SOURCE CONTROL

Client ID	DCBP	TCMX	TOT OUT
MB-021909	80.8%	67.2%	0
LCS-021909	73.8%	69.0%	0
LCSD-021909	83.5%	69.2%	0
PL2SC-SS-J249-021209	D	D	0

	LCS/MB LIMITS	QC LIMITS
(DCBP) = Decachlorobiphenyl	(30-160)	(30-160)
(TCMX) = Tetrachlorometaxylene	(30-160)	(30-160)

Prep Method: SW3580A
Log Number Range: 09-4248 to 09-4248

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PCB by GC/ECD Method SW8082
Page 1 of 1

Sample ID: LCS-021909
LCS/LCSD

Lab Sample ID: LCS-021909
LIMS ID: 09-4248
Matrix: Filter Bag
Data Release Authorized:
Reported: 02/24/09

QC Report No: OM42-The Boeing Company
Project: BP2 SOURCE CONTROL

Date Sampled: 02/12/09
Date Received: 02/12/09

Date Extracted LCS/LCSD: 02/19/09

Date Analyzed LCS: 02/23/09 17:31
LCSD: 02/23/09 17:49
Instrument/Analyst LCS: ECD5/JGR
LCSD: ECD5/JGR
GPC Cleanup: No
Sulfur Cleanup: Yes

Sample Amount LCS: 1.00 Filter Bag
LCSD: 1.00 Filter Bag
Final Extract Volume LCS: 5.0 mL
LCSD: 5.0 mL
Dilution Factor LCS: 1.00
LCSD: 1.00
Silica Gel: Yes
Acid Cleanup: Yes

Analyte	LCS	Spike Added-LCS	LCS Recovery	LCSD	Spike Added-LCSD	LCSD Recovery	RPD
Aroclor 1016	1.9	2.5	76.0%	2.0	2.5	80.0%	5.1%
Aroclor 1260	2.1	2.5	84.0%	2.3	2.5	92.0%	9.1%

PCB Surrogate Recovery

	LCS	LCSD
Decachlorobiphenyl	73.8%	83.5%
Tetrachlorometaxylene	69.0%	69.2%

Reported in Total µg
RPD calculated using sample concentrations per SW846.

PCB METHOD BLANK SUMMARY

BLANK NO.

OM42MB1

Lab Name: ANALYTICAL RESOURCES, INC
Client: THE BOEING CO

ARI Job No.: OM42
Project: BP2 SOURCE CONTROL

Lab Sample ID: OM42MB1
Lab File ID: 0223B029

Date Extracted: 02/19/09
Matrix: FILTER BAG

Date Analyzed: 02/23/09
Instrument ID: ECD5

Time Analyzed: 1714
GC Columns: ZB5/ZB35

THIS METHOD BLANK APPLIES TO THE FOLLOWING SAMPLES, MS and MSD:

	CLIENT SAMPLE NO.	LAB SAMPLE ID	DATE ANALYZED
01	OM42LCS1	OM42LCS1	02/23/09
02	OM42LCSD1	OM42LCSD1	02/23/09
03	PL2SC-SS-J24	OM42A	02/23/09

ALL RUNS ARE DUAL COLUMN

FORM IV PCB

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PCB by GC/ECD Method SW8082

Sample ID: MB-021909
METHOD BLANK

Lab Sample ID: MB-021909
LIMS ID: 09-4248
Matrix: Filter Bag
Data Release Authorized:
Reported: 02/24/09

QC Report No: OM42-The Boeing Company
Project: BP2 SOURCE CONTROL

Date Sampled: NA
Date Received: NA

Date Extracted: 02/19/09
Date Analyzed: 02/23/09 17:14
Instrument/Analyst: ECD5/JGR
GPC Cleanup: No
Sulfur Cleanup: Yes
Acid Cleanup: Yes

Sample Amount: 1.00 Filter Bag
Final Extract Volume: 5.0 mL
Dilution Factor: 1.00
Silica Gel: Yes

CAS Number	Analyte	RL	Result
12674-11-2	Aroclor 1016	0.5	< 0.5 U
53469-21-9	Aroclor 1242	0.5	< 0.5 U
12672-29-6	Aroclor 1248	0.5	< 0.5 U
11097-69-1	Aroclor 1254	0.5	< 0.5 U
11096-82-5	Aroclor 1260	0.5	< 0.5 U
11104-28-2	Aroclor 1221	0.5	< 0.5 U
11141-16-5	Aroclor 1232	0.5	< 0.5 U

Reported in Total µg

PCB Surrogate Recovery	
Decachlorobiphenyl	80.8%
Tetrachlorometaxylene	67.2%

METALS

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
TOTAL METALS
Page 1 of 1

Sample ID: PL2SC-SS-J249-021209
SAMPLE

Lab Sample ID: OM42B
LIMS ID: 09-4249
Matrix: Soil
Data Release Authorized:
Reported: 03/02/09

QC Report No: OM42-The Boeing Company
Project: BP2 SOURCE CONTROL

Date Sampled: 02/12/09
Date Received: 02/12/09

Percent Total Solids: 14.1%

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	RL	mg/kg-dry	Q
3050B	02/17/09	7060A	02/27/09	**7440-38-2**	**Arsenic**	2	26	
3050B	02/17/09	6010B	02/23/09	**7440-43-9**	**Cadmium**	1	7	
3050B	02/17/09	6010B	02/23/09	**7440-47-3**	**Chromium**	3	176	
3050B	02/17/09	6010B	02/23/09	**7440-50-8**	**Copper**	1	2,330	
3050B	02/17/09	7421	02/23/09	**7439-92-1**	**Lead**	10	390	
CLP	02/17/09	7471A	02/20/09	**7439-97-6**	**Mercury**	0.3	0.5	
3050B	02/17/09	6010B	02/23/09	**7440-22-4**	**Silver**	2	4	
3050B	02/17/09	6010B	02/23/09	**7440-66-6**	**Zinc**	7	5,870	

U-Analyte undetected at given RL
RL-Reporting Limit

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
TOTAL METALS
Page 1 of 1

Sample ID: METHOD BLANK

Lab Sample ID: OM42MB
LIMS ID: 09-4249
Matrix: Soil
Data Release Authorized:
Reported: 03/02/09

QC Report No: OM42-The Boeing Company
Project: BP2 SOURCE CONTROL

Date Sampled: NA
Date Received: NA

Percent Total Solids: NA

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	RL	mg/kg-dry	Q
3050B	02/17/09	7060A	02/27/09	7440-38-2	Arsenic	0.1	0.1	U
3050B	02/17/09	6010B	02/23/09	7440-43-9	Cadmium	0.2	0.2	U
3050B	02/17/09	6010B	02/23/09	7440-47-3	Chromium	0.5	0.5	U
3050B	02/17/09	6010B	02/23/09	7440-50-8	Copper	0.2	0.2	U
3050B	02/17/09	7421	02/23/09	7439-92-1	Lead	0.1	0.1	U
CLP	02/17/09	7471A	02/20/09	7439-97-6	Mercury	0.05	0.05	U
3050B	02/17/09	6010B	02/23/09	7440-22-4	Silver	0.3	0.3	U
3050B	02/17/09	6010B	02/23/09	7440-66-6	Zinc	1	1	U

U-Analyte undetected at given RL
RL-Reporting Limit

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
TOTAL METALS
Page 1 of 1

Sample ID: LAB CONTROL

Lab Sample ID: OM42LCS
LIMS ID: 09-4249
Matrix: Soil
Data Release Authorized:
Reported: 03/02/09

QC Report No: OM42-The Boeing Company
Project: BP2 SOURCE CONTROL

Date Sampled: NA
Date Received: NA

BLANK SPIKE QUALITY CONTROL REPORT

Analyte	Analysis Method	Spike Found	Spike Added	% Recovery	Q
Arsenic	7060A	10.0	10.0	100%	
Cadmium	6010B	49.3	50.0	98.6%	
Chromium	6010B	48.1	50.0	96.2%	
Copper	6010B	48.7	50.0	97.4%	
Lead	7421	9.8	10.0	98.0%	
Mercury	7471A	1.08	1.00	108%	
Silver	6010B	54.1	50.0	108%	
Zinc	6010B	48	50	96.0%	

Reported in mg/kg-dry

N-Control limit not met
NA-Not Applicable, Analyte Not Spiked
Control Limits: 80-120%

Analytical Resources, Incorporated
Analytical Chemists and Consultants

Organic Extractions Laboratory
Analyst Notes

ARI Job No.: OM42 Client ID: The Boeing Company

Parameter: PCB Client Project: BP2 Source Control

SOP Number(s): 3545 No Anomalies:

List problems, concerns, corrective actions and any other pertinent information
Filter Bag wet weight = 652.36g
Metals split (wet) = 14.18 g
Filter Bag dry weight with plastic Ring = 170.65g
Plastic Ring weight = 8.42g
Filter Bag dry weight without plastic Ring = 162.23g
Sample A would not concentrate to 5mL. Took to a 10mL FEV. Split 2mL off for acid/sulfur cleanups. SC 2/26/07

Analyst Initials:		Date:	

3056F

Revision 006
1/12/07

Analytical Resources, Incorporated
Analytical Chemists and Consultants

March 3, 2009

Kent Angelos
Golder Associates, Inc.
18300 NE Union Hill Road, Suite 200
Redmond, WA 98052-3333

RE: Boeing Plant 2 Source Control
ARI IDs: ON49 & ON53

Dear Kent:

Please find enclosed the original Chain-of-Custody (COC) records, sample receipt documentation, and the final data package for the project referenced above.

Sample receipt information and analytical details are addressed in the Case Narrative.

An electronic copy of this package will be kept on file at ARI. If you have any questions or require additional information, please contact me at your convenience.

Sincerely,
ANALYTICAL RESOURCES, INC.

Kelly Bottem
Client Services Manager
(206) 695-6211
kellyb@arilabs.com

KB/eb

Enclosures

cc: Kent Angelos, Golder Associates Inc., 18300 NE Union Hill Road, Suite 200, Redmond, WA 98052-3333

Chain of Custody
Documentation

prepared
for

THE BOEING COMPANY

Project: Plant 2 Source Control

ARI JOB NO: ON49 & ON53

prepared
by

Analytical Resources, Inc.

Chain of Custody Record & Laboratory Analysis Request

ARI Assigned Number:	Turn-around Requested: Std	Page: 1 of 1	
ARI Client Company: Boeing	Phone:	Date: 2/19/09	Ice Present?
Client Contact: Will Ernst		No. of Coolers:	Cooler Temps:
Client Project Name: BP2 Source Control			
Client Project #: @	Samplers: Liz Shea, Jill Lamberts		

Analytical Resources, Incorporated
Analytical Chemists and Consultants
4611 South 134th Place, Suite 100
Tukwila, WA 98168
206-695-6200 206-695-6201 (fax)

Sample ID	Date	Time	Matrix	No. Containers	Analysis Requested: PCBs	Analysis Requested: Dissolved SMS Metals	Analysis Requested	Analysis Requested	Analysis Requested	Analysis Requested	Analysis Requested	Notes/Comments
												field filtered
PL2SC-EB3-021909	2/14/09	1145	W	4	X	X						

Comments/Special Instructions	Relinquished by: (Signature)	Received by: (Signature)	Relinquished by: (Signature)	Received by: (Signature)
SMS metals as per QAPP	Elizabeth Shea	Jonathan Walter		
	Printed Name: Liz Shea	Printed Name: Jonathan Walter	Printed Name:	Printed Name:
	Company: Golder	Company: ARI	Company:	Company:
	Date & Time: 2/19/09 1315	Date & Time: 2/19/09 1315	Date & Time:	Date & Time:

Sample Retention Policy: All samples submitted to ARI will be appropriately discarded no sooner than 90 days after receipt or 60 days after submission of hardcopy data, whichever is longer, unless alternate retention schedules have been established by work-order or contract.

Analytical Resources, Incorporated
Analytical Chemists and Consultants

Cooler Receipt Form

ARI Client: Boeing
COC No: 0
Assigned ARI Job No: ~~ON49~~ 01N53

Project Name:
Delivered by: Hand
Tracking No:

Preliminary Examination Phase:

Were intact, properly signed and dated custody seals attached to the outside of to cooler?	YES	(NO)
Were custody papers included with the cooler?	(YES)	NO
Were custody papers properly filled out (ink, signed, etc.)	(YES)	NO
Record cooler temperature (recommended 2.0-6.0 °C for chemistry	11.2 °C	

Cooler Accepted by: JH Date: 2/19/09 Time: 1313

Complete custody forms and attach all shipping documents

Log-In Phase:

Was a temperature blank included in the cooler?		YES	(NO)
What kind of packing material was used?		N	
Was sufficient ice used (if appropriate)?		(YES)	NO
Were all bottles sealed in individual plastic bags?		YES	(NO)
Did all bottle arrive in good condition (unbroken)?		(YES)	NO
Were all bottle labels complete and legible?		(YES)	NO
Did all bottle labels and tags agree with custody papers?		(YES)	NO
Were all bottles used correct for the requested analyses?		(YES)	NO
Do any of the analyses (bottles) require preservation? (attach preservation checklist)		(YES)	NO
Were all VOC vials free of air bubbles?	(NA)	YES	NO
Was sufficient amount of sample sent in each bottle?		(YES)	NO

Samples Logged by: CW Date: 2/20/2009 Time: 935

*** Notify Project Manager of discrepancies or concerns ***

Explain discrepancies or negative responses:

By: Date:

PRESERVATION VERIFICATION 02/20/09
Page 1 of 1

ANALYTICAL RESOURCES INCORPORATED

ARI Job No: **ON53**

Inquiry Number: NONE
Analysis Requested: 02/19/09
Contact: Ernst, Will
Client: The Boeing Company
Logged by: MM
Sample Set Used: Yes-481
Validatable Package: No
Deliverables:

PC: Kelly
VTSR: 02/19/09

Project #:
Project: BP2 SOURCE CONTROL
Sample Site:
SDG No:
Analytical Protocol: In-house

LOGNUM ARI ID	CLIENT ID	CN >12	WAD >12	NH3 <2	COD <2	FOG <2	MET <2	PHEN <2	PHOS <2	TKN <2	NO23 <2	TOC <2	S2 >9	DMET FLT	DOC FLT	PARAMETER	ADJUSTED TO	LOT NUMBER	AMOUNT ADDED	DATE/BY
09-5091 **ON53A**	PL2SC-EB3-021909						DIS							Y						

Checked By MM Date 2-20-2009

Analytical Resources, Incorporated
Analytical Chemists and Consultants

Cooler Receipt Form

ARI Client: Boeing | Project Name: _____

COC No: _____ | Delivered by: Hand

Assigned ARI Job No: ON49 | Tracking No: _____

Preliminary Examination Phase:

Were intact, properly signed and dated custody seals attached to the outside of to cooler?	YES	(NO)
Were custody papers included with the cooler?	(YES)	NO
Were custody papers properly filled out (ink, signed, etc.)	(YES)	NO
Record cooler temperature (recommended 2.0-6.0 °C for chemistry	11.2 °C	

Cooler Accepted by: JH Date: 2/19/09 Time: 1313

Complete custody forms and attach all shipping documents

Log-In Phase:

Was a temperature blank included in the cooler?		YES	(NO)
What kind of packing material was used?		N	
Was sufficient ice used (if appropriate)?		(YES)	NO
Were all bottles sealed in individual plastic bags?		YES	(NO)
Did all bottle arrive in good condition (unbroken)?		(YES)	NO
Were all bottle labels complete and legible?		(YES)	NO
Did all bottle labels and tags agree with custody papers?		(YES)	NO
Were all bottles used correct for the requested analyses?		(YES)	NO
Do any of the analyses (bottles) require preservation? (attach preservation checklist)		(YES)	NO
Were all VOC vials free of air bubbles?	(NA)	YES	NO
Was sufficient amount of sample sent in each bottle?		(YES)	NO

Samples Logged by: CW Date: 2/20/2009 Time: 935

*** Notify Project Manager of discrepancies or concerns ***

Explain discrepancies or negative responses:

By: Date:

PRESERVATION VERIFICATION 02/20/09
Page 1 of 1

ANALYTICAL RESOURCES INCORPORATED

ARI Job No: **ON49**

Inquiry Number: NONE
Analysis Requested: 02/19/09
Contact: Ernst, Will
Client: The Boeing Company
Logged by: MM
Sample Set Used: Yes-481 Yes
Validatable Package: ~~No~~
Deliverables:

PC: Kelly
VTSR: 02/19/09

Project #:
Project: BP2 SOURCE CONTROL
Sample Site:
SDG No:
Analytical Protocol: In-house

LOGNUM ARI ID	CLIENT ID	CN >12	WAD >12	NH3 <2	COD <2	FOG <2	MET <2	PHEN <2	PHOS <2	TKN <2	NO23 <2	TOC <2	S2 >9	DMET FLT	DOC FLT	PARAMETER	ADJUSTED TO	LOT NUMBER	AMOUNT ADDED	DATE/BY
09-5068 ON49A	PL2SC-EB3-021909						DIS OK							Y						

Checked By W Date 2/20/2009

Case Narrative

prepared
for

THE BOEING COMPANY

Project: Plant 2 Source Control

ARI JOB NO: ON49 & ON53

prepared
by

Analytical Resources, Inc.

Case Narrative

Project: Boeing Plant 2 Source Control
ARI IDs: ON49 & ON53
Matrix: Water
Date: March 5, 2009

Sample Receipt Information

One water sample was received in good condition at Analytical Resources, Inc. (ARI) on February 19, 2009 under ARI sample delivery groups ON49 and ON53. The cooler temperature, as measured by IR thermometer, was 11.2°C. For further details regarding sample receipt, please refer to the Cooler Receipt Form.

Select samples were analyzed for the parameters listed below, as requested on the Chain of Custody.

PCBs by Method 8082:

The sample was extracted on 2/24/09 and analyzed on 2/26/09 within the method recommended holding times.

Initial calibration (s): All analytes of interest were within method acceptance criteria.

Continuing calibration (s): Are in control.

Samples: There were no anomalies associated with these samples.

Surrogates: The surrogate DCBP is out of control high in the LCS and LCSD. All other surrogate and spike recoveries were in control, therefore no further corrective action was taken.

LCS/ LCSD(s): All LCS percent recoveries were within control limits.

Method Blank: The method blank was free of contamination.

Dissolved Metals by Methods 6010B and 7000 series

The samples were digested on 2/23/09. The digests were analyzed on 2/27/09 within the method recommended holding times.

Replicate(s): All percent recoveries were within compliance.

Samples: No anomalies were encountered for these samples.

LCS/Blank Spike(s): All percent recoveries were within compliance.

Method Blank(s): Are in control.

Case Narrative

Project: Boeing Plant 2 Source Control
ARI IDs: ON49 & ON53
Matrix: Water
Date: March 5, 2009

Dissolved Low-Level Mercury by Method SW7470A

The samples were digested on 2/24/09. The digests were analyzed on 2/26/09 within the method recommended holding times.

Replicate(s): All percent recoveries were within compliance.

Samples: No anomalies were encountered for these samples.

LCS/Blank Spike(s): All percent recoveries were within compliance.

Method Blank(s): Are in control.

Standard Reference: All percent recoveries were within compliance.

ARI Data Reporting Qualifiers

Effective 11/22/04

Inorganic Data

U Indicates that the target analyte was not detected at the reported concentration

* Duplicate RPD is not within established control limits

B Reported value is less than the CRDL but ≥ the Reporting Limit

N Matrix Spike recovery not within established control limits

NA Not Applicable, analyte not spiked

H The natural concentration of the spiked element is so much greater than the concentration spiked that an accurate determination of spike recovery is not possible

L Analyte concentration is ≤5 times the Reporting Limit and the replicate control limit defaults to ±1 RL instead of the normal 20% RPD

Organic Data

U Indicates that the target analyte was not detected at the reported concentration

* Flagged value is not within established control limits

B Analyte detected in an associated Method Blank at a concentration greater than one-half of ARI's Reporting Limit or 5% of the regulatory limit or 5% of the analyte concentration in the sample.

J Estimated concentration when the value is less than ARI's established reporting limits

D The spiked compound was not detected due to sample extract dilution

NR Spiked compound recovery is not reported due to chromatographic interference

E Estimated concentration calculated for an analyte response above the valid instrument calibration range. A dilution is required to obtain an accurate quantification of the analyte.

S Indicates an analyte response that has saturated the detector. The calculated concentration is not valid; a dilution is required to obtain valid quantification of the analyte

NA The flagged analyte was not analyzed for

NS The flagged analyte was not spiked into the sample

M Estimated value for an analyte detected and confirmed by an analyst but with low spectral match parameters. This flag is used only for GC-MS analyses

N The analysis indicates the presence of an analyte for which there is presumptive evidence to make a "tentative identification"

Y The analyte reporting limit is raised due to a positive chromatographic interference. The compound is not detected above the raised limit but may be present at or below the limit

C The analyte was positively identified on only one of two chromatographic columns. Chromatographic interference prevented a positive identification on the second column

P The analyte was detected on both chromatographic columns but the quantified values differ by ≥40% RPD with no obvious chromatographic interference

Geotechnical Data

SM Sample matrix was not appropriate for the requested analysis. This normally refers to samples contaminated with an organic product that interferes with the sieving process and/or moisture content, porosity and saturation calculations

SS Sample did not contain the proportion of "fines" required to perform the pipette portion of the grain size analysis

W Weight of sample in some pipette aliquots was below the level required for accurate weighing

F Samples were frozen prior to particle size determination

LCS SOLUTIONS

02/27/09

LABE	SOLN ID	TEST	CONC. UG/ML	SOLVENT	EXP.
1	1549-3	PCB	20	ACETONE	10/10/09
2#	1472-3	BCOC PEST	10	ACETONE	07/20/08
3	1579-3	PEST	02/04/20	ACETONE	09/23/09
4	1576-3	LOW PEST	0.2/0.4/2	ACETONE	07/31/09
5	1580-2	EPH	1500	MECL2	01/29/10
6	1559-2	PCP	12.5/125	ACETONE	11/05/09
7	1581-4	ABN	100	ACETONE	08/01/09
8	1566-1	TBT	2.5	MECL2	12/04/09
9	1567-3	PORE TBT	.125/.25	MECL2	12/04/09
10	1578-3	ABN ACID	100/200	MEOH	10/21/09
11	1563-3	TPHD	15000	ACETONE	11/20/09
12	1583-1	ABN BASE	200	ACETONE	02/05/10
13	1573-2	LOW PCB	2	ACETONE	10/10/09
14	1547-1	LOW ABN ACID	10/20	MEOH	04/10/09
15*	1452-1	SIM PNA	15/75	MEOH	04/09/09
16*	1502-2	DIOXANE	100	MEOH	02/26/10
17	1516-2	1248 PCB	20	ACETONE	05/07/09
18	1514-4	LOW SIM PNA	1.5/7.5	ACETONE	04/24/09
19	1574-4	AK103	7500	MECL2	12/02/09
20	1572-2	PNA	100	ACETONE	12/26/09
21*	1414-4	SKY/BHT	100	MEOH	04/08/09
22	1570-1	HERB	12.5/12500	MEOH	12/22/09
23	1505-1	LOW ABN BASE	20	MEOH	03/20/09
24	1573-4	LOW ABN	10	ACETONE	08/01/09
25#	1481-1	DIPHENYL	100	MEOH	07/20/08
26*	1545-2	OP-PEST	25	MEOH	02/16/10
27#	1495-1	STEROLS	200	MEOH	12/29/08
28#	1494-1	ADD. PEST	4	ACETONE	01/23/09
29#	1496-3	DECANES	100	MEOH	02/12/09
30	1497-2	EDB/DBCP	2	ACETONE	02/12/09
31	1510-3	TERPINEOL	100	MEOH	03/21/09

LCS SOLUTIONS

02/27/09

32	1576-2	GUAIACOL	50-200	ACETONE	06/05/09
33	1522-1	RESIN ACID	250	ACETONE	06/11/09
34	1530-2	CONGENERS	1	ACETONE	07/23/09
50	1571-1	FULL RESIN	250	ACETONE	06/10/09
*=REVERIFIED SOLUTION					
#=PROJECT SPECIFIC					

SURR SOLUTIONS

02/27/09

LABEL	SOLN ID	TEST	CONC. UG/ML	SOLVENT	EXP.
A	1584-5	ABN	100/150	MEOH	02/18/10
B	1572-1	SIM PNA	15/75	MEOH	08/28/09
C	1559-1	SIM ABN	25/37.5	MEOH	03/13/09
D	1573-3	LOW PCB	0.2	ACETONE	07/31/09
E*	1478-1	HERB	62.5	MEOH	09/21/09
F	1574-3	PCP	12.5	ACETONE	01/06/10
G*	1534-1	1,4DIOXANE	100	MEOH	02/26/10
H*	1545-1	OP-PEST	25	MEOH	02/16/10
I	1559-4	LOW S. PNA	1.5	MEOH	08/28/09
J	1566-5	TBT-PORE	0.125	MECL2	12/04/09
K	1538-1	MED PCB	20	ACETONE	07/31/09
L	1584-4	TBT	2.5	MECL2	12/04/09
M	1578-1	EPH	1500	MECL2	12/09/09
N	1538-2	PCB	2	ACETONE	07/31/09
O	1567-4	TPH	450	MECL2	09/24/09
P	1560-3	HCID	2250	MECL2	09/24/09
Q	1497-3	EDB	2	ACETONE	02/12/09
R	1521-4	RESIN ACID	250	ACETONE	06/11/09
S	1568-5	PBDE	.25	MEOH	12/11/09
T	*reverified solution				
U					
V					
W					
X					
Y					
Z					

Data Summary Package

prepared
for

THE BOEING COMPANY

Project: Plant 2 Source Control

ARI JOB NO: ON49 & ON53

prepared
by

Analytical Resources, Inc.

PCBS

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PCB by GC/ECD Method SW8082
Page 1 of 1

Sample ID: PL2SC-EB3-021909
SAMPLE

Lab Sample ID: ON49A
LIMS ID: 09-5068
Matrix: Water
Data Release Authorized: VTS
Reported: 02/28/09

QC Report No: ON49-The Boeing Company
Project: BP2 SOURCE CONTROL

Date Sampled: 02/19/09
Date Received: 02/19/09

Date Extracted: 02/24/09
Date Analyzed: 02/26/09 10:02
Instrument/Analyst: ECD5/JGR
GPC Cleanup: No
Sulfur Cleanup: No

Sample Amount: 500 mL
Final Extract Volume: 5.0 mL
Dilution Factor: 1.00
Silica Gel: No
Acid Cleanup: No

CAS Number	Analyte	RL	Result
12674-11-2	Aroclor 1016	1.0	< 1.0 U
53469-21-9	Aroclor 1242	1.0	< 1.0 U
12672-29-6	Aroclor 1248	1.0	< 1.0 U
11097-69-1	Aroclor 1254	1.0	< 1.0 U
11096-82-5	Aroclor 1260	1.0	< 1.0 U
11104-28-2	Aroclor 1221	1.0	< 1.0 U
11141-16-5	Aroclor 1232	1.0	< 1.0 U

Reported in µg/L (ppb)

PCB Surrogate Recovery

Decachlorobiphenyl	106%
Tetrachlorometaxylene	78.5%

FORM I

ANALYTICAL RESOURCES INCORPORATED

SW8082/PCB WATER SURROGATE RECOVERY SUMMARY

Matrix: Water

QC Report No: ON49-The Boeing Company
Project: BP2 SOURCE CONTROL

Client ID	DCBP % REC	DCBP LCL-UCL	TCMX % REC	TCMX LCL-UCL	TOT OUT
MB-022409	101%	47-101	65.0%	61-104	0
LCS-022409	104%*	47-101	72.5%	61-104	1
LCSD-022409	103%*	47-101	72.8%	61-104	1
PL2SC-EB3-021909	106%	42-120	78.5%	55-102	0

Prep Method: SW3510C
Log Number Range: 09-5068 to 09-5068

FORM-II SW8082

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PCB by GC/ECD Method SW8082
Page 1 of 1

Sample ID: LCS-022409
LCS/LCSD

Lab Sample ID: LCS-022409
LIMS ID: 09-5068
Matrix: Water
Data Release Authorized: VTS
Reported: 02/28/09

QC Report No: ON49-The Boeing Company
Project: BP2 SOURCE CONTROL

Date Sampled: NA
Date Received: NA

Date Extracted LCS/LCSD: 02/24/09

Date Analyzed LCS: 02/26/09 09:28
LCSD: 02/26/09 09:45

Instrument/Analyst LCS: ECD5/JGR
LCSD: ECD5/JGR

GPC Cleanup: No
Sulfur Cleanup: No

Sample Amount LCS: 500 mL
LCSD: 500 mL

Final Extract Volume LCS: 5.0 mL
LCSD: 5.0 mL

Dilution Factor LCS: 1.00
LCSD: 1.00

Silica Gel: No
Acid Cleanup: No

Analyte	LCS	Spike Added-LCS	LCS Recovery	LCSD	Spike Added-LCSD	LCSD Recovery	RPD
Aroclor 1016	4.77	5.00	95.4%	4.82	5.00	96.4%	1.0%
Aroclor 1260	5.66	5.00	113%	5.23	5.00	105%	7.9%

PCB Surrogate Recovery

	LCS	LCSD
Decachlorobiphenyl	104%	103%
Tetrachlorometaxylene	72.5%	72.8%

Results reported in µg/L
RPD calculated using sample concentrations per SW846.

PCB METHOD BLANK SUMMARY

BLANK NO.

ON49MBW1

Lab Name: ANALYTICAL RESOURCES, INC

Client: THE BOEING COMPANY

ARI Job No.: ON49

Project: BP2 SOURCE CONTROL

Lab Sample ID: ON49MBW1

Lab File ID: 0226B007

Date Extracted: 02/24/09

Matrix: LIQUID

Date Analyzed: 02/26/09

Instrument ID: ECD5

Time Analyzed: 0911

GC Columns: ZB5/ZB35

THIS METHOD BLANK APPLIES TO THE FOLLOWING SAMPLES, MS and MSD:

	CLIENT SAMPLE NO.	LAB SAMPLE ID	DATE ANALYZED
01	ON49LCSW1	ON49LCSW1	02/26/09
02	ON49LCSDW1	ON49LCSDW1	02/26/09
03	PL2SC-EB3-021909	ON49A	02/26/09

ALL RUNS ARE DUAL COLUMN

FORM IV PCB

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PCB by GC/ECD Method SW8082
Page 1 of 1

Sample ID: MB-022409
METHOD BLANK

Lab Sample ID: MB-022409
LIMS ID: 09-5068
Matrix: Water
Data Release Authorized: VTS
Reported: 02/28/09

QC Report No: ON49-The Boeing Company
Project: BP2 SOURCE CONTROL
Date Sampled: NA
Date Received: NA

Date Extracted: 02/24/09
Date Analyzed: 02/26/09 09:11
Instrument/Analyst: ECD5/JGR
GPC Cleanup: No
Sulfur Cleanup: No

Sample Amount: 500 mL
Final Extract Volume: 5.0 mL
Dilution Factor: 1.00
Silica Gel: No
Acid Cleanup: No

CAS Number	Analyte	RL	Result
12674-11-2	Aroclor 1016	1.0	< 1.0 U
53469-21-9	Aroclor 1242	1.0	< 1.0 U
12672-29-6	Aroclor 1248	1.0	< 1.0 U
11097-69-1	Aroclor 1254	1.0	< 1.0 U
11096-82-5	Aroclor 1260	1.0	< 1.0 U
11104-28-2	Aroclor 1221	1.0	< 1.0 U
11141-16-5	Aroclor 1232	1.0	< 1.0 U

Reported in µg/L (ppb)

PCB Surrogate Recovery

Decachlorobiphenyl	101%
Tetrachlorometaxylene	65.0%

FORM I

METALS

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
DISSOLVED METALS
Page 1 of 1

Sample ID: PL2SC-EB3-021909
SAMPLE

Lab Sample ID: ON49A
LIMS ID: 09-5068
Matrix: Water
Data Release Authorized:
Reported: 03/02/09

QC Report No: ON49-The Boeing Company
Project: BP2 SOURCE CONTROL

Date Sampled: 02/19/09
Date Received: 02/19/09

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	RL	µg/L	Q
7000A	02/23/09	7060A	02/27/09	7440-38-2	Arsenic	1	1	U
6010B	02/23/09	6010B	02/27/09	7440-43-9	Cadmium	2	2	U
6010B	02/23/09	6010B	02/27/09	7440-47-3	Chromium	5	5	U
6010B	02/23/09	6010B	02/27/09	7440-50-8	Copper	2	2	U
7000A	02/23/09	7421	02/27/09	7439-92-1	Lead	1	1	U
6010B	02/23/09	6010B	02/27/09	7440-22-4	Silver	3	3	U
6010B	02/23/09	6010B	02/27/09	7440-66-6	Zinc	10	10	U

U-Analyte undetected at given RL
RL-Reporting Limit

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
DISSOLVED METALS **Sample ID: METHOD BLANK**

Lab Sample ID: ON49MB
LIMS ID: 09-5068
Matrix: Water
Data Release Authorized:
Reported: 03/02/09

QC Report No: ON49-The Boeing Company
Project: BP2 SOURCE CONTROL

Date Sampled: NA
Date Received: NA

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	RL	µg/L	Q
7000A	02/23/09	7060A	02/27/09	7440-38-2	Arsenic	1	1	U
6010B	02/23/09	6010B	02/27/09	7440-43-9	Cadmium	2	2	U
6010B	02/23/09	6010B	02/27/09	7440-47-3	Chromium	5	5	U
6010B	02/23/09	6010B	02/27/09	7440-50-8	Copper	2	2	U
7000A	02/23/09	7421	02/27/09	7439-92-1	Lead	1	1	U
6010B	02/23/09	6010B	02/27/09	7440-22-4	Silver	3	3	U
6010B	02/23/09	6010B	02/27/09	7440-66-6	Zinc	10	10	U

U-Analyte undetected at given RL
RL-Reporting Limit

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
DISSOLVED METALS

Sample ID: LAB CONTROL

Lab Sample ID: ON49LCS
LIMS ID: 09-5068
Matrix: Water
Data Release Authorized:
Reported: 03/02/09

QC Report No: ON49-The Boeing Company
Project: BP2 SOURCE CONTROL

Date Sampled: NA
Date Received: NA

BLANK SPIKE QUALITY CONTROL REPORT

Analyte	Analysis Method	Spike Found	Spike Added	% Recovery	Q
Arsenic	7060A	22	20	110%	
Cadmium	6010B	548	500	110%	
Chromium	6010B	507	500	101%	
Copper	6010B	502	500	100%	
Lead	7421	21	20	105%	
Silver	6010B	517	500	103%	
Zinc	6010B	540	500	108%	

Reported in µg/L

N-Control limit not met
Control Limits: 80-120%

LOW-LEVEL MERCURY

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
Dissolved Mercury by Method SW7470A

Data Release Authorized:
Reported: 02/27/09
Date Received: 02/19/09
Page 1 of 1

QC Report No: ON53-The Boeing Company
Project: BP2 SOURCE CONTROL

Client/ ARI ID	Date Sampled	Matrix	Prep Date Anal Date	RL	Result
PL2SC-EB3-021909 ON53A 09-5091	02/19/09	Water	02/24/09 02/26/09	20.0	20.0 U
MB-022409 Method Blank	NA	Water	02/24/09 02/26/09	20.0	20.0 U

Reported in ng/L

RL-Analytical reporting limit
U-Undetected at reported detection limit

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
DISSOLVED METALS

Sample ID: PL2SC-EB3-021909
DUPLICATE

Lab Sample ID: ON53A
LIMS ID: 09-5091
Matrix: Water
Data Release Authorized:
Reported: 02/27/09

QC Report No: ON53-The Boeing Company
Project: BP2 SOURCE CONTROL

Date Sampled: 02/19/09
Date Received: 02/19/09

MATRIX DUPLICATE QUALITY CONTROL REPORT

Analyte	Analysis Method	Sample	Duplicate	RPD	Control Limit	Q
Mercury	7470A	20.0 U	20.0 U	0.0%	+/- 20.0	L

Reported in ng/L

*-Control Limit Not Met
L-RPD Invalid, Limit = Detection Limit

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
DISSOLVED METALS

Sample ID: PL2SC-EB3-021909
MATRIX SPIKE

Lab Sample ID: ON53A
LIMS ID: 09-5091
Matrix: Water
Data Release Authorized:
Reported: 02/27/09

QC Report No: ON53-The Boeing Company
Project: BP2 SOURCE CONTROL

Date Sampled: 02/19/09
Date Received: 02/19/09

MATRIX SPIKE QUALITY CONTROL REPORT

Analyte	Analysis Method	Sample	Spike	Spike Added	% Recovery	Q
Mercury	7470A	20.0 U	100	100	100%	

Reported in ng/L

N-Control Limit Not Met
H-% Recovery Not Applicable, Sample Concentration Too High
NA-Not Applicable, Analyte Not Spiked

Percent Recovery Limits: 75-125%

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
DISSOLVED METALS

Sample ID: LAB CONTROL

Lab Sample ID: ON53LCS
LIMS ID: 09-5091
Matrix: Water
Data Release Authorized:
Reported: 02/27/09

QC Report No: ON53-The Boeing Company
Project: BP2 SOURCE CONTROL

Date Sampled: NA
Date Received: NA

BLANK SPIKE QUALITY CONTROL REPORT

Analyte	Analysis Method	Spike Found	Spike Added	% Recovery	Q
Mercury	7470A	181	200	90.5%	

Reported in ng/L

N-Control limit not met
Control Limits: 80-120%

Analytical Resources, Incorporated
Analytical Chemists and Consultants

March 13, 2009

Kent Angelos
Golder Associates, Inc.
18300 NE Union Hill Road, Suite 200
Redmond, WA 98052-3333

RE: Boeing Plant 2 Source Control
ARI IDs: OO10 & OO11 and OO85 & OO87

Dear Kent:

Please find enclosed the original Chain-of-Custody (COC) records, sample receipt documentation, and the final data package for the project referenced above.

Sample receipt information and analytical details are addressed in the Case Narrative.

An electronic copy of this package will be kept on file at ARI. If you have any questions or require additional information, please contact me at your convenience.

Sincerely,
ANALYTICAL RESOURCES, INC.

Kelly Bottem
Client Services Manager
(206) 695-6211
kellyb@arilabs.com

KB/eb

Enclosures

cc: Kent Angelos, Golder Associates Inc., 18300 NE Union Hill Road, Suite 200, Redmond, WA 98052-3333

Chain of Custody
Documentation

prepared
for

THE BOEING COMPANY

Project: Plant 2 Source Control

ARI JOB NOS.: OO10, OO11, OO85 AND OO87

prepared
by

Analytical Resources, Inc.

Chain of Custody Record & Laboratory Analysis Request

ARI Assigned Number: 0010 & 0011	Turn-around Requested: Std	Page: 1 of 1	
ARI Client Company: BOEING	Phone:	Date: 2/24/09	Ice Present?
Client Contact: WILL ERNST		No. of Coolers:	Cooler Temps:
Client Project Name: BP2 SOURCE CONTROL			
Client Project #:	Samplers: Liz Shea		

Analytical Resources, Incorporated
Analytical Chemists and Consultants
4611 South 134th Place, Suite 100
Tukwila, WA 98168
206-695-6200 206-695-6201 (fax)

Sample ID	Date	Time	Matrix	No. Containers	Analysis Requested: SMS Metals Dissolved *	Analysis Requested: LL Hg Dissolved *	Notes/Comments
P2SC-W-J249-022309	2/23/09	1630	W	2	X	X	* field filtered

Comments/Special Instructions: SMS Metals as per QAPP	Relinquished by: (Signature) Elizabeth Shea	Received by: (Signature) Jonathan Walter	Relinquished by: (Signature)	Received by: (Signature)
	Printed Name: Liz Shea	Printed Name: Jonathan Walter	Printed Name:	Printed Name:
	Company: Golder	Company: ARI	Company:	Company:
	Date & Time: 2/24/09	Date & Time: 2/24/09 1046	Date & Time:	Date & Time:

Sample Retention Policy: All samples submitted to ARI will be appropriately discarded no sooner than 90 days after receipt or 60 days after submission of hardcopy data, whichever is longer, unless alternate retention schedules have been established by work-order or contract.

PRESERVATION VERIFICATION 02/25/09
Page 1 of 1

ANALYTICAL RESOURCES INCORPORATED

ARI Job No: **0011**

Inquiry Number: NONE
Analysis Requested: 02/24/09
Contact: Ernst, Will
Client: The Boeing Company
Logged by: MM
Sample Set Used: Yes-481
Validatable Package: No
Deliverables:

PC: Kelly
VTSR: 02/24/09

Project #:
Project: BP2 SOURCE CONTROL
Sample Site:
SDG No:
Analytical Protocol: In-house

LOGNUM / ARI ID	CLIENT ID	CN >12	WAD >12	NH3 <2	COD <2	FOG <2	MET <2	PHEN <2	PHOS <2	TKN <2	NO23 <2	TOC <2	S2 >9	DMET FLT	DOC FLT	PARAMETER	ADJUSTED TO	LOT NUMBER	AMOUNT ADDED	DATE/BY
09-5417							DIS							Y						
0011A	PL2SC-W-J249-022309						02													

Checked By W Date 2/25/09

Analytical Resources, Incorporated
Analytical Chemists and Consultants

Cooler Receipt Form

ARI Client: Boeing Project Name: _____

COC No: _____ Delivered by: Hand

Assigned ARI Job No: _____ Tracking No: _____

Preliminary Examination Phase:

Were intact, properly signed and dated custody seals attached to the outside of to cooler?	YES	(NO)
Were custody papers included with the cooler?	(YES)	NO
Were custody papers properly filled out (ink, signed, etc.)	(YES)	NO
Record cooler temperature (recommended 2.0-6.0 °C for chemistry	2.6 °C	

Cooler Accepted by: JW Date: 2/24/09 Time: 1046

Complete custody forms and attach all shipping documents

Log-In Phase:

Was a temperature blank included in the cooler?	YES	(NO)
What kind of packing material was used?	N	
Was sufficient ice used (if appropriate)?	(YES)	NO
Were all bottles sealed in individual plastic bags?	YES	(NO)
Did all bottle arrive in good condition (unbroken)?	(YES)	NO
Were all bottle labels complete and legible?	(YES)	NO
Did all bottle labels and tags agree with custody papers?	(YES)	NO
Were all bottles used correct for the requested analyses?	(YES)	NO
Do any of the analyses (bottles) require preservation? (attach preservation checklist)	(YES)	NO
Were all VOC vials free of air bubbles? (NA)	YES	NO
Was sufficient amount of sample sent in each bottle?	(YES)	NO

Samples Logged by: _____ Date: 2/25/09 Time: 755

***** Notify Project Manager of discrepancies or concerns *****

Explain discrepancies or negative responses:

By: Date:

Chain of Custody Record & Laboratory Analysis Request

ARI Assigned Number: 0010	Turn-around Requested: Std	Page: 1 of 1	
ARI Client Company: BOEING	Phone:	Date: 2/24/09	Ice Present?
Client Contact: WILL ERNST		No. of Coolers:	Cooler Temps:
Client Project Name: BP2 SOURCE CONTROL			
Client Project #:	Samplers: Liz Shea		

Analytical Resources, Incorporated
Analytical Chemists and Consultants
4611 South 134th Place, Suite 100
Tukwila, WA 98168
206-695-6200 206-695-6201 (fax)

Sample ID	Date	Time	Matrix	No. Containers	Analysis Requested: SMS Metals * Dissolved	Analysis Requested: [redacted]	Notes/Comments
P2SC-W-J249-022309	2/23/09	1630	W	2	X	[redacted]	* field filtered

Comments/Special Instructions	Relinquished by: (Signature)	Printed Name	Company	Date & Time	Received by: (Signature)	Printed Name	Company	Date & Time
SMS Metals as per QAPP	Elizabeth Shea	Liz Shea	Golder	2/24/09	Jonathan Walter	Jonathon Walter	ARI	2/24/09 1046
	Relinquished by: (Signature)	Printed Name:	Company:	Date & Time:	Received by: (Signature)	Printed Name:	Company:	Date & Time:

PRESERVATION VERIFICATION 02/25/09
Page 1 of 1

ANALYTICAL RESOURCES INCORPORATED

ARI Job No: **0010**

Inquiry Number: NONE
Analysis Requested: 02/24/09
Contact: Ernst, Will
Client: The Boeing Company
Logged by: JW
Sample Set Used: Yes-481
Validatable Package: ~~No~~ Yes
Deliverables:

PC: Kelly
VTSR: 02/24/09

Project #:
Project: BP2 SOURCE CONTROL
Sample Site:
SDG No:
Analytical Protocol: In-house

LOGNUM ARI ID	CLIENT ID	CN >12	WAD >12	NH3 <2	COD <2	FOG <2	MET <2	PHEN <2	PHOS <2	TKN <2	NO23 <2	TOC <2	S2 >9	DMET FLT	DOC FLT	PARAMETER	ADJUSTED TO	LOT NUMBER	AMOUNT ADDED	DATE/BY
09-5411 **0010A**	PL2SC-W-J249-022309						DIS ok							Y						

Checked By JW Date 2/25/09

Analytical Resources, Incorporated
Analytical Chemists and Consultants

Cooler Receipt Form

ARI Client: Boeing Project Name: BP2 Source Control

COC No: _____ Delivered by: Hand

Assigned ARI Job No: AD10 Tracking No: _____

Preliminary Examination Phase:

Were intact, properly signed and dated custody seals attached to the outside of to cooler?	YES	(NO)
Were custody papers included with the cooler?	(YES)	NO
Were custody papers properly filled out (ink, signed, etc.)	(YES)	NO
Record cooler temperature (recommended 2.0-6.0 °C for chemistry	2.6 °C	

Cooler Accepted by: JW Date: 2/24/09 Time: 1046

Complete custody forms and attach all shipping documents

Log-In Phase:

Was a temperature blank included in the cooler?	YES	(NO)
What kind of packing material was used?	ICE	
Was sufficient ice used (if appropriate)?	(YES)	NO
Were all bottles sealed in individual plastic bags?	YES	(NO)
Did all bottle arrive in good condition (unbroken)?	(YES)	NO
Were all bottle labels complete and legible?	(YES)	NO
Did all bottle labels and tags agree with custody papers?	(YES)	NO
Were all bottles used correct for the requested analyses?	(YES)	NO
Do any of the analyses (bottles) require preservation? (attach preservation checklist)	(YES)	NO
Were all VOC vials free of air bubbles? (NA)	YES	NO
Was sufficient amount of sample sent in each bottle?	(YES)	NO

Samples Logged by: JW Date: 2/25/09 Time: 0750

*** Notify Project Manager of discrepancies or concerns ***

Explain discrepancies or negative responses:

By: Date:

Chain of Custody Record & Laboratory Analysis Request

ARI Assigned Number: 0085+0087	Turn-around Requested:	Page: /	of
ARI Client Company: BOEING	Phone:	Date:	Ice Present?
Client Contact: WILL ERNST		No. of Coolers:	Cooler Temps:
Client Project Name: BP2 Source Control			
Client Project #:	Samplers: Liz Shea		

Analytical Resources, Incorporated
Analytical Chemists and Consultants
4611 South 134th Place, Suite 100
Tukwila, WA 98168
206-695-6200 206-695-6201 (fax)

Sample ID	Date	Time	Matrix	No. Containers	Analysis Requested: SMS metals Dissolved	Analysis Requested: Dissolved LL Hg	Analysis Requested: PCBs	Notes/Comments
PL2SC-EB1-022709	2/27/09	1130	W	4	+	+	+	⊗ = field filtered
PL2SC-SS-J249-022709	2/27/09	1230	filter bag	1				HOLD
Sample IDs Sited per Golder 2/27/09 JD								

Comments/Special Instructions	Relinquished by: (Signature)	Printed Name:	Company:	Date & Time:	Received by: (Signature)	Printed Name:	Company:	Date & Time:	Relinquished by: (Signature)	Printed Name:	Company:	Date & Time:	Received by: (Signature)	Printed Name:	Company:	Date & Time:
SMS metals as per QAPP.	Elizabeth Shea	Liz Shea	Golder	1402 2/27/09		Mikka Mulumba	ARI	2/27/2009 1402								

Limits of Liability: *ARI will perform all requested services in accordance with appropriate methodology following ARI Standard Operating Procedures and the ARI Quality Assurance Program. This program meets standards for the industry. The total liability of ARI, its officers, agents, employees, or successors, arising out of or in connection with the requested services, shall not exceed the Invoiced amount for said services. The acceptance by the client of a proposal for services by ARI release ARI from any liability in excess thereof, not withstanding any provision to the contrary in any contract, purchase order or co-signed agreement between ARI and the Client.*

Sample Retention Policy: All samples submitted to ARI will be appropriately discarded no sooner than 90 days after receipt or 60 days after submission of hardcopy data, whichever is longer, unless alternate retention schedules have been established by work-order or contract.

PRESERVATION VERIFICATION 02/27/09
Page 1 of 1

ANALYTICAL RESOURCES INCORPORATED

ARI Job No: **0085**

Inquiry Number: NONE
Analysis Requested: 02/27/09
Contact: Ernst, Will
Client: The Boeing Company
Logged by: MM
Sample Set Used: Yes-481
Validatable Package: ~~No~~ YES
Deliverables:

PC: Kelly
VTSR: 02/27/09

Project #:
Project: BP2 SOURCE CONTROL
Sample Site:
SDG No:
Analytical Protocol: In-house

LOGNUM ARI ID	CLIENT ID	CN >12	WAD >12	NH3 <2	COD <2	FOG <2	MET <2	PHEN <2	PHOS <2	TKN <2	NO23 <2	TOC <2	S2 >9	DMET FLT	DOC FLT	PARAMETER	ADJUSTED TO	LOT NUMBER	AMOUNT ADDED	DATE/BY
09-5755 **0085A**	PL2SC-EBI-022709						DES							Y						

Checked By MM Date 2/27/2009

Analytical Resources, Incorporated
Analytical Chemists and Consultants

Cooler Receipt Form

ARI Client: BOEING Project Name: _____

COC No: NA Delivered by: HAND

Assigned ARI Job No: 6085 Tracking No: NA

Preliminary Examination Phase:

Were intact, properly signed and dated custody seals attached to the outside of to cooler?	YES	(NO)
Were custody papers included with the cooler?	(YES)	NO
Were custody papers properly filled out (ink, signed, etc.)	(YES)	NO
Record cooler temperature (recommended 2.0-6.0 °C for chemistry	12.6 °C	

Cooler Accepted by: MM Date: 2/27/2009 Time: 1402

Complete custody forms and attach all shipping documents

Log-In Phase:

Was a temperature blank included in the cooler?	YES	(NO)
What kind of packing material was used?	IN	
Was sufficient ice used (if appropriate)?	(YES)	NO
Were all bottles sealed in individual plastic bags?	YES	(NO)
Did all bottle arrive in good condition (unbroken)?	(YES)	NO
Were all bottle labels complete and legible?	(YES)	NO
Did all bottle labels and tags agree with custody papers?	(YES)	NO
Were all bottles used correct for the requested analyses?	(YES)	NO
Do any of the analyses (bottles) require preservation? (attach preservation checklist)	YES	(NO)
Were all VOC vials free of air bubbles? (NA)	YES	NO
Was sufficient amount of sample sent in each bottle?	(YES)	NO

Samples Logged by: MM Date: 2/27/2009 Time: 1426

***** Notify Project Manager of discrepancies or concerns *****

Explain discrepancies or negative responses:

Sample bottles read sampling time as 1230, COC read Sampling time as 1130

By: MM Date: 2/27/09

Chain of Custody Record & Laboratory Analysis Request

ARI Assigned Number:	Turn-around Requested:	Page: 1 of 1	
ARI Client Company: BOEING	Phone:	Date:	Ice Present?
Client Contact: WILL ERNST		No. of Coolers:	Cooler Temps:
Client Project Name: BP2 Source Control			
Client Project #:	Samplers: Liz Shea		

Analytical Resources, Incorporated
Analytical Chemists and Consultants
4611 South 134th Place, Suite 100
Tukwila, WA 98168
206-695-6200 206-695-6201 (fax)

Sample ID	Date	Time	Matrix	No. Containers	Analysis Requested: SMS Metals Diss. Solved	[redacted]	PCBS						Notes/Comments
PL2SC-EB1-022709	2/27/09	1130	W	4	⊗		X						⊗ = field filtered
PL2SC-SS-J249-022709	"	1230	filter bag	1	—		—						HOLD

Sample IDs filed per Golder 2/27/09 KB

Comments/Special Instructions	Relinquished by: (Signature)	Received by: (Signature)	Relinquished by: (Signature)	Received by: (Signature)
SMS metals as per QAPP.	Elizabeth Shea			
	Printed Name: Liz Shea	Printed Name: Mikka Mulumba	Printed Name:	Printed Name:
	Company: Golder	Company: ARI	Company:	Company:
	Date & Time: 1402 2/27/09	Date & Time: 2/27/2009 1402	Date & Time:	Date & Time:

Limits of Liability: *ARI will perform all requested services in accordance with appropriate methodology following ARI Standard Operating Procedures and the ARI Quality Assurance Program. This program meets standards for the industry. The total liability of ARI, its officers, agents, employees, or successors, arising out of or in connection with the requested services, shall not exceed the Invoiced amount for said services. The acceptance by the client of a proposal for services by ARI release ARI from any liability in excess thereof, not withstanding any provision to the contrary in any contract, purchase order or co-signed agreement between ARI and the Client.*

Sample Retention Policy: All samples submitted to ARI will be appropriately discarded no sooner than 90 days after receipt or 60 days after submission of hardcopy data, whichever is longer, unless alternate retention schedules have been established by work-order or contract.

PRESERVATION VERIFICATION 02/27/09
Page 1 of 1

ANALYTICAL RESOURCES INCORPORATED

ARI Job No: **0087**

Inquiry Number: NONE
Analysis Requested: 02/27/09
Contact: Ernst, Will
Client: The Boeing Company
Logged by: MM
Sample Set Used: Yes-481
Validatable Package: No
Deliverables:

PC: Kelly
VTSR: 02/27/09

Project #:
Project: BP2 SOURCE CONTROL
Sample Site:
SDG No:
Analytical Protocol: In-house

LOGNUM ARI ID	CLIENT ID	CN >12	WAD >12	NH3 <2	COD <2	FOG <2	MET <2	PHEN <2	PHOS <2	TKN <2	NO23 <2	TOC <2	S2 >9	DMET FLT	DOC FLT	PARAMETER	ADJUSTED TO	LOT NUMBER	AMOUNT ADDED	DATE/BY
09-5759 **0087A**	PL2SC-EBI-022709						DIS OK							Y						

Checked By UR Date 2/27/2009.

Analytical Resources, Incorporated
Analytical Chemists and Consultants

Cooler Receipt Form

ARI Client: [redacted] Project Name: _____

COC No: NA Delivered by: HAND

Assigned ARI Job No: 0087 Tracking No: NA

Preliminary Examination Phase:

Were intact, properly signed and dated custody seals attached to the outside of to cooler?	YES	(NO)
Were custody papers included with the cooler?	(YES)	NO
Were custody papers properly filled out (ink, signed, etc.)	(YES)	NO
Record cooler temperature (recommended 2.0-6.0 °C for chemistry	12.6 °C	

Cooler Accepted by: MM Date: 2/27/2009 Time: 1402

Complete custody forms and attach all shipping documents

Log-In Phase:

Was a temperature blank included in the cooler?	YES	(NO)
What kind of packing material was used?	N	
Was sufficient ice used (if appropriate)?	(YES)	NO
Were all bottles sealed in individual plastic bags?	YES	(NO)
Did all bottle arrive in good condition (unbroken)?	(YES)	NO
Were all bottle labels complete and legible?	(YES)	NO
Did all bottle labels and tags agree with custody papers?	YES	(NO)
Were all bottles used correct for the requested analyses?	(YES)	NO
Do any of the analyses (bottles) require preservation? (attach preservation checklist)	(YES)	NO
Were all VOC vials free of air bubbles? (NA)	YES	NO
Was sufficient amount of sample sent in each bottle?	(YES)	NO

Samples Logged by: UN Date: 2/27/2009 Time: 1452

***** Notify Project Manager of discrepancies or concerns *****

Explain discrepancies or negative responses:

Sample bottle reads sampling time as 1230, COC reads sampling time as 1130

By: UN Date: 2/27/09

Case Narrative

prepared
for

THE BOEING COMPANY

Project: Plant 2 Source Control

ARI JOB NOS.: OO10, OO11, OO85 AND OO87

prepared
by

Analytical Resources, Inc.

Case Narrative

Project: Boeing Plant 2 Source Control
ARI IDs: OO10 & OO11 and OO85 & OO87
Matrix: Water
Date: March 13, 2009

Sample Receipt Information

One water sample was received in good condition at Analytical Resources, Inc. (ARI) on February 24, 2009 under ARI sample delivery groups OO10 and OO11 and one water sample and a filter bag were received on 2/27/09 under ARI delivery groups OO85 and OO87. The filter bag was placed on hold pending further instructions. The cooler temperatures, as measured by IR thermometer, were 12.6 and 2.6°C. For further details regarding sample receipt, please refer to the Cooler Receipt Form.

Select samples were analyzed for the parameters listed below, as requested on the Chain of Custody.

PCBs by Method 8082:

The samples were extracted on 03/3/09 and analyzed on 03/4/09 within the method recommended holding times.

Initial calibration (s): All analytes of interest were within method acceptance criteria.

Continuing calibration (s): Are in control.

Samples: There were no anomalies associated with these samples.

Surrogates: All surrogate recoveries were in control.

LCS(s): All percent recoveries for the analytes of interest were within compliance.

Method Blank: The method blank was free of contamination.

Dissolved Metals by Methods 6010B and 7000 series

The samples were digested on 3/2/09 and 3/3/09. The digests were analyzed on 3/3/09 and 3/5/09 within the method recommended holding times.

Replicate(s): All percent recoveries were within compliance.

Samples: No anomalies were encountered for these samples.

LCS/Blank Spike(s): All percent recoveries were within compliance.

Method Blank(s): Are in control.

Case Narrative

Project: Boeing Plant 2 Source Control
ARI IDs: OO10 & OO11 and OO85 & OO87
Matrix: Water
Date: March 13, 2009

Dissolved Low-Level Mercury by Method SW7470A

The samples were digested on 2/26/09 and 3/3/09. The digests were analyzed on 2/26/09 and 3/11/09 within the method recommended holding times.

Replicate(s): All percent recoveries were within compliance.

Samples: No anomalies were encountered for these samples.

LCS/Blank Spike(s): All percent recoveries were within compliance.

Method Blank(s): Are in control.

Standard Reference: All percent recoveries were within compliance.

Data Reporting Qualifiers

Effective 12/28/04

Inorganic Data

U	Indicates that the target analyte was not detected at the reported concentration
*	Duplicate RPD is not within established control limits
B	Reported value is less than the CRDL but ≥ the Reporting Limit
N	Matrix Spike recovery not within established control limits
NA	Not Applicable, analyte not spiked
H	The natural concentration of the spiked element is so much greater than the concentration spiked that an accurate determination of spike recovery is not possible
L	Analyte concentration is ≤5 times the Reporting Limit and the replicate control limit defaults to ±1 RL instead of the normal 20% RPD

Organic Data

U	Indicates that the target analyte was not detected at the reported concentration
*	Flagged value is not within established control limits
B	Analyte detected in an associated Method Blank at a concentration greater than one-half of ARI's Reporting Limit or 5% of the regulatory limit or 5% of the analyte concentration in the sample.
J	Estimated concentration when the value is less than ARI's established reporting limits
D	The spiked compound was not detected due to sample extract dilution
NR	Spiked compound recovery is not reported due to chromatographic interference
E	Estimated concentration calculated for an analyte response above the valid instrument calibration range. A dilution is required to obtain an accurate quantification of the analyte.
S	Indicates an analyte response that has saturated the detector. The calculated concentration is not valid; a dilution is required to obtain valid quantification of the analyte
NA	The flagged analyte was not analyzed for
NS	The flagged analyte was not spiked into the sample

M Estimated value for an analyte detected and confirmed by an analyst but with low spectral match parameters. This flag is used only for GC-MS analyses

M2 The sample contains PCB congeners that do not match any standard Aroclor pattern. The PCBs are identified and quantified as the Aroclor whose pattern most closely matches that of the sample. The reported value is an estimate.

N The analysis indicates the presence of an analyte for which there is presumptive evidence to make a "tentative identification"

Y The analyte is not detected at or above the reported concentration. The reporting limit is raised due to chromatographic interference. The Y flag is equivalent to the U flag with a raised reporting limit.

C The analyte was positively identified on only one of two chromatographic columns. Chromatographic interference prevented a positive identification on the second column

P The analyte was detected on both chromatographic columns but the quantified values differ by ≥40% RPD with no obvious chromatographic interference

Geotechnical Data

A The total of all fines fractions. This flag is used to report total fines when only sieve analysis is requested and balances total grain size with sample weight.

F Samples were frozen prior to particle size determination

SM Sample matrix was not appropriate for the requested analysis. This normally refers to samples contaminated with an organic product that interferes with the sieving process and/or moisture content, porosity and saturation calculations

SS Sample did not contain the proportion of "fines" required to perform the pipette portion of the grain size analysis

W Weight of sample in some pipette aliquots was below the level required for accurate weighting

LCS SOLUTIONS

02/27/09

LABE	SOLN ID	TEST	CONC. UG/ML	SOLVENT	EXP.
1	1549-3	PCB	20	ACETONE	10/10/09
2#	1472-3	BCOC PEST	10	ACETONE	07/20/08
3	1579-3	PEST	02/04/20	ACETONE	09/23/09
4	1576-3	LOW PEST	0.2/0.4/2	ACETONE	07/31/09
5	1580-2	EPH	1500	MECL2	01/29/10
6	1559-2	PCP	12.5/125	ACETONE	11/05/09
7	1581-4	ABN	100	ACETONE	08/01/09
8	1566-1	TBT	2.5	MECL2	12/04/09
9	1567-3	PORE TBT	.125/.25	MECL2	12/04/09
10	1578-3	ABN ACID	100/200	MEOH	10/21/09
11	1563-3	TPHD	15000	ACETONE	11/20/09
12	1583-1	ABN BASE	200	ACETONE	02/05/10
13	1573-2	LOW PCB	2	ACETONE	10/10/09
14	1547-1	LOW ABN ACID	10/20	MEOH	04/10/09
15*	1452-1	SIM PNA	15/75	MEOH	04/09/09
16*	1502-2	DIOXANE	100	MEOH	02/26/10
17	1516-2	1248 PCB	20	ACETONE	05/07/09
18	1514-4	LOW SIM PNA	1.5/7.5	ACETONE	04/24/09
19	1574-4	AK103	7500	MECL2	12/02/09
20	1572-2	PNA	100	ACETONE	12/26/09
21*	1414-4	SKY/BHT	100	MEOH	04/08/09
22	1570-1	HERB	12.5/12500	MEOH	12/22/09
23	1505-1	LOW ABN BASE	20	MEOH	03/20/09
24	1573-4	LOW ABN	10	ACETONE	08/01/09
25#	1481-1	DIPHENYL	100	MEOH	07/20/08
26*	1545-2	OP-PEST	25	MEOH	02/16/10
27#	1495-1	STEROLS	200	MEOH	12/29/08
28#	1494-1	ADD. PEST	4	ACETONE	01/23/09
29#	1496-3	DECANES	100	MEOH	02/12/09
30	1497-2	EDB/DBCP	2	ACETONE	02/12/09
31	1510-3	TERPINEOL	100	MEOH	03/21/09

LCS SOLUTIONS

02/27/09

32	1576-2	GUAIACOL	50-200	ACETONE	06/05/09
33	1522-1	RESIN ACID	250	ACETONE	06/11/09
34	1530-2	CONGENERS	1	ACETONE	07/23/09
50	1571-1	FULL RESIN	250	ACETONE	06/10/09
*=REVERIFIED SOLUTION					
#=PROJECT SPECIFIC					

SURR SOLUTIONS

02/27/09

LABEL	SOLN ID	TEST	CONC. UG/ML	SOLVENT	EXP.
A	1584-5	ABN	100/150	MEOH	02/18/10
B	1572-1	SIM PNA	15/75	MEOH	08/28/09
C	1559-1	SIM ABN	25/37.5	MEOH	03/13/09
D	1573-3	LOW PCB	0.2	ACETONE	07/31/09
E*	1478-1	HERB	62.5	MEOH	09/21/09
F	1574-3	PCP	12.5	ACETONE	01/06/10
G*	1534-1	1,4DIOXANE	100	MEOH	02/26/10
H*	1545-1	OP-PEST	25	MEOH	02/16/10
I	1559-4	LOW S. PNA	1.5	MEOH	08/28/09
J	1566-5	TBT-PORE	0.125	MECL2	12/04/09
K	1538-1	MED PCB	20	ACETONE	07/31/09
L	1584-4	TBT	2.5	MECL2	12/04/09
M	1578-1	EPH	1500	MECL2	12/09/09
N	1538-2	PCB	2	ACETONE	07/31/09
O	1567-4	TPH	450	MECL2	09/24/09
P	1560-3	HCID	2250	MECL2	09/24/09
Q	1497-3	EDB	2	ACETONE	02/12/09
R	1521-4	RESIN ACID	250	ACETONE	06/11/09
S	1568-5	PBDE	.25	MEOH	12/11/09
T	*reverified solution				
U					
V					
W					
X					
Y					
Z					

Data Summary Package

prepared
for

THE BOEING COMPANY

Project: Plant 2 Source Control

ARI JOB NOS.: OO10, OO11, OO85 AND OO87

prepared
by

Analytical Resources, Inc.

PCBS

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PCB by GC/ECD Method SW8082
Page 1 of 1

Sample ID: PL2SC-EBI-022709
SAMPLE

Lab Sample ID: 0085A
LIMS ID: 09-5755
Matrix: Water
Data Release Authorized:
Reported: 03/06/09

QC Report No: 0085-The Boeing Company
Project: BP2 SOURCE CONTROL

Date Sampled: 02/27/09
Date Received: 02/27/09

Date Extracted: 03/03/09
Date Analyzed: 03/04/09 18:01
Instrument/Analyst: ECD5/JGR
GPC Cleanup: No
Sulfur Cleanup: No

Sample Amount: 500 mL
Final Extract Volume: 5.0 mL
Dilution Factor: 1.00
Silica Gel: No
Acid Cleanup: No

CAS Number	Analyte	RL	Result
12674-11-2	Aroclor 1016	1.0	< 1.0 U
53469-21-9	Aroclor 1242	1.0	< 1.0 U
12672-29-6	Aroclor 1248	1.0	< 1.0 U
11097-69-1	Aroclor 1254	1.0	< 1.0 U
11096-82-5	Aroclor 1260	1.0	< 1.0 U
11104-28-2	Aroclor 1221	1.0	< 1.0 U
11141-16-5	Aroclor 1232	1.0	< 1.0 U

Reported in µg/L (ppb)

PCB Surrogate Recovery

Decachlorobiphenyl	90.5%
Tetrachlorometaxylene	71.5%

FORM I

ANALYTICAL RESOURCES INCORPORATED

SW8082/PCB WATER SURROGATE RECOVERY SUMMARY

Matrix: Water

QC Report No: 0085-The Boeing Company
Project: BP2 SOURCE CONTROL

Client ID	DCBP % REC	DCBP LCL-UCL	TCMX % REC	TCMX LCL-UCL	TOT OUT
MB-030309	76.8%	47-101	74.0%	61-104	0
LCS-030309	92.5%	47-101	70.8%	61-104	0
LCSD-030309	89.5%	47-101	62.5%	61-104	0
PL2SC-EBI-022709	90.5%	42-120	71.5%	55-102	0

Prep Method: SW3510C
Log Number Range: 09-5755 to 09-5755

FORM-II SW8082

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PCB by GC/ECD Method SW8082
Page 1 of 1

Sample ID: LCS-030309
LCS/LCSD

Lab Sample ID: LCS-030309
LIMS ID: 09-5755
Matrix: Water
Data Release Authorized:
Reported: 03/06/09

QC Report No: 0085-The Boeing Company
Project: BP2 SOURCE CONTROL

Date Sampled: NA
Date Received: NA

Date Extracted LCS/LCSD: 03/03/09

Date Analyzed LCS: 03/04/09 17:27
LCSD: 03/04/09 17:44
Instrument/Analyst LCS: ECD5/JGR
LCSD: ECD5/JGR
GPC Cleanup: No
Sulfur Cleanup: No

Sample Amount LCS: 500 mL
LCSD: 500 mL
Final Extract Volume LCS: 5.0 mL
LCSD: 5.0 mL
Dilution Factor LCS: 1.00
LCSD: 1.00
Silica Gel: No
Acid Cleanup: No

Analyte	LCS	Spike Added-LCS	LCS Recovery	LCSD	Spike Added-LCSD	LCSD Recovery	RPD
Aroclor 1016	4.68	5.00	93.6%	4.30	5.00	86.0%	8.5%
Aroclor 1260	4.84	5.00	96.8%	4.69	5.00	93.8%	3.1%

PCB Surrogate Recovery

	LCS	LCSD
Decachlorobiphenyl	92.5%	89.5%
Tetrachlorometaxylene	70.8%	62.5%

Results reported in µg/L
RPD calculated using sample concentrations per SW846.

FORM III

PCB METHOD BLANK SUMMARY

BLANK NO.

OO85MBW1

Lab Name: ANALYTICAL RESOURCES, INC
Client: THE BOEING COMPANY

ARI Job No.: OO85
Project: BP2 SOURCE CONTROL

Lab Sample ID: OO85MBW1
Lab File ID: 0304B024

Date Extracted: 03/03/09
Matrix: LIQUID

Date Analyzed: 03/04/09
Instrument ID: ECD5

Time Analyzed: 1710
GC Columns: ZB5/ZB35

THIS METHOD BLANK APPLIES TO THE FOLLOWING SAMPLES, MS and MSD:

	CLIENT SAMPLE NO.	LAB SAMPLE ID	DATE ANALYZED
01	OO85LCSW1	OO85LCSW1	03/04/09
02	OO85LCSDW1	OO85LCSDW1	03/04/09
03	PL2SC-EBI-022709	OO85A	03/04/09

ALL RUNS ARE DUAL COLUMN

FORM IV PCB

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PCB by GC/ECD Method SW8082

Sample ID: MB-030309
METHOD BLANK

Lab Sample ID: MB-030309
LIMS ID: 09-5755
Matrix: Water
Data Release Authorized:
Reported: 03/06/09

QC Report No: 0085-The Boeing Company
Project: BP2 SOURCE CONTROL

Date Sampled: NA
Date Received: NA

Date Extracted: 03/03/09
Date Analyzed: 03/04/09 17:10
Instrument/Analyst: ECD5/JGR
GPC Cleanup: No
Sulfur Cleanup: No

Sample Amount: 500 mL
Final Extract Volume: 5.0 mL
Dilution Factor: 1.00
Silica Gel: No
Acid Cleanup: No

CAS Number	Analyte	RL	Result
12674-11-2	Aroclor 1016	1.0	< 1.0 U
53469-21-9	Aroclor 1242	1.0	< 1.0 U
12672-29-6	Aroclor 1248	1.0	< 1.0 U
11097-69-1	Aroclor 1254	1.0	< 1.0 U
11096-82-5	Aroclor 1260	1.0	< 1.0 U
11104-28-2	Aroclor 1221	1.0	< 1.0 U
11141-16-5	Aroclor 1232	1.0	< 1.0 U

Reported in µg/L (ppb)

PCB Surrogate Recovery	
Decachlorobiphenyl	76.8%
Tetrachlorometaxylene	74.0%

METALS

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
DISSOLVED METALS
Page 1 of 1

Sample ID: PL2SC-W-J249-022309
SAMPLE

Lab Sample ID: OO11A
LIMS ID: 09-5417
Matrix: Water
Data Release Authorized:
Reported: 03/06/09

QC Report No: OO11-The Boeing Company
Project: BP2 SOURCE CONTROL

Date Sampled: 02/23/09
Date Received: 02/24/09

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	RL	µg/L	Q
7000A	03/02/09	7060A	03/05/09	7440-38-2	Arsenic	1	1	U
6010B	03/02/09	6010B	03/03/09	7440-43-9	Cadmium	2	2	U
6010B	03/02/09	6010B	03/03/09	7440-47-3	Chromium	5	5	U
6010B	03/02/09	6010B	03/03/09	**7440-50-8**	**Copper**	2	**8**	
7000A	03/02/09	7421	03/03/09	7439-92-1	Lead	1	1	U
6010B	03/02/09	6010B	03/03/09	7440-22-4	Silver	3	3	U
6010B	03/02/09	6010B	03/03/09	**7440-66-6**	**Zinc**	10	**60**	

U-Analyte undetected at given RL
RL-Reporting Limit

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
DISSOLVED METALS

Sample ID: PL2SC-W-J249-022309
MATRIX SPIKE

Lab Sample ID: 0011A
LIMS ID: 09-5417
Matrix: Water
Data Release Authorized:
Reported: 03/06/09

QC Report No: 0011-The Boeing Company
Project: BP2 SOURCE CONTROL

Date Sampled: 02/23/09
Date Received: 02/24/09

MATRIX SPIKE QUALITY CONTROL REPORT

Analyte	Analysis Method	Sample	Spike	Spike Added	% Recovery	Q
Arsenic	7060A	1.00 U	23.0	20.0	115%	
Cadmium	6010B	2.00 U	530	500	106%	
Chromium	6010B	5.00 U	491	500	98.2%	
Copper	6010B	8.35	505	500	99.3%	
Lead	7421	1.00 U	20.0	20.0	100%	
Silver	6010B	3.00 U	494	500	98.8%	
Zinc	6010B	64.2	590	500	105%	

Reported in µg/L

N-Control Limit Not Met
H-% Recovery Not Applicable, Sample Concentration Too High
NA-Not Applicable, Analyte Not Spiked

Percent Recovery Limits: 75-125%

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
DISSOLVED METALS

Sample ID: PL2SC-W-J249-022309
DUPLICATE

Lab Sample ID: OO11A
LIMS ID: 09-5417
Matrix: Water
Data Release Authorized:
Reported: 03/06/09

QC Report No: OO11-The Boeing Company
Project: BP2 SOURCE CONTROL

Date Sampled: 02/23/09
Date Received: 02/24/09

MATRIX DUPLICATE QUALITY CONTROL REPORT

Analyte	Analysis Method	Sample	Duplicate	RPD	Control Limit	Q
Arsenic	7060A	1 U	1 U	0.0%	+/- 1	L
Cadmium	6010B	2 U	2 U	0.0%	+/- 2	L
Chromium	6010B	5 U	5 U	0.0%	+/- 5	L
Copper	6010B	8	9	11.8%	+/- 2	L
Lead	7421	1 U	1 U	0.0%	+/- 1	L
Silver	6010B	3 U	3 U	0.0%	+/- 3	L
Zinc	6010B	60	70	15.4%	+/- 20%	

Reported in µg/L

*-Control Limit Not Met
L-RPD Invalid, Limit = Detection Limit

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
DISSOLVED METALS

Sample ID: LAB CONTROL

Lab Sample ID: 0011LCS
LIMS ID: 09-5417
Matrix: Water
Data Release Authorized:
Reported: 03/06/09

QC Report No: 0011-The Boeing Company
Project: BP2 SOURCE CONTROL

Date Sampled: NA
Date Received: NA

BLANK SPIKE QUALITY CONTROL REPORT

Analyte	Analysis Method	Spike Found	Spike Added	% Recovery	Q
Arsenic	7060A	21	20	105%	
Cadmium	6010B	533	500	107%	
Chromium	6010B	488	500	97.6%	
Copper	6010B	503	500	101%	
Lead	7421	18	20	90.0%	
Silver	6010B	441	500	88.2%	
Zinc	6010B	500	500	100%	

Reported in µg/L

N-Control limit not met
Control Limits: 80-120%

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
DISSOLVED METALS

Sample ID: METHOD BLANK

Lab Sample ID: 0011MB
LIMS ID: 09-5417
Matrix: Water
Data Release Authorized:
Reported: 03/06/09

QC Report No: 0011-The Boeing Company
Project: BP2 SOURCE CONTROL

Date Sampled: NA
Date Received: NA

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	RL	µg/L	Q
7000A	03/02/09	7060A	03/05/09	7440-38-2	Arsenic	1	1	U
6010B	03/02/09	6010B	03/03/09	7440-43-9	Cadmium	2	2	U
6010B	03/02/09	6010B	03/03/09	7440-47-3	Chromium	5	5	U
6010B	03/02/09	6010B	03/03/09	7440-50-8	Copper	2	2	U
7000A	03/02/09	7421	03/03/09	7439-92-1	Lead	1	1	U
6010B	03/02/09	6010B	03/03/09	7440-22-4	Silver	3	3	U
6010B	03/02/09	6010B	03/03/09	7440-66-6	Zinc	10	10	U

U-Analyte undetected at given RL
RL-Reporting Limit

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
DISSOLVED METALS
Page 1 of 1

Sample ID: PL2SC-EBI-022709
SAMPLE

Lab Sample ID: OO85A
LIMS ID: 09-5755
Matrix: Water
Data Release Authorized:
Reported: 03/06/09

QC Report No: OO85-The Boeing Company
Project: BP2 SOURCE CONTROL

Date Sampled: 02/27/09
Date Received: 02/27/09

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	RL	µg/L	Q
7000A	03/03/09	7060A	03/05/09	7440-38-2	Arsenic	1	1	U
6010B	03/03/09	6010B	03/05/09	7440-43-9	Cadmium	2	2	U
6010B	03/03/09	6010B	03/05/09	7440-47-3	Chromium	5	5	U
6010B	03/03/09	6010B	03/05/09	7440-50-8	Copper	2	2	U
7000A	03/03/09	7421	03/03/09	7439-92-1	Lead	1	1	U
6010B	03/03/09	6010B	03/05/09	7440-22-4	Silver	3	3	U
6010B	03/03/09	6010B	03/05/09	7440-66-6	Zinc	10	10	U

U-Analyte undetected at given RL
RL-Reporting Limit

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
DISSOLVED METALS
Page 1 of 1

Sample ID: LAB CONTROL

Lab Sample ID: 0085LCS
LIMS ID: 09-5755
Matrix: Water
Data Release Authorized:
Reported: 03/06/09

QC Report No: 0085-The Boeing Company
Project: BP2 SOURCE CONTROL

Date Sampled: NA
Date Received: NA

BLANK SPIKE QUALITY CONTROL REPORT

Analyte	Analysis Method	Spike Found	Spike Added	% Recovery	Q
Arsenic	7060A	21	20	105%	
Cadmium	6010B	519	500	104%	
Chromium	6010B	502	500	100%	
Copper	6010B	495	500	99.0%	
Lead	7421	19	20	95.0%	
Silver	6010B	440	500	88.0%	
Zinc	6010B	520	500	104%	

Reported in µg/L

N-Control limit not met
Control Limits: 80-120%

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
DISSOLVED METALS **Sample ID: METHOD BLANK**

Lab Sample ID: OO85MB
LIMS ID: 09-5755
Matrix: Water
Data Release Authorized:
Reported: 03/06/09

QC Report No: OO85-The Boeing Company
Project: BP2 SOURCE CONTROL

Date Sampled: NA
Date Received: NA

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	RL	µg/L	Q
7000A	03/03/09	7060A	03/05/09	7440-38-2	Arsenic	1	1	U
6010B	03/03/09	6010B	03/05/09	7440-43-9	Cadmium	2	2	U
6010B	03/03/09	6010B	03/05/09	7440-47-3	Chromium	5	5	U
6010B	03/03/09	6010B	03/05/09	7440-50-8	Copper	2	2	U
7000A	03/03/09	7421	03/03/09	7439-92-1	Lead	1	1	U
6010B	03/03/09	6010B	03/05/09	7440-22-4	Silver	3	3	U
6010B	03/03/09	6010B	03/05/09	7440-66-6	Zinc	10	10	U

U-Analyte undetected at given RL
RL-Reporting Limit

LOW-LEVEL MERCURY

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
Dissolved Mercury by Method SW7470A

Data Release Authorized:
Reported: 02/27/09
Date Received: 02/24/09
Page 1 of 1

QC Report No: 0010-The Boeing Company
Project: BP2 SOURCE CONTROL

Client/ ARI ID	Date Sampled	Matrix	Prep Date Anal Date	RL	Result
PL2SC-W-J249-022309 0010A 09-5411	02/23/09	Water	02/26/09 02/26/09	20.0	20.0 U
MB-022609 Method Blank	NA	Water	02/26/09 02/26/09	20.0	20.0 U

Reported in ng/L

RL-Analytical reporting limit
U-Undetected at reported detection limit

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
DISSOLVED METALS

Sample ID: PL2SC-W-J249-022309
DUPLICATE

Lab Sample ID: OO10A
LIMS ID: 09-5411
Matrix: Water
Data Release Authorized:
Reported: 02/27/09

QC Report No: OO10-The Boeing Company
Project: BP2 SOURCE CONTROL

Date Sampled: 02/23/09
Date Received: 02/24/09

MATRIX DUPLICATE QUALITY CONTROL REPORT

Analyte	Analysis Method	Sample	Duplicate	RPD	Control Limit	Q
Mercury	7470A	20.0 U	20.0 U	0.0%	+/- 20.0	L

Reported in ng/L

*-Control Limit Not Met
L-RPD Invalid, Limit = Detection Limit

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
DISSOLVED METALS
Page 1 of 1

Sample ID: PL2SC-W-J249-022309
MATRIX SPIKE

Lab Sample ID: 0010A
LIMS ID: 09-5411
Matrix: Water
Data Release Authorized:
Reported: 02/27/09

QC Report No: 0010-The Boeing Company
Project: BP2 SOURCE CONTROL

Date Sampled: 02/23/09
Date Received: 02/24/09

MATRIX SPIKE QUALITY CONTROL REPORT

Analyte	Analysis Method	Sample	Spike	Spike Added	% Recovery	Q
Mercury	7470A	20.0 U	105	100	105%	

Reported in ng/L

N-Control Limit Not Met
H-% Recovery Not Applicable, Sample Concentration Too High
NA-Not Applicable, Analyte Not Spiked

Percent Recovery Limits: 75-125%

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
DISSOLVED METALS

Sample ID: LAB CONTROL

Lab Sample ID: 0010LCS
LIMS ID: 09-5411
Matrix: Water
Data Release Authorized:
Reported: 02/27/09

QC Report No: 0010-The Boeing Company
Project: BP2 SOURCE CONTROL

Date Sampled: NA
Date Received: NA

BLANK SPIKE QUALITY CONTROL REPORT

Analyte	Analysis Method	Spike Found	Spike Added	% Recovery	Q
Mercury	7470A	176	200	88.0%	

Reported in ng/L

N-Control limit not met
Control Limits: 80-120%

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
Dissolved Mercury by Method SW7470A

Data Release Authorized:
Reported: 03/13/09
Date Received: 02/27/09

QC Report No: 0087-The Boeing Company
Project: BP2 SOURCE CONTROL

Client/ ARI ID	Date Sampled	Matrix	Prep Date Anal Date	RL	Result
PL2SC-EBI-022709 0087A 09-5759	02/27/09	Water	03/03/09 03/11/09	20.0	20.0 U
MB-030309 Method Blank	NA	Water	03/03/09 03/11/09	20.0	20.0 U

Reported in ng/L

RL-Analytical reporting limit
U-Undetected at reported detection limit

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
DISSOLVED METALS
Page 1 of 1

Sample ID: PL2SC-EBI-022709
DUPLICATE

Lab Sample ID: 0087A
LIMS ID: 09-5759
Matrix: Water
Data Release Authorized:
Reported: 03/13/09

QC Report No: 0087-The Boeing Company
Project: BP2 SOURCE CONTROL

Date Sampled: 02/27/09
Date Received: 02/27/09

MATRIX DUPLICATE QUALITY CONTROL REPORT

Analyte	Analysis Method	Sample	Duplicate	RPD	Control Limit	Q
Mercury	7470A	20.0 U	20.0 U	0.0%	+/- 20.0	L

Reported in ng/L

*-Control Limit Not Met
L-RPD Invalid, Limit = Detection Limit

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
DISSOLVED METALS

Sample ID: PL2SC-EBI-022709
MATRIX SPIKE

Lab Sample ID: 0087A
LIMS ID: 09-5759
Matrix: Water
Data Release Authorized:
Reported: 03/13/09

QC Report No: 0087-The Boeing Company
Project: BP2 SOURCE CONTROL

Date Sampled: 02/27/09
Date Received: 02/27/09

MATRIX SPIKE QUALITY CONTROL REPORT

Analyte	Analysis Method	Sample	Spike	Spike Added	% Recovery	Q
Mercury	7470A	20.0 U	84.5	100	84.5%	

Reported in ng/L

N-Control Limit Not Met
H-% Recovery Not Applicable, Sample Concentration Too High
NA-Not Applicable, Analyte Not Spiked

Percent Recovery Limits: 75-125%

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
DISSOLVED METALS
Page 1 of 1

Sample ID: LAB CONTROL

Lab Sample ID: 0087LCS
LIMS ID: 09-5759
Matrix: Water
Data Release Authorized:
Reported: 03/13/09

QC Report No: 0087-The Boeing Company
Project: BP2 SOURCE CONTROL

Date Sampled: NA
Date Received: NA

BLANK SPIKE QUALITY CONTROL REPORT

Analyte	Analysis Method	Spike Found	Spike Added	% Recovery	Q
Mercury	7470A	161	200	80.5%	

Reported in ng/L

N-Control limit not met
Control Limits: 80-120%

Analytical Resources, Incorporated
Analytical Chemists and Consultants

March 18, 2009

Kent Angelos
Golder Associates, Inc.
18300 NE Union Hill Road, Suite 200
Redmond, WA 98052-3333

RE: Boeing Plant 2 Source Control
ARI IDs: OP48 & OP51

Dear Kent:

Please find enclosed the original Chain of Custody (COC) records, sample receipt documentation, and the final data package for the project referenced above.

Sample receipt information and analytical details are addressed in the Case Narrative.

An electronic copy of this package will be kept on file at ARI. If you have any questions or require additional information, please contact me at your convenience.

Sincerely,
ANALYTICAL RESOURCES, INC.

Kelly Bottem
Client Services Manager
(206) 695-6211
kellyb@arilabs.com

KB/eb

cc: Kent Angelos, Golder Associates Inc., 18300 NE Union Hill Road, Suite 200, Redmond, WA 98052-3333

Enclosures

Chain of Custody
Documentation

prepared
for

THE BOEING COMPANY

Project: Plant 2 Source Control

ARI JOB NO: OP48 & OP51

prepared
by

Analytical Resources, Inc.

Chain of Custody Record & Laboratory Analysis Request

ARI Assigned Number: OP48 + OP51	Turn-around Requested: std.				Page: 1 of 1										
ARI Client Company: Boeing	Phone:				Date: 315109	Ice Present? Yes									
Client Contact: Will Ernst					No. of Coolers: 1	Cooler Temps: 6.8									
Client Project Name: BP2 Source Control					Analysis Requested										Notes/Comments
Client Project #:	Samplers: J. Lamberts				SMS metals dissolved	Dissolved Hg									Field filtered
Sample ID	Date	Time	Matrix	No. Containers											
PL2SC-BW-A-030509	315109	1030	W	2	X	X									
Comments/Special Instructions: SMS metals per QAPP.	Relinquished by: (Signature) Jill Lamberts			Received by: (Signature) Jonathon Walter			Relinquished by: (Signature)			Received by: (Signature)					
	Printed Name: Jill Lamberts			Printed Name: Jonathon Walter			Printed Name:			Printed Name:					
	Company: Enolder			Company: ARI			Company:			Company:					
	Date & Time: 315109 1120			Date & Time: 3/5/09 1120			Date & Time:			Date & Time:					

Analytical Resources, Incorporated
Analytical Chemists and Consultants
4611 South 134th Place, Suite 100
Tukwila, WA 98168
206-695-6200 206-695-6201 (fax)

PRESERVATION VERIFICATION 03/05/09
Page 1 of 1

ANALYTICAL RESOURCES INCORPORATED

ARI Job No: **OP48**

Inquiry Number: NONE
Analysis Requested: 03/05/09
Contact: Ernst, Will
Client: The Boeing Company
Logged by: AV
Sample Set Used: Yes-481
Validatable Package: ~~No~~ Yes
Deliverables:

PC: Kelly
VTSR: 03/05/09

Project #:
Project: BP2 SOURCE CONTROL
Sample Site:
SDG No:
Analytical Protocol: In-house

LOGNUM ARI ID	CLIENT ID	CN >12	WAD >12	NH3 <2	COD <2	FOG <2	MET <2	PHEN <2	PHOS <2	TKN <2	NO23 <2	TOC <2	S2 >9	DMET FLT	DOC FLT	PARAMETER	ADJUSTED TO	LOT NUMBER	AMOUNT ADDED	DATE/BY
09-6055 **OP48A**	PL2SC-W-A-030509						DIS OK							Y						

Checked By AV Date 3/5/09

Analytical Resources, Incorporated
Analytical Chemists and Consultants

Cooler Receipt Form

ARI Client: Boeing Project Name: BP2 Source Control

COC No: NA Delivered by: Hand

Assigned ARI Job No: OP48 Tracking No: NA

Preliminary Examination Phase:

Were intact, properly signed and dated custody seals attached to the outside of to cooler?	YES	(NO)
Were custody papers included with the cooler?	(YES)	NO
Were custody papers properly filled out (ink, signed, etc.)	(YES)	NO
Record cooler temperature (recommended 2.0-6.0 °C for chemistry	6.8 °C	

Cooler Accepted by: JW Date: 3/5/09 Time: 1120

Complete custody forms and attach all shipping documents

Log-In Phase:

Was a temperature blank included in the cooler?	YES	(NO)
What kind of packing material was used?		
Was sufficient ice used (if appropriate)?	YES	(NO)
Were all bottles sealed in individual plastic bags?	YES	(NO)
Did all bottle arrive in good condition (unbroken)?	(YES)	NO
Were all bottle labels complete and legible?	(YES)	NO
Did all bottle labels and tags agree with custody papers?	(YES)	NO
Were all bottles used correct for the requested analyses?	(YES)	NO
Do any of the analyses (bottles) require preservation? (attach preservation checklist)	(YES)	NO
Were all VOC vials free of air bubbles? (NA)	YES	NO
Was sufficient amount of sample sent in each bottle?	(YES)	NO

Samples Logged by: AV Date: 3/5/09 Time: 1339

***** Notify Project Manager of discrepancies or concerns *****

Explain discrepancies or negative responses:

By: Date:

Chain of Custody Record & Laboratory Analysis Request

ARI Assigned Number: OP51	Turn-around Requested: std.	Page: 1 of 1	
ARI Client Company: Boeing	Phone:	Date: 315109	Ice Present? Yes
Client Contact: Will Ernst		No. of Coolers: 1	Cooler Temps: 6.8
Client Project Name: BP2 Source Control			
Client Project #:	Samplers: J. Lamberts		

Analytical Resources, Incorporated
Analytical Chemists and Consultants
4611 South 134th Place, Suite 100
Tukwila, WA 98168
206-695-6200 206-695-6201 (fax)

Sample ID	Date	Time	Matrix	No. Containers	Analysis Requested: Dissolved SMS metals	Analysis Requested: Dissolved Lufty	Notes/Comments
PL2SC-BH-A-030509	315109	1030	W	2	X	X	Field filtered

Comments/Special Instructions: SMS metals per QAPP.	Relinquished by: (Signature) Jill Lamberts	Received by: (Signature) Jonathon Walter	Relinquished by: (Signature)	Received by: (Signature)
	Printed Name: Jill Lamberts	Printed Name: Jonathon Walter	Printed Name:	Printed Name:
	Company: Ecology	Company: ARI	Company:	Company:
	Date & Time: 315109 1120	Date & Time: 3/5/09 1120	Date & Time:	Date & Time:

Limits of Liability: *ARI will perform all requested services in accordance with appropriate methodology following ARI Standard Operating Procedures and the ARI Quality Assurance Program. This program meets standards for the industry. The total liability of ARI, its officers, agents, employees, or successors, arising out of or in connection with the requested services, shall not exceed the Invoiced amount for said services. The acceptance by the client of a proposal for services by ARI release ARI from any liability in excess thereof, not withstanding any provision to the contrary in any contract, purchase order or co-signed agreement between ARI and the Client.*

Sample Retention Policy: All samples submitted to ARI will be appropriately discarded no sooner than 90 days after receipt or 60 days after submission of hardcopy data, whichever is longer, unless alternate retention schedules have been established by work-order or contract.

PRESERVATION VERIFICATION 03/05/09
Page 1 of 1

ANALYTICAL RESOURCES INCORPORATED

ARI Job No: **OP51**

Inquiry Number: NONE
Analysis Requested: 03/05/09
Contact: Ernst, Will
Client: The Boeing Company
Logged by: AV
Sample Set Used: Yes-481 Yes
Validatable Package: ~~No~~
Deliverables:

PC: Kelly
VTSR: 03/05/09

Project #:
Project: BP2 SOURCE CONTROL
Sample Site:
SDG No:
Analytical Protocol: In-house

LOGNUM ARI ID	CLIENT ID	CN >12	WAD >12	NH3 <2	COD <2	FOG <2	MET <2	PHEN <2	PHOS <2	TKN <2	NO23 <2	TOC <2	S2 >9	DMET FLT	DOC FLT	PARAMETER	ADJUSTED TO	LOT NUMBER	AMOUNT ADDED	DATE/BY
09-6063 OP51A	PL2SC-W-A-030509						DIS OK							Y						

OP51A 090305

Checked By AV Date 3/5/09

Analytical Resources, Incorporated
Analytical Chemists and Consultants

Cooler Receipt Form

ARI Client: Boeing
COC No: NA
Assigned ARI Job No: OP51

Project Name: BP2 Source Control
Delivered by: Hand
Tracking No: NA

Preliminary Examination Phase:

Were intact, properly signed and dated custody seals attached to the outside of to cooler?	YES	(NO)
Were custody papers included with the cooler?	(YES)	NO
Were custody papers properly filled out (ink, signed, etc.)	(YES)	NO
Record cooler temperature (recommended 2.0-6.0 °C for chemistry	6.8 °C	

Cooler Accepted by: JW Date: 3/5/09 Time: 1120

Complete custody forms and attach all shipping documents

Log-In Phase:

Was a temperature blank included in the cooler?	YES	(NO)
What kind of packing material was used?		
Was sufficient ice used (if appropriate)?	YES	(NO)
Were all bottles sealed in individual plastic bags?	YES	(NO)
Did all bottle arrive in good condition (unbroken)?	(YES)	NO
Were all bottle labels complete and legible?	(YES)	NO
Did all bottle labels and tags agree with custody papers?	(YES)	NO
Were all bottles used correct for the requested analyses?	(YES)	NO
Do any of the analyses (bottles) require preservation? (attach preservation checklist)	(YES)	NO
Were all VOC vials free of air bubbles? (NA)	YES	NO
Was sufficient amount of sample sent in each bottle?	(YES)	NO

Samples Logged by: AV Date: 3/5/09 Time: 1402

*** Notify Project Manager of discrepancies or concerns ***

Explain discrepancies or negative responses:

By: Date:

Case Narrative

prepared
for

THE BOEING COMPANY

Project: Plant 2 Source Control

ARI JOB NO: OP48 & OP51

prepared
by

Analytical Resources, Inc.

Case Narrative

Project: Boeing Plant 2 Source Control
ARI IDs: OP48 & OP51
Matrix: Water
Date: March 19, 2009

Sample Receipt Information

One water sample was received in good condition at Analytical Resources, Inc. (ARI) on March 5, 2009 under ARI sample delivery groups (SDGs) OP48 and OP51. The cooler temperature, as measured by IR thermometer, was 6.8°C. For further details regarding sample receipt, please refer to the enclosed Cooler Receipt Form and Preservation Verification sheet.

The sample was analyzed for the parameters listed below, as requested on the Chain of Custody.

Dissolved Metals by Methods 6010B and 7000 series

The samples were digested on 3/9/09. The digests were analyzed between 3/13/09 and 3/16/09 within the method recommended holding times.

Replicate(s): All percent recoveries were within compliance.

Samples: No anomalies were encountered for these samples.

LCS/Blank Spike(s): All percent recoveries were within compliance.

Method Blank(s): Are in control.

Dissolved Low-Level Mercury by Method SW7470A

The samples were digested on 3/9/09. The digests were analyzed on 3/11/09 within the method recommended holding times.

Replicate(s): All percent recoveries were within compliance.

Samples: No anomalies were encountered for these samples.

LCS/Blank Spike(s): All percent recoveries were within compliance.

Method Blank(s): Are in control.

Standard Reference: All percent recoveries were within compliance.

Data Summary Package

prepared
for

THE BOEING COMPANY

Project: Plant 2 Source Control

ARI JOB NO: OP48 & OP51

prepared
by

Analytical Resources, Inc.

METALS

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
DISSOLVED METALS

Sample ID: PL2SC-W-A-030509
SAMPLE

Lab Sample ID: OP48A
LIMS ID: 09-6055
Matrix: Water
Data Release Authorized:
Reported: 03/17/09

QC Report No: OP48-The Boeing Company
Project: BP2 SOURCE CONTROL

Date Sampled: 03/05/09
Date Received: 03/05/09

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	RL	µg/L	Q
7000A	03/09/09	7060A	03/16/09	7440-38-2	Arsenic	1	1	U
6010B	03/09/09	6010B	03/13/09	7440-43-9	Cadmium	2	2	U
6010B	03/09/09	6010B	03/13/09	7440-47-3	Chromium	5	5	U
6010B	03/09/09	6010B	03/13/09	**7440-50-8**	**Copper**	2	**2**	
7000A	03/09/09	7421	03/16/09	7439-92-1	Lead	1	1	U
6010B	03/09/09	6010B	03/13/09	7440-22-4	Silver	3	3	U
6010B	03/09/09	6010B	03/13/09	**7440-66-6**	**Zinc**	10	**290**	

U-Analyte undetected at given RL
RL-Reporting Limit

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
DISSOLVED METALS
Page 1 of 1

Sample ID: PL2SC-W-A-030509
DUPLICATE

Lab Sample ID: OP48A
LIMS ID: 09-6055
Matrix: Water
Data Release Authorized:
Reported: 03/17/09

QC Report No: OP48-The Boeing Company
Project: BP2 SOURCE CONTROL

Date Sampled: 03/05/09
Date Received: 03/05/09

MATRIX DUPLICATE QUALITY CONTROL REPORT

Analyte	Analysis Method	Sample	Duplicate	RPD	Control Limit	Q
Arsenic	7060A	1 U	1 U	0.0%	+/- 1	L
Cadmium	6010B	2 U	2 U	0.0%	+/- 2	L
Chromium	6010B	5 U	5 U	0.0%	+/- 5	L
Copper	6010B	2	2	0.0%	+/- 2	L
Lead	7421	1 U	1 U	0.0%	+/- 1	L
Silver	6010B	3 U	3 U	0.0%	+/- 3	L
Zinc	6010B	290	290	0.0%	+/- 20%	

Reported in µg/L

*-Control Limit Not Met
L-RPD Invalid, Limit = Detection Limit

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
DISSOLVED METALS

Sample ID: PL2SC-W-A-030509
MATRIX SPIKE

Lab Sample ID: OP48A
LIMS ID: 09-6055
Matrix: Water
Data Release Authorized:
Reported: 03/17/09

QC Report No: OP48-The Boeing Company
Project: BP2 SOURCE CONTROL

Date Sampled: 03/05/09
Date Received: 03/05/09

MATRIX SPIKE QUALITY CONTROL REPORT

Analyte	Analysis Method	Sample	Spike	Spike Added	% Recovery	Q
Arsenic	7060A	1.00 U	21.0	20.0	105%	
Cadmium	6010B	2.00 U	572	500	114%	
Chromium	6010B	5.00 U	539	500	108%	
Copper	6010B	2.09	524	500	104%	
Lead	7421	1.00 U	22.0	20.0	110%	
Silver	6010B	3.00 U	466	500	93.2%	
Zinc	6010B	287	804	500	103%	

Reported in µg/L

N-Control Limit Not Met
H-% Recovery Not Applicable, Sample Concentration Too High
NA-Not Applicable, Analyte Not Spiked

Percent Recovery Limits: 75-125%

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
DISSOLVED METALS
Page 1 of 1

Sample ID: METHOD BLANK

Lab Sample ID: OP48MB
LIMS ID: 09-6055
Matrix: Water
Data Release Authorized:
Reported: 03/17/09

QC Report No: OP48-The Boeing Company
Project: BP2 SOURCE CONTROL

Date Sampled: NA
Date Received: NA

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	RL	µg/L	Q
7000A	03/09/09	7060A	03/16/09	7440-38-2	Arsenic	1	1	U
6010B	03/09/09	6010B	03/13/09	7440-43-9	Cadmium	2	2	U
6010B	03/09/09	6010B	03/13/09	7440-47-3	Chromium	5	5	U
6010B	03/09/09	6010B	03/13/09	7440-50-8	Copper	2	2	U
7000A	03/09/09	7421	03/16/09	7439-92-1	Lead	1	1	U
6010B	03/09/09	6010B	03/13/09	7440-22-4	Silver	3	3	U
6010B	03/09/09	6010B	03/13/09	7440-66-6	Zinc	10	10	U

U-Analyte undetected at given RL
RL-Reporting Limit

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
DISSOLVED METALS

Sample ID: LAB CONTROL

Lab Sample ID: OP48LCS
LIMS ID: 09-6055
Matrix: Water
Data Release Authorized:
Reported: 03/17/09

QC Report No: OP48-The Boeing Company
Project: BP2 SOURCE CONTROL

Date Sampled: NA
Date Received: NA

BLANK SPIKE/BLANK SPIKE DUPLICATE QUALITY CONTROL REPORT

Analyte	Analysis Method	Spike Found	Spike Dup Found	Spike Added	Spike Recovery	Spike Dup Recovery	RPD	Q
Arsenic	7060A	20	20	20	100%	100%	0.0%	
Cadmium	6010B	534	542	500	107%	108%	1.5%	
Chromium	6010B	527	532	500	105%	106%	0.9%	
Copper	6010B	528	531	500	106%	106%	0.6%	
Lead	7421	21	24	20	105%	120%	13.3%	
Silver	6010B	489	494	500	97.8%	98.8%	1.0%	
Zinc	6010B	530	530	500	106%	106%	0.0%	

Reported in ug/L

N-Control limit not met
Control Limits: 80-120%

LOW-LEVEL MERCURY

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
Dissolved Mercury by Method SW7470A

Data Release Authorized:
Reported: 03/13/09
Date Received: 03/05/09
Page 1 of 1

QC Report No: OP51-The Boeing Company
Project: BP2 SOURCE CONTROL

Client/ ARI ID	Date Sampled	Matrix	Prep Date Anal Date	RL	Result
PL2SC-W-A-030509 OP51A 09-6063	03/05/09	Water	03/09/09 03/11/09	20.0	20.0 U
MB-030909 Method Blank	NA	Water	03/09/09 03/11/09	20.0	20.0 U

Reported in ng/L

RL-Analytical reporting limit
U-Undetected at reported detection limit

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
DISSOLVED METALS

Sample ID: PL2SC-W-A-030509
DUPLICATE

Lab Sample ID: OP51A
LIMS ID: 09-6063
Matrix: Water
Data Release Authorized:
Reported: 03/13/09

QC Report No: OP51-The Boeing Company
Project: BP2 SOURCE CONTROL

Date Sampled: 03/05/09
Date Received: 03/05/09

MATRIX DUPLICATE QUALITY CONTROL REPORT

Analyte	Analysis Method	Sample	Duplicate	RPD	Control Limit	Q
Mercury	7470A	20.0 U	20.0 U	0.0%	+/- 20.0	L

Reported in ng/L

*-Control Limit Not Met
L-RPD Invalid, Limit = Detection Limit

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
DISSOLVED METALS

Sample ID: PL2SC-W-A-030509
MATRIX SPIKE

Lab Sample ID: OP51A
LIMS ID: 09-6063
Matrix: Water
Data Release Authorized:
Reported: 03/13/09

QC Report No: OP51-The Boeing Company
Project: BP2 SOURCE CONTROL

Date Sampled: 03/05/09
Date Received: 03/05/09

MATRIX SPIKE QUALITY CONTROL REPORT

Analyte	Analysis Method	Sample	Spike	Spike Added	% Recovery	Q
Mercury	7470A	20.0 U	89.6	100	89.6%	

Reported in ng/L

N-Control Limit Not Met
H-% Recovery Not Applicable, Sample Concentration Too High
NA-Not Applicable, Analyte Not Spiked

Percent Recovery Limits: 75-125%

OP51A : 00029

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
DISSOLVED METALS

Sample ID: LAB CONTROL

Lab Sample ID: OP51LCS
LIMS ID: 09-6063
Matrix: Water
Data Release Authorized:
Reported: 03/13/09

QC Report No: OP51-The Boeing Company
Project: BP2 SOURCE CONTROL

Date Sampled: NA
Date Received: NA

BLANK SPIKE QUALITY CONTROL REPORT

Analyte	Analysis Method	Spike Found	Spike Added	% Recovery	Q
Mercury	7470A	171	200	85.5%	

Reported in ng/L

N-Control limit not met
Control Limits: 80-120%

Analytical Resources, Incorporated
Analytical Chemists and Consultants

April 10, 2009

Kent Angelos
Golder Associates, Inc.
18300 NE Union Hill Road, Suite 200
Redmond, WA 98052-3333

RE: Boeing Plant 2 Source Control
ARI IDs: OR49, OS60, OS61, OS73, OS79

Dear Kent:

Please find enclosed the original Chain of Custody (COC) records, sample receipt documentation, and the final data package for the project referenced above.

Sample receipt information and analytical details are addressed in the Case Narrative.

An electronic copy of this package will be kept on file at ARI. If you have any questions or require additional information, please contact me at your convenience.

Sincerely,
ANALYTICAL RESOURCES, INC.

Kelly Bottem
Client Services Manager
(206) 695-6211
kellyb@arilabs.com

KB/eb

cc: Kent Angelos, Golder Associates Inc., 18300 NE Union Hill Road, Suite 200, Redmond, WA 98052-3333

Enclosures

Chain of Custody
Documentation

prepared
for

The Boeing Company

Project: BOEING PLANT 2 SOURCE CONTROL

ARI JOB NO: OR49, OS60, OS61, OS73, OS79

prepared
by

Analytical Resources, Inc.

Chain of Custody Record & Laboratory Analysis Request

ARI Assigned Number: OR49	Turn-around Requested: std	Page: 1 of 1	
ARI Client Company: Boeing	Phone:	Date: 3/19/09	Ice Present? No
Client Contact: Will Ernst		No. of Coolers: 0	Cooler Temps: Amb
Client Project Name: BP2 Source Control			
Client Project #:	Samplers: J. Lamberts, D. Gorman		

Analytical Resources, Incorporated
Analytical Chemists and Consultants
4611 South 134th Place, Suite 100
Tukwila, WA 98168
206-695-6200 206-695-6201 (fax)

Sample ID	Date	Time	Matrix	No. Containers	Analysis Requested: SMS Metals	Analysis Requested: PCBs	Analysis Requested: Hg	Analysis Requested: TSS	Analysis Requested:	Analysis Requested:	Analysis Requested: XD	Notes/Comments
												Kelly added Hg on 3/19/09
BL25C-SS-A-030509	3/19/09	1045	FB	1	X	X	X	X				

Comments/Special Instructions	Relinquished by: (Signature)	Received by: (Signature)	Relinquished by: (Signature)	Received by: (Signature)
SMS Metals per QAPP	Printed Name: Jill Lamberts	Printed Name: Dami Hayes	Printed Name:	Printed Name:
	Company: Golder	Company: ARI	Company:	Company:
	Date & Time: 3/19/09 1200	Date & Time: 3/19/09 1200	Date & Time:	Date & Time:

Limits of Liability: *ARI will perform all requested services in accordance with appropriate methodology following ARI Standard Operating Procedures and the ARI Quality Assurance Program. This program meets standards for the industry. The total liability of ARI, its officers, agents, employees, or successors, arising out of or in connection with the requested services, shall not exceed the Invoiced amount for said services. The acceptance by the client of a proposal for services by ARI release ARI from any liability in excess thereof, not withstanding any provision to the contrary in any contract, purchase order or co-signed agreement between ARI and the Client.*

Sample Retention Policy: All samples submitted to ARI will be appropriately discarded no sooner than 90 days after receipt or 60 days after submission of hardcopy data, whichever is longer, unless alternate retention schedules have been established by work-order or contract.

Analytical Resources, Incorporated
Analytical Chemists and Consultants

Cooler Receipt Form

ARI Client: Boeing — Project Name: BP 2 Source Control

COC No(s): _____ (NA) — Delivered by: Fed-Ex UPS Courier (Hand Delivered) Other: _____

Assigned ARI Job No: OK449 — Tracking No: _____ (NA)

Preliminary Examination Phase:

Were intact, properly signed and dated custody seals attached to the outside of to cooler?	YES	(NO)
Were custody papers included with the cooler?	(YES)	NO
Were custody papers properly filled out (ink, signed, etc.)	(YES)	NO

Temperature of Cooler(s) (°C) (recommended 2.0-6.0 °C for chemistry): Amb

If cooler temperature is out of compliance fill out form 00070F — Temp Gun ID#: N/A

Cooler Accepted by: JH — Date: 3/19/09 — Time: 1200

Complete custody forms and attach all shipping documents

Log-In Phase:

Was a temperature blank included in the cooler?		YES	(NO)
What kind of packing material was used? ... Bubble Wrap Wet Ice Gel Packs Baggies Foam Block Paper Other: None			
Was sufficient ice used (if appropriate)?	NA	YES	(NO)
Were all bottles sealed in individual plastic bags?		(YES)	NO
Did all bottles arrive in good condition (unbroken)?		(YES)	NO
Were all bottle labels complete and legible?		(YES)	NO
Did the number of containers listed on COC match with the number of containers received?		(YES)	NO
Did all bottle labels and tags agree with custody papers?		(YES)	NO
Were all bottles used correct for the requested analyses?		(YES)	NO
Do any of the analyses (bottles) require preservation? (attach preservation sheet, excluding VOCs)...	NA	YES	(NO)
Were all VOC vials free of air bubbles?	(NA)	YES	NO
Was sufficient amount of sample sent in each bottle?		(YES)	NO

Samples Logged by: JH — Date: 3/19/09 — Time: 1700

***** Notify Project Manager of discrepancies or concerns *****

Sample ID on Bottle	Sample ID on COC	Sample ID on Bottle	Sample ID on COC

Additional Notes, Discrepancies, & Resolutions:

By: Date:

Small Air Bubbles < 2mm	Peabubbles 2-4 mm	LARGE Air Bubbles > 4 mm
•	•	●

Small → "sm"
Peabubbles → "pb"
Large → "lg"
Headspace → "hs"

Chain of Custody Record & Laboratory Analysis Request

ARI Assigned Number:	Turn-around Requested: std	Page: 1 of 1	
ARI Client Company: Boeing Plant 2	Phone:	Date: 3/27/09	Ice Present? Yes
Client Contact: Will Ernst		No. of Coolers: 1	Cooler Temps: 6.0
Client Project Name: BP2 Source Control			
Client Project #:	Samplers: Jill Lamberts, Mike Lumpkin		

Analytical Resources, Incorporated
Analytical Chemists and Consultants
4611 South 134th Place, Suite 100
Tukwila, WA 98168
206-695-6200 206-695-6201 (fax)

Sample ID	Date	Time	Matrix	No. Containers	TAL Metals (Dissolved)	SMS Metals (Dissolved)	PCBs						Notes/Comments
BL2SC-EB1-032709	3/27/09	1123	W	4	X	X	X						O-field filtered w/ 0.45um filter

Comments/Special Instructions: SMS Metals per QAPP.

Relinquished by: (Signature)	Michael Lumpkin	Received by: (Signature)		Relinquished by: (Signature)	Received by: (Signature)
Printed Name:	Michael Lumpkin	Printed Name:	Jonathon Walter	Printed Name:	Printed Name:
Company:	Golder	Company:	ARI	Company:	Company:
Date & Time:	3/27/09 1355	Date & Time:	3/27/09 1355	Date & Time:	Date & Time:

Limits of Liability: *ARI will perform all requested services in accordance with appropriate methodology following ARI Standard Operating Procedures and the ARI Quality Assurance Program. This program meets standards for the industry. The total liability of ARI, its officers, agents, employees, or successors, arising out of or in connection with the requested services, shall not exceed the Invoiced amount for said services. The acceptance by the client of a proposal for services by ARI release ARI from any liability in excess thereof, not withstanding any provision to the contrary in any contract, purchase order or co-signed agreement between ARI and the Client.*

Sample Retention Policy: All samples submitted to ARI will be appropriately discarded no sooner than 90 days after receipt or 60 days after submission of hardcopy data, whichever is longer, unless alternate retention schedules have been established by work-order or contract.

PRESERVATION VERIFICATION 03/30/09
Page 1 of 1

ANALYTICAL RESOURCES INCORPORATED

ARI Job No: **OS60**

Inquiry Number: NONE
Analysis Requested: 03/27/09
Contact: Ernst, Will
Client: The Boeing Company
Logged by: MM
Sample Set Used: Yes-481
Validatable Package: Yes
Deliverables:

PC: Kelly
VTSR: 03/27/09

Project #:
Project: BP2 SOURCE CONTROL
Sample Site:
SDG No:
Analytical Protocol: In-house

LOCNUM / ARI ID	CLIENT ID	CN >12	WAD >12	NH3 <2	COD <2	FOG <2	MET <2	PHEN <2	PHOS <2	TKN <2	NO23 <2	TOC <2	S2 >9	AK102 <2	DMET FLT	DOC FLT	PARAMETER	ADJUSTED TO	LOT NUMBER	AMOUNT ADDED	DATE/BY
09-7569 **OS60A**	PL2SC-EB1-032709						DIS yes								Y						

Checked By UM Date 3/27/2009

Analytical Resources, Incorporated
Analytical Chemists and Consultants

Cooler Receipt Form

ARI Client: Boeing Project Name: BP2 Source Control

COC No(s): _____ (NA) Delivered by: Fed-Ex UPS Courier Hand Delivered Other: _____

Assigned ARI Job No: _____ Tracking No: _____ (NA)

Preliminary Examination Phase:

Were intact, properly signed and dated custody seals attached to the outside of to cooler?	YES	(NO)
Were custody papers included with the cooler?	(YES)	NO
Were custody papers properly filled out (ink, signed, etc.)	(YES)	NO

Temperature of Cooler(s) (°C) (recommended 2.0-6.0 °C for chemistry)..... 6.0

If cooler temperature is out of compliance fill out form 00070F Temp Gun ID#: 101856

Cooler Accepted by: JW Date: 3/27/09 Time: 1355

Complete custody forms and attach all shipping documents

Log-In Phase:

Was a temperature blank included in the cooler?		YES	(NO)
What kind of packing material was used? ... Bubble Wrap Wet Ice Gel Packs Baggies Foam Block Paper Other: _____			
Was sufficient ice used (if appropriate)?	NA	(YES)	NO
Were all bottles sealed in individual plastic bags?		(YES)	NO
Did all bottles arrive in good condition (unbroken)?		(YES)	NO
Were all bottle labels complete and legible?		(YES)	NO
Did the number of containers listed on COC match with the number of containers received?		(YES)	NO
Did all bottle labels and tags agree with custody papers?		(YES)	NO
Were all bottles used correct for the requested analyses?		(YES)	NO
Do any of the analyses (bottles) require preservation? (attach preservation sheet, excluding VOCs)...	(NA)	YES	NO
Were all VOC vials free of air bubbles?	(NA)	YES	NO
Was sufficient amount of sample sent in each bottle?		(YES)	NO

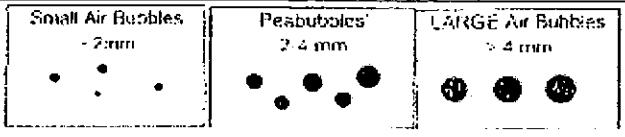
Samples Logged by: _____ Date: 9/27/09 Time: 1415

*** Notify Project Manager of discrepancies or concerns ***

Sample ID on Bottle	Sample ID on COC	Sample ID on Bottle	Sample ID on COC

Additional Notes, Discrepancies, & Resolutions:

By: _____ Date: _____



Small → "sm"
Peabubbles → "pb"
Large → "lg"
Headspace → "hs"

Analytical Resources, Incorporated
Analytical Chemists and Consultants

Cooler Receipt Form

ARI Client: Boeing Project Name: BP2 Source Control

COC No(s): _____ (NA) Delivered by: Fed-Ex UPS Courier Hand Delivered Other: _____

Assigned ARI Job No: _____ Tracking No: _____ (NA)

Preliminary Examination Phase:

Were intact, properly signed and dated custody seals attached to the outside of to cooler?	YES	(NO)
Were custody papers included with the cooler?	(YES)	NO
Were custody papers properly filled out (ink, signed, etc.)	(YES)	NO

Temperature of Cooler(s) (°C) (recommended 2.0-6.0 °C for chemistry)..... 6.0

If cooler temperature is out of compliance fill out form 00070F Temp Gun ID#: 101886

Cooler Accepted by: JW Date: 3/27/09 Time: 1355

Complete custody forms and attach all shipping documents

Log-In Phase:

Was a temperature blank included in the cooler?		YES	(NO)
What kind of packing material was used? ...	Bubble Wrap Wet Ice Gel Packs Baggies Foam Block Paper Other: _____		
Was sufficient ice used (if appropriate)?	NA	(YES)	NO
Were all bottles sealed in individual plastic bags?		(YES)	NO
Did all bottles arrive in good condition (unbroken)?		(YES)	NO
Were all bottle labels complete and legible?		(YES)	NO
Did the number of containers listed on COC match with the number of containers received?		(YES)	NO
Did all bottle labels and tags agree with custody papers?		(YES)	NO
Were all bottles used correct for the requested analyses?		(YES)	NO
Do any of the analyses (bottles) require preservation? (attach preservation sheet, excluding VOCs)...	NA	(YES)	NO
Were all VOC vials free of air bubbles?	(NA)	YES	NO
Was sufficient amount of sample sent in each bottle?		(YES)	NO

Samples Logged by: JW Date: 3/27/09 Time: 1429

*** Notify Project Manager of discrepancies or concerns ***

Sample ID on Bottle	Sample ID on COC	Sample ID on Bottle	Sample ID on COC

Additional Notes, Discrepancies, & Resolutions:

By: _____ Date: _____

Small Air Bubbles < 2mm	Peabubbles 2-4 mm	LARGE Air Bubbles > 4 mm
• • •	• • •	● ● ●

Small → "sm"

Peabubbles → "pb"

Large → "lg"

Headspace → "hs"

PRESERVATION VERIFICATION 03/27/09
Page 1 of 1

ANALYTICAL RESOURCES INCORPORATED

ARI Job No: **OS61**

Inquiry Number: NONE
Analysis Requested: 03/27/09
Contact: Ernst, Will
Client: The Boeing Company
Logged by: MM
Sample Set Used: Yes-481
Validatable Package: ~~No~~ Yes
Deliverables:

PC: Kelly
VTSR: 03/27/09

Project #:
Project: BP2 SOURCE CONTROL
Sample Site:
SDG No:
Analytical Protocol: In-house

LOGNUM ARI ID	CLIENT ID	CN >12	WAD >12	NH3 <2	COD <2	FOG <2	MET <2	PHEN <2	PHOS <2	TKN <2	NO23 <2	TOC <2	S2 >9	AK102 <2	DMET FLT	DOC FLT	PARAMETER	ADJUSTED TO	LOT NUMBER	AMOUNT ADDED	DATE/BY
09-757C **OS61A**	PL2SC-EB1-032709						DIS Yes														

Checked By MM Date 3/27/2009

Chain of Custody Record & Laboratory Analysis Request

ARI Assigned Number: 0513	Turn-around Requested: STD	Page: 1 of 1	
ARI Client Company: BOEING	Phone:	Date: 3/28/09	Ice Present?
Client Contact:		No. of Coolers: 1	Cooler Temps: 7.4
Client Project Name: Boeing Plant 2 Source Control			
Client Project #:	Samplers: J. LL Lamberts, L. Shea		

Analytical Resources, Incorporated
Analytical Chemists and Consultants
4611 South 134th Place, Suite 100
Tukwila, WA 98168
206-695-6200 206-695-6201 (fax)

Sample ID	Date	Time	Matrix	No. Containers	* LL Hg dissolved	* Metals SMS dissolved	Analysis Requested						Notes/Comments
PL2SC-W-B-032809	3/28/09	11:15	W	2	X	X							*Field filtered*
PL2SC-W-J505-032809	"	11:45	W	2	X	X							

Comments/Special Instructions	Relinquished by: (Signature)	Received by: (Signature)	Relinquished by: (Signature)	Received by: (Signature)
SMS Metals as per QAPP	Elizabeth Shea	Tami Hayes		
	Printed Name: Liz Shea	Printed Name: Tami Hayes	Printed Name:	Printed Name:
	Company: Boeing	Company: ARI	Company:	Company:
	Date & Time: 3/28/09 1230	Date & Time: 3/28/09 1230	Date & Time:	Date & Time:

Analytical Resources, Incorporated
Analytical Chemists and Consultants

Cooler Receipt Form

ARI Client: Boeing
COC No(s): ( ) NA
Assigned ARI Job No: 0573

Project Name: Boeing Plant 2 Source Control
Delivered by: Fed-Ex UPS Courier Hand Delivered Other: ____
Tracking No: ____ (NA)

Preliminary Examination Phase:

Were intact, properly signed and dated custody seals attached to the outside of to cooler?	YES	(NO)
Were custody papers included with the cooler?	(YES)	NO
Were custody papers properly filled out (ink, signed, etc.)	(YES)	NO
Temperature of Cooler(s) (°C) (recommended 2.0-6.0 °C for chemistry)	7.4	
If cooler temperature is out of compliance fill out form 00070F	Temp Gun ID#:	10126

Cooler Accepted by: JH Date: 3/20/09 Time: 1230

Complete custody forms and attach all shipping documents

Log-In Phase:

Was a temperature blank included in the cooler?		YES	(NO)
What kind of packing material was used? ... Bubble Wrap (Wet Ice) Gel Packs Baggies Foam Block Paper Other:		7.2	
Was sufficient ice used (if appropriate)?	NA	(YES)	(NO)
Were all bottles sealed in individual plastic bags?		YES	(NO)
Did all bottles arrive in good condition (unbroken)?		(YES)	NO
Were all bottle labels complete and legible?		(YES)	NO
Did the number of containers listed on COC match with the number of containers received?		(YES)	NO
Did all bottle labels and tags agree with custody papers?		(YES)	NO
Were all bottles used correct for the requested analyses?		(YES)	NO
Do any of the analyses (bottles) require preservation? (attach preservation sheet, excluding VOCs)...	NA	(YES)	NO
Were all VOC vials free of air bubbles?	(NA)	YES	NO
Was sufficient amount of sample sent in each bottle?		(YES)	NO

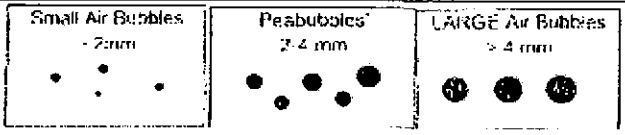
Samples Logged by: JH Date: 3/20/09 Time: 1230

***** Notify Project Manager of discrepancies or concerns *****

Sample ID on Bottle	Sample ID on COC	Sample ID on Bottle	Sample ID on COC

Additional Notes, Discrepancies, & Resolutions:

By: Date:



Small → "sm"
Peabubbles → "pb"
Large → "lg"
Headspace → "hs"

Analytical Resources, Incorporated
Analytical Chemists and Consultants

Cooler Temperature Compliance Form

Cooler#:		Temperature(°C): 7.4	
Sample ID		**Bottle Count**	**Bottle Type**
PL25-W-B-032891		2	32oz HDPE
PL25-W-JSCS-032891		2	32oz HDPE

Cooler#:		Temperature(°C):	
Sample ID		**Bottle Count**	**Bottle Type**

Cooler#:		Temperature(°C):	
Sample ID		**Bottle Count**	**Bottle Type**

Cooler#:		Temperature(°C):	
Sample ID		**Bottle Count**	**Bottle Type**

Completed by: _____ Date: _____ Time: _____

PRESERVATION VERIFICATION 03/30/09
Page 1 of 1

ANALYTICAL RESOURCES INCORPORATED

ARI Job No: OS73

Inquiry Number: NONE
Analysis Requested: 03/30/09
Contact: Ernst, Will
Client: The Boeing Company
Logged by: JH
Sample Set Used: Yes-481
Validatable Package: ~~No~~ Yes
Deliverables:

PC: Kelly
VTSR: 03/28/09

Project #:
Project: BOEING PLANT 2 SOURCE CONTROL
Sample Site:
SDG No:
Analytical Protocol: In-house

LOGNUM ARI ID	CLIENT ID	CN >12	WAD >12	NH3 <2	COD <2	FOG <2	MET <2	PHEN <2	PHOS <2	TKN <2	NO23 <2	TOC <2	S2 >9	AK102 <2	DMET FLT	DOC FLT	PARAMETER	ADJUSTED TO	LOT NUMBER	AMOUNT ADDED	DATE/BY
09-7658 OS73A	PL2SC-W-B-032809						DIS OK								Y						
09-7659 OS73B	PL2SC-W-J505-032809						DIS OK								Y						

Checked By JH Date 3/30/09

Analytical Resources, Incorporated
Analytical Chemists and Consultants

Cooler Receipt Form

ARI Client: Boeing

COC No(s): ~~_____~~ NA

Assigned ARI Job No: ~~JH~~ 0573 0579

Project Name: Boeing Plant 2 Source Control

Delivered by: Fed-Ex UPS Courier Hand Delivered Other: _____

Tracking No: _____ NA

Preliminary Examination Phase:

Were intact, properly signed and dated custody seals attached to the outside of to cooler?	YES	NO
Were custody papers included with the cooler?	YES	NO
Were custody papers properly filled out (ink, signed, etc.)	YES	NO
Temperature of Cooler(s) (°C) (recommended 2.0-6.0 °C for chemistry)	7.4	

If cooler temperature is out of compliance fill out form 00070F — Temp Gun ID#: 101886

Cooler Accepted by: JH Date: 3/28/09 Time: 1230

Complete custody forms and attach all shipping documents

Log-In Phase:

Was a temperature blank included in the cooler?		YES	NO
What kind of packing material was used? ... Bubble Wrap Wet Ice Gel Packs Baggies Foam Block Paper Other: 7.2			
Was sufficient ice used (if appropriate)?	NA	YES	NO
Were all bottles sealed in individual plastic bags?		YES	NO
Did all bottles arrive in good condition (unbroken)?		YES	NO
Were all bottle labels complete and legible?		YES	NO
Did the number of containers listed on COC match with the number of containers received?		YES	NO
Did all bottle labels and tags agree with custody papers?		YES	NO
Were all bottles used correct for the requested analyses?		YES	NO
Do any of the analyses (bottles) require preservation? (attach preservation sheet, excluding VOCs)...	NA	YES	NO
Were all VOC vials free of air bubbles?	NA	YES	NO
Was sufficient amount of sample sent in each bottle?		YES	NO

Samples Logged by: JH Date: 3/28/09 Time: 1230

***** Notify Project Manager of discrepancies or concerns *****

Sample ID on Bottle	Sample ID on COC	Sample ID on Bottle	Sample ID on COC

Additional Notes, Discrepancies, & Resolutions:

By: Date:

Small Air Bubbles < 2mm	Peabubbles 2-4 mm	LARGE Air Bubbles > 4 mm
•	•	•

Small → "sm"

Peabubbles → "pb"

Large → "lg"

Headspace → "hs"

Analytical Resources, Incorporated
Analytical Chemists and Consultants

Cooler Temperature Compliance Form

Cooler#:	Temperature(°C): 7.4	
Sample ID	**Bottle Count**	**Bottle Type**
PL2SC-W-B-032805	2	32oz HDPE
PL2SC-W-JSOS-032809	2	32oz HDPE

Cooler#:	Temperature(°C):	
Sample ID	**Bottle Count**	**Bottle Type**

Cooler#:	Temperature(°C):	
Sample ID	**Bottle Count**	**Bottle Type**

Cooler#:	Temperature(°C):	
Sample ID	**Bottle Count**	**Bottle Type**

Completed by: _____ Date: _____ Time: _____

PRESERVATION VERIFICATION 03/30/09
Page 1 of 1

ANALYTICAL RESOURCES INCORPORATED

ARI Job No: **OS79**

Inquiry Number: NONE
Analysis Requested: 03/30/09
Contact: Ernst, Will
Client: The Boeing Company
Logged by: JH
Sample Set Used: Yes-481
Validatable Package: ~~No~~ Yes
Deliverables:

PC: Kelly
VTSR: 03/28/09

Project #:
Project: BOEING PLANT 2 SOURCE CONTROL
Sample Site:
SDG No:
Analytical Protocol: In-house

LOGNUM ARI ID	CLIENT ID	CN >12	WAD >12	NH3 <2	COD <2	FOG <2	MET <2	PHEN <2	PHOS <2	TKN <2	NO23 <2	TOC <2	S2 >9	AK102 <2	DMET FLT	DOC FLT	PARAMETER	ADJUSTED TO	LOT NUMBER	AMOUNT ADDED	DATE/BY
09-7662 OS79A	PL2SC-W-B-032809						DIS OK								Y ✓						
09-7663 OS79B	PL2SC-W-J505-032809						DIS OK								Y	✓					

Checked By JH Date 3/30/09

Case Narrative

prepared
for

The Boeing Company

Project: BOEING PLANT 2 SOURCE CONTROL

ARI JOB NO: OR49, OS60, OS61, OS73, OS79

prepared
by

Analytical Resources, Inc.

Case Narrative

Project: Boeing Plant 2 Source Control
ARI IDs: OR49, OS60, OS61, OS73, OS79
Matrix: Water, Filter Bag
Date: April 10, 2009

Sample Receipt Information

One filter bag sample was received in good condition at Analytical Resources, Inc. (ARI) on March 19, 2009 under ARI sample delivery groups (SDGs) OR49 and three water samples were received in good condition at Analytical Resources, Inc. (ARI) on March 27, 2009 and March 28, 2009 under ARI sample delivery groups (SDGs) OS60, OS61, OS73 and OS79. The cooler temperatures, as measured by IR thermometer, were AMB, 6.0 and 7.4°C. For further details regarding sample receipt, please refer to the enclosed Cooler Receipt Form and Preservation Verification sheet.

The samples were analyzed for the parameters listed below, as requested on the Chain of Custody.

PCBs by Method 8082:

The filter bag sample was extracted on 3/30/09 and analyzed on 4/1/09 within the method recommended holding times. The water sample was extracted on 3/30/09 and analyzed on 4/4/09 within the method recommended holding time.

Initial calibration (s): All analytes of interest were within method acceptance criteria.

Continuing calibration (s): Are in control.

Samples: There were no anomalies associated with these samples.

Surrogates: The surrogate DCBP is out of control high and the surrogate TCMX is out of control low for the method blank. TCMX is not required per the analysis method and the method blank was non-detect, therefore no further corrective action was taken.

The LCSD surrogate DCBP is out of control high. The LCS was in control, therefore no further corrective action was taken.

LCS(s): All percent recoveries for the analytes of interest were within compliance.

Method Blank: The method blank was free of contamination.

Dissolved Metals by Methods 6010B and 7000 series

The samples were digested on 3/31/09. The digests were analyzed between 4/3/09 and 4/7/09 within the method recommended holding times.

Case Narrative

Project: Boeing Plant 2 Source Control
ARI IDs: OR49, OS60, OS61, OS73, OS79
Matrix: Water, Filter Bag
Date: April 10, 2009

Replicate(s): All percent recoveries were within compliance.

Samples: No anomalies were encountered for these samples.

LCS/Blank Spike(s): All percent recoveries were within compliance.

Method Blank(s): Are in control.

Dissolved Low-Level Mercury by Method SW7470A

The samples were digested on 3/30/09 and 3/31/09. The digests were analyzed on 4/1/09 within the method recommended holding times.

Replicate(s): All percent recoveries were within compliance.

Samples: No anomalies were encountered for these samples.

LCS/Blank Spike(s): All percent recoveries were within compliance.

Method Blank(s): Are in control.

Standard Reference: All percent recoveries were within compliance.

Analytical Resources, Incorporated
Analytical Chemists and Consultants

Organic Extractions Laboratory
Analyst Notes

ARI Job No.: QR49 Client ID: The Boeing Company

Parameter: PCB Client Project: BP2 Source Control

SOP Number(s): 3545 **No Anomalies:**

List problems, concerns, corrective actions and any other pertinent information

Filter Bag weight wet = 317.04g

Metals soil/solid split = Insufficient Volume (No Metals split)

Filter Bag weight Dry with plastic Ring = 112.34g

Plastic Ring weight = 8.44g

Filter Bag weight Dry without plastic Ring = 103.90

extract required High volume acid clean, transfered and Acid cleaned a second time, color remained. ~ww 3/31/09

extract emulsed at water wash portion of sulfer clean, centrifuged to break, leaving a yellow top layer white layer under that, cloudy layer under that and a clear layer at the bottom ~ww 3/31/09

Analyst Initials:		Date:	

Data Reporting Qualifiers

Effective 12/28/04

Inorganic Data

U Indicates that the target analyte was not detected at the reported concentration

* Duplicate RPD is not within established control limits

B Reported value is less than the CRDL but ≥ the Reporting Limit

N Matrix Spike recovery not within established control limits

NA Not Applicable, analyte not spiked

H The natural concentration of the spiked element is so much greater than the concentration spiked that an accurate determination of spike recovery is not possible

L Analyte concentration is ≤5 times the Reporting Limit and the replicate control limit defaults to ±1 RL instead of the normal 20% RPD

Organic Data

U Indicates that the target analyte was not detected at the reported concentration

* Flagged value is not within established control limits

B Analyte detected in an associated Method Blank at a concentration greater than one-half of ARI's Reporting Limit or 5% of the regulatory limit or 5% of the analyte concentration in the sample.

J Estimated concentration when the value is less than ARI's established reporting limits

D The spiked compound was not detected due to sample extract dilution

NR Spiked compound recovery is not reported due to chromatographic interference

E Estimated concentration calculated for an analyte response above the valid instrument calibration range. A dilution is required to obtain an accurate quantification of the analyte.

S Indicates an analyte response that has saturated the detector. The calculated concentration is not valid; a dilution is required to obtain valid quantification of the analyte

NA The flagged analyte was not analyzed for

NS The flagged analyte was not spiked into the sample

M Estimated value for an analyte detected and confirmed by an analyst but with low spectral match parameters. This flag is used only for GC-MS analyses

M2 The sample contains PCB congeners that do not match any standard Aroclor pattern. The PCBs are identified and quantified as the Aroclor whose pattern most closely matches that of the sample. The reported value is an estimate.

N The analysis indicates the presence of an analyte for which there is presumptive evidence to make a "tentative identification"

Y The analyte is not detected at or above the reported concentration. The reporting limit is raised due to chromatographic interference. The Y flag is equivalent to the U flag with a raised reporting limit.

C The analyte was positively identified on only one of two chromatographic columns. Chromatographic interference prevented a positive identification on the second column

P The analyte was detected on both chromatographic columns but the quantified values differ by ≥40% RPD with no obvious chromatographic interference

Geotechnical Data

A The total of all fines fractions. This flag is used to report total fines when only sieve analysis is requested and balances total grain size with sample weight.

F Samples were frozen prior to particle size determination

SM Sample matrix was not appropriate for the requested analysis. This normally refers to samples contaminated with an organic product that interferes with the sieving process and/or moisture content, porosity and saturation calculations

SS Sample did not contain the proportion of "fines" required to perform the pipette portion of the grain size analysis

W Weight of sample in some pipette aliquots was below the level required for accurate weighting

LCS SOLUTIONS

02/27/09

LABEL	SOLN ID	TEST	CONC. UG/ML	SOLVENT	EXP.
1	1549-3	PCB	20	ACETONE	10/10/09
2#	1472-3	BCOC PEST	10	ACETONE	07/20/08
3	1579-3	PEST	02/04/20	ACETONE	09/23/09
4	1576-3	LOW PEST	0.2/0.4/2	ACETONE	07/31/09
5	1580-2	EPH	1500	MECL2	01/29/10
6	1559-2	PCP	12.5/125	ACETONE	11/05/09
7	1581-4	ABN	100	ACETONE	08/01/09
8	1566-1	TBT	2.5	MECL2	12/04/09
9	1567-3	PORE TBT	.125/.25	MECL2	12/04/09
10	1578-3	ABN ACID	100/200	MEOH	10/21/09
11	1563-3	TPHD	15000	ACETONE	11/20/09
12	1583-1	ABN BASE	200	ACETONE	02/05/10
13	1573-2	LOW PCB	2	ACETONE	10/10/09
14	1547-1	LOW ABN ACID	10/20	MEOH	04/10/09
15*	1452-1	SIM PNA	15/75	MEOH	04/09/09
16*	1502-2	DIOXANE	100	MEOH	02/26/10
17	1516-2	1248 PCB	20	ACETONE	05/07/09
18	1514-4	LOW SIM PNA	1.5/7.5	ACETONE	04/24/09
19	1574-4	AK103	7500	MECL2	12/02/09
20	1572-2	PNA	100	ACETONE	12/26/09
21*	1414-4	SKY/BHT	100	MEOH	04/08/09
22	1570-1	HERB	12.5/12500	MEOH	12/22/09
23	1505-1	LOW ABN BASE	20	MEOH	03/20/09
24	1573-4	LOW ABN	10	ACETONE	08/01/09
25#	1481-1	DIPHENYL	100	MEOH	07/20/08
26*	1545-2	OP-PEST	25	MEOH	02/16/10
27#	1495-1	STEROLS	200	MEOH	12/29/08
28#	1494-1	ADD. PEST	4	ACETONE	01/23/09
29#	1496-3	DECANES	100	MEOH	02/12/09
30	1497-2	EDB/DBCP	2	ACETONE	02/12/09
31	1510-3	TERPINEOL	100	MEOH	03/21/09

LCS SOLUTIONS

02/27/09

32	1576-2	GUAIACOL	50-200	ACETONE	06/05/09
33	1522-1	RESIN ACID	250	ACETONE	06/11/09
34	1530-2	CONGENERS	1	ACETONE	07/23/09
50	1571-1	FULL RESIN	250	ACETONE	06/10/09
*=REVERIFIED SOLUTION					
#=PROJECT SPECIFIC					

SURR SOLUTIONS

02/27/09

LABEL	SOLN ID	TEST	CONC. UG/ML	SOLVENT	EXP.
A	1584-5	ABN	100/150	MEOH	02/18/10
B	1572-1	SIM PNA	15/75	MEOH	08/28/09
C	1559-1	SIM ABN	25/37.5	MEOH	03/13/09
D	1573-3	LOW PCB	0.2	ACETONE	07/31/09
E*	1478-1	HERB	62.5	MEOH	09/21/09
F	1574-3	PCP	12.5	ACETONE	01/06/10
G*	1534-1	1,4DIOXANE	100	MEOH	02/26/10
H*	1545-1	OP-PEST	25	MEOH	02/16/10
I	1559-4	LOW S. PNA	1.5	MEOH	08/28/09
J	1566-5	TBT-PORE	0.125	MECL2	12/04/09
K	1538-1	MED PCB	20	ACETONE	07/31/09
L	1584-4	TBT	2.5	MECL2	12/04/09
M	1578-1	EPH	1500	MECL2	12/09/09
N	1538-2	PCB	2	ACETONE	07/31/09
O	1567-4	TPH	450	MECL2	09/24/09
P	1560-3	HCID	2250	MECL2	09/24/09
Q	1497-3	EDB	2	ACETONE	02/12/09
R	1521-4	RESIN ACID	250	ACETONE	06/11/09
S	1568-5	PBDE	.25	MEOH	12/11/09
T	*reverified	solution			
U					
V					
W					
X					
Y					
Z					

Data Summary Package

prepared
for

The Boeing Company

Project: BOEING PLANT 2 SOURCE CONTROL

ARI JOB NO: OR49, OS60, OS61, OS73, OS79

prepared
by

Analytical Resources, Inc.

PCB ANALYSIS

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PCB by GC/ECD Method SW8082
Page 1 of 1

Sample ID: PL2SC-SS-A-031909
SAMPLE

Lab Sample ID: OR49B
LIMS ID: 09-7035
Matrix: Filter Bag
Data Release Authorized:
Reported: 04/02/09

QC Report No: OR49-The Boeing Company
Project: BP2 SOURCE CONTROL

Date Sampled: 03/19/09
Date Received: 03/19/09

Date Extracted: 03/30/09
Date Analyzed: 04/01/09 14:56
Instrument/Analyst: ECD5/JGR
GPC Cleanup: No
Sulfur Cleanup: Yes
Acid Cleanup: Yes

Sample Amount: 1.00 Filter Bag
Final Extract Volume: 5.0 mL
Dilution Factor: 10.0
Silica Gel: Yes

CAS Number	Analyte	RL	Result
12674-11-2	Aroclor 1016	1.0	< 1.0 U
53469-21-9	Aroclor 1242	1.0	< 1.0 U
12672-29-6	Aroclor 1248	1.0	< 1.0 U
11097-69-1	**Aroclor 1254**	**1.0**	**1.8**
11096-82-5	**Aroclor 1260**	**1.0**	**1.7**
11104-28-2	Aroclor 1221	1.0	< 1.0 U
11141-16-5	Aroclor 1232	1.0	< 1.0 U

Reported in Total µg

PCB Surrogate Recovery

Decachlorobiphenyl	89.0%
Tetrachlorometaxylene	92.0%

FORM I

ANALYTICAL RESOURCES INCORPORATED

SW8082/PCB SURROGATE RECOVERY SUMMARY

Matrix: Filter Bag

QC Report No: OR49-The Boeing Company
Project: BP2 SOURCE CONTROL

Client ID	DCBP	TCMX	TOT OUT
MB-033009	96.0%	77.2%	0
LCS-033009	94.0%	79.2%	0
LCSD-033009	92.0%	77.5%	0
PL2SC-SS-A-031909	89.0%	92.0%	0

	LCS/MB LIMITS	QC LIMITS
(DCBP) = Decachlorobiphenyl	(30-160)	(30-160)
(TCMX) = Tetrachlorometaxylene	(30-160)	(30-160)

Prep Method: SW3550B
Log Number Range: 09-7035 to 09-7035

FORM-II SW8082

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PCB by GC/ECD Method SW8082
Page 1 of 1

Sample ID: LCS-033009
LCS/LCSD

Lab Sample ID: LCS-033009
LIMS ID: 09-7035
Matrix: Filter Bag
Data Release Authorized:
Reported: 04/02/09

QC Report No: OR49-The Boeing Company
Project: BP2 SOURCE CONTROL

Date Sampled: 03/19/09
Date Received: 03/19/09

Date Extracted LCS/LCSD: 03/30/09

Date Analyzed LCS: 04/01/09 14:22
LCSD: 04/01/09 14:39
Instrument/Analyst LCS: ECD5/JGR
LCSD: ECD5/JGR

GPC Cleanup: No
Sulfur Cleanup: Yes

Sample Amount LCS: 1.00 Filter Bag
LCSD: 1.00 Filter Bag
Final Extract Volume LCS: 5.0 mL
LCSD: 5.0 mL
Dilution Factor LCS: 1.00
LCSD: 1.00
Silica Gel: Yes
Acid Cleanup: Yes

Analyte	LCS	Spike Added-LCS	LCS Recovery	LCSD	Spike Added-LCSD	LCSD Recovery	RPD
Aroclor 1016	2.0	2.5	80.0%	2.0	2.5	80.0%	0.0%
Aroclor 1260	2.5	2.5	100%	2.5	2.5	100%	0.0%

PCB Surrogate Recovery

	LCS	LCSD
Decachlorobiphenyl	94.0%	92.0%
Tetrachlorometaxylene	79.2%	77.5%

Reported in Total µg
RPD calculated using sample concentrations per SW846.

PCB METHOD BLANK SUMMARY

BLANK NO.

OR49MB1

Lab Name: ANALYTICAL RESOURCES, INC
Client: THE BOEING COMPANY

ARI Job No.: OR49
Project: BP2 SOURCE CONTROL

Lab Sample ID: OR49MB1
Lab File ID: 0401B030

Date Extracted: 03/30/09
Matrix: SOLID

Date Analyzed: 04/01/09
Instrument ID: ECD5

Time Analyzed: 1405
GC Columns: ZB5/ZB35

THIS METHOD BLANK APPLIES TO THE FOLLOWING SAMPLES, MS and MSD:

	CLIENT SAMPLE NO.	LAB SAMPLE ID	DATE ANALYZED
01	OR49LCS1	OR49LCS1	04/01/09
02	OR49LCSD1	OR49LCSD1	04/01/09
03	PL2SC-SS-A-031909	OR49B	04/01/09

ALL RUNS ARE DUAL COLUMN

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PCB by GC/ECD Method SW8082
Page 1 of 1

Sample ID: MB-033009
METHOD BLANK

Lab Sample ID: MB-033009
LIMS ID: 09-7035
Matrix: Filter Bag
Data Release Authorized:
Reported: 04/02/09

QC Report No: OR49-The Boeing Company
Project: BP2 SOURCE CONTROL

Date Sampled: NA
Date Received: NA

Date Extracted: 03/30/09
Date Analyzed: 04/01/09 14:05
Instrument/Analyst: ECD5/JGR
GPC Cleanup: No
Sulfur Cleanup: Yes
Acid Cleanup: Yes

Sample Amount: 1.00 Filter Bag
Final Extract Volume: 5.0 mL
Dilution Factor: 1.00
Silica Gel: Yes

CAS Number	Analyte	RL	Result
12674-11-2	Aroclor 1016	0.5	< 0.5 U
53469-21-9	Aroclor 1242	0.5	< 0.5 U
12672-29-6	Aroclor 1248	0.5	< 0.5 U
11097-69-1	Aroclor 1254	0.5	< 0.5 U
11096-82-5	Aroclor 1260	0.5	< 0.5 U
11104-28-2	Aroclor 1221	0.5	< 0.5 U
11141-16-5	Aroclor 1232	0.5	< 0.5 U

Reported in Total µg

PCB Surrogate Recovery

Decachlorobiphenyl	96.0%
Tetrachlorometaxylene	77.2%

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PCB by GC/ECD Method SW8082
Page 1 of 1

Sample ID: PL2SC-EB1-032709
SAMPLE

Lab Sample ID: OS60A
LIMS ID: 09-7569
Matrix: Water
Data Release Authorized:
Reported: 04/07/09

QC Report No: OS60-The Boeing Company
Project: BP2 SOURCE CONTROL

Date Sampled: 03/27/09
Date Received: 03/27/09

Date Extracted: 03/30/09
Date Analyzed: 04/04/09 00:43
Instrument/Analyst: ECD5/JGR
GPC Cleanup: No
Sulfur Cleanup: No

Sample Amount: 500 mL
Final Extract Volume: 5.0 mL
Dilution Factor: 1.00
Silica Gel: No
Acid Cleanup: No

CAS Number	Analyte	RL	Result
12674-11-2	Aroclor 1016	1.0	< 1.0 U
53469-21-9	Aroclor 1242	1.0	< 1.0 U
12672-29-6	Aroclor 1248	1.0	< 1.0 U
11097-69-1	Aroclor 1254	1.0	< 1.0 U
11096-82-5	Aroclor 1260	1.0	< 1.0 U
11104-28-2	Aroclor 1221	1.0	< 1.0 U
11141-16-5	Aroclor 1232	1.0	< 1.0 U

Reported in µg/L (ppb)

PCB Surrogate Recovery

Decachlorobiphenyl	101%
Tetrachlorometaxylene	72.8%

FORM I

ANALYTICAL RESOURCES INCORPORATED

SW8082/PCB WATER SURROGATE RECOVERY SUMMARY

Matrix: Water

QC Report No: OS60-The Boeing Company
Project: BP2 SOURCE CONTROL

Client ID	DCBP % REC	DCBP LCL-UCL	TCMX % REC	TCMX LCL-UCL	TOT OUT
MB-033009	104%*	47-101	60.5%*	61-104	2
LCS-033009	96.2%	47-101	63.8%	61-104	0
LCSD-033009	103%*	47-101	68.5%	61-104	1
PL2SC-EB1-032709	101%	42-120	72.8%	55-102	0

Prep Method: SW3510C
Log Number Range: 09-7569 to 09-7569

FORM-II SW8082

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PCB by GC/ECD Method SW8082
Page 1 of 1

Sample ID: LCS-033009
LCS/LCSD

Lab Sample ID: LCS-033009
LIMS ID: 09-7569
Matrix: Water
Data Release Authorized:
Reported: 04/07/09

QC Report No: OS60-The Boeing Company
Project: BP2 SOURCE CONTROL

Date Sampled: NA
Date Received: NA

Date Extracted LCS/LCSD: 03/30/09

Date Analyzed LCS: 04/04/09 00:09
LCSD: 04/04/09 00:26
Instrument/Analyst LCS: ECD5/JGR
LCSD: ECD5/JGR
GPC Cleanup: No
Sulfur Cleanup: No

Sample Amount LCS: 500 mL
LCSD: 500 mL
Final Extract Volume LCS: 5.0 mL
LCSD: 5.0 mL
Dilution Factor LCS: 1.00
LCSD: 1.00
Silica Gel: No
Acid Cleanup: No

Analyte	LCS	Spike Added-LCS	LCS Recovery	LCSD	Spike Added-LCSD	LCSD Recovery	RPD
Aroclor 1016	4.38	5.00	87.6%	4.89	5.00	97.8%	11.0%
Aroclor 1260	5.25	5.00	105%	5.50	5.00	110%	4.7%

PCB Surrogate Recovery

	LCS	LCSD
Decachlorobiphenyl	96.2%	103%
Tetrachlorometaxylene	63.8%	68.5%

Results reported in µg/L
RPD calculated using sample concentrations per SW846.

PCB METHOD BLANK SUMMARY

BLANK NO.

OS60MBW1

Lab Name: ANALYTICAL RESOURCES, INC
Client: THE BOEING COMPANY

ARI Job No.: OS60
Project: BP2 SOURCE CONTROL

Lab Sample ID: OS60MBW1
Lab File ID: 0403B047

Date Extracted: 03/30/09
Matrix: LIQUID

Date Analyzed: 04/04/09
Instrument ID: ECD5

Time Analyzed: 2352
GC Columns: ZB5/ZB35

THIS METHOD BLANK APPLIES TO THE FOLLOWING SAMPLES, MS and MSD:

	CLIENT SAMPLE NO.	LAB SAMPLE ID	DATE ANALYZED
01	OS60LCSW1	OS60LCSW1	04/04/09
02	OS60LCSDW1	OS60LCSDW1	04/04/09
03	PL2SC-EB1-032709	OS60A	04/04/09

ALL RUNS ARE DUAL COLUMN

FORM IV PCB

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PCB by GC/ECD Method SW8082

Sample ID: MB-033009
METHOD BLANK

Lab Sample ID: MB-033009
LIMS ID: 09-7569
Matrix: Water
Data Release Authorized:
Reported: 04/07/09

QC Report No: OS60-The Boeing Company
Project: BP2 SOURCE CONTROL

Date Sampled: NA
Date Received: NA

Date Extracted: 03/30/09
Date Analyzed: 04/04/09 23:52
Instrument/Analyst: ECD5/JGR
GPC Cleanup: No
Sulfur Cleanup: No

Sample Amount: 500 mL
Final Extract Volume: 5.0 mL
Dilution Factor: 1.00
Silica Gel: No
Acid Cleanup: No

CAS Number	Analyte	RL	Result
12674-11-2	Aroclor 1016	1.0	< 1.0 U
53469-21-9	Aroclor 1242	1.0	< 1.0 U
12672-29-6	Aroclor 1248	1.0	< 1.0 U
11097-69-1	Aroclor 1254	1.0	< 1.0 U
11096-82-5	Aroclor 1260	1.0	< 1.0 U
11104-28-2	Aroclor 1221	1.0	< 1.0 U
11141-16-5	Aroclor 1232	1.0	< 1.0 U

Reported in µg/L (ppb)

PCB Surrogate Recovery

Decachlorobiphenyl	104%
Tetrachlorometaxylene	60.5%

METALS ANALYSIS

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
DISSOLVED METALS

Sample ID: PL2SC-EB1-032709
SAMPLE

Lab Sample ID: OS60A
LIMS ID: 09-7569
Matrix: Water
Data Release Authorized:
Reported: 04/10/09

QC Report No: OS60-The Boeing Company
Project: BP2 SOURCE CONTROL

Date Sampled: 03/27/09
Date Received: 03/27/09

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	RL	µg/L	Q
7000A	03/31/09	7060A	04/07/09	7440-38-2	Arsenic	1	1	U
6010B	03/31/09	6010B	04/03/09	7440-43-9	Cadmium	2	2	U
6010B	03/31/09	6010B	04/03/09	7440-47-3	Chromium	5	5	U
6010B	03/31/09	6010B	04/03/09	7440-50-8	Copper	2	2	U
7000A	03/31/09	7421	04/07/09	7439-92-1	Lead	1	1	U
6010B	03/31/09	6010B	04/03/09	7440-22-4	Silver	3	3	U
6010B	03/31/09	6010B	04/03/09	7440-66-6	Zinc	10	10	U

U-Analyte undetected at given RL
RL-Reporting Limit

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
DISSOLVED METALS
Page 1 of 1

Sample ID: METHOD BLANK

Lab Sample ID: OS60MB
LIMS ID: 09-7569
Matrix: Water
Data Release Authorized:
Reported: 04/10/09

QC Report No: OS60-The Boeing Company
Project: BP2 SOURCE CONTROL

Date Sampled: NA
Date Received: NA

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	RL	µg/L	Q
7000A	03/31/09	7060A	04/07/09	7440-38-2	Arsenic	1	1	U
6010B	03/31/09	6010B	04/03/09	7440-43-9	Cadmium	2	2	U
6010B	03/31/09	6010B	04/03/09	7440-47-3	Chromium	5	5	U
6010B	03/31/09	6010B	04/03/09	7440-50-8	Copper	2	2	U
7000A	03/31/09	7421	04/07/09	7439-92-1	Lead	1	1	U
6010B	03/31/09	6010B	04/03/09	7440-22-4	Silver	3	3	U
6010B	03/31/09	6010B	04/03/09	7440-66-6	Zinc	10	10	U

U-Analyte undetected at given RL
RL-Reporting Limit

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
DISSOLVED METALS

Sample ID: LAB CONTROL

Lab Sample ID: OS60LCS
LIMS ID: 09-7569
Matrix: Water
Data Release Authorized:
Reported: 04/10/09

QC Report No: OS60-The Boeing Company
Project: BP2 SOURCE CONTROL

Date Sampled: NA
Date Received: NA

BLANK SPIKE QUALITY CONTROL REPORT

Analyte	Analysis Method	Spike Found	Spike Added	% Recovery	Q
Arsenic	7060A	20	20	100%	
Cadmium	6010B	527	500	105%	
Chromium	6010B	501	500	100%	
Copper	6010B	499	500	99.8%	
Lead	7421	19	20	95.0%	
Silver	6010B	487	500	97.4%	
Zinc	6010B	500	500	100%	

Reported in µg/L

N-Control limit not met
Control Limits: 80-120%

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
DISSOLVED METALS
Page 1 of 1

Sample ID: PL2SC-W-B-032809
SAMPLE

Lab Sample ID: OS79A
LIMS ID: 09-7662
Matrix: Water
Data Release Authorized:
Reported: 04/10/09

QC Report No: OS79-The Boeing Company
Project: BOEING PLANT 2 SOURCE CONTROL

Date Sampled: 03/28/09
Date Received: 03/28/09

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	RL	µg/L	Q
7000A	03/31/09	7060A	04/07/09	7440-38-2	Arsenic	1	1	U
6010B	03/31/09	6010B	04/03/09	7440-43-9	Cadmium	2	2	U
6010B	03/31/09	6010B	04/03/09	7440-47-3	Chromium	5	5	U
6010B	03/31/09	6010B	04/03/09	**7440-50-8**	**Copper**	2	**4**	
7000A	03/31/09	7421	04/07/09	7439-92-1	Lead	1	1	U
6010B	03/31/09	6010B	04/03/09	7440-22-4	Silver	3	3	U
6010B	03/31/09	6010B	04/03/09	**7440-66-6**	**Zinc**	10	**50**	

U-Analyte undetected at given RL
RL-Reporting Limit

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
DISSOLVED METALS
Page 1 of 1

Sample ID: PL2SC-W-J505-032809
SAMPLE

Lab Sample ID: OS79B
LIMS ID: 09-7663
Matrix: Water
Data Release Authorized:
Reported: 04/10/09

QC Report No: OS79-The Boeing Company
Project: BOEING PLANT 2 SOURCE CONTROL

Date Sampled: 03/28/09
Date Received: 03/28/09

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	RL	µg/L	Q
7000A	03/31/09	7060A	04/07/09	7440-38-2	Arsenic	1	1	U
6010B	03/31/09	6010B	04/03/09	7440-43-9	Cadmium	2	2	U
6010B	03/31/09	6010B	04/03/09	7440-47-3	Chromium	5	5	U
6010B	03/31/09	6010B	04/03/09	**7440-50-8**	**Copper**	2	**10**	
7000A	03/31/09	7421	04/07/09	7439-92-1	Lead	1	1	U
6010B	03/31/09	6010B	04/03/09	7440-22-4	Silver	3	3	U
6010B	03/31/09	6010B	04/03/09	**7440-66-6**	**Zinc**	10	**90**	

U-Analyte undetected at given RL
RL-Reporting Limit

MERCURY ANALYSIS

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
Dissolved Mercury by Method SW7470A

Data Release Authorized:
Reported: 04/01/09
Date Received: 03/27/09
Page 1 of 1

QC Report No: OS61-The Boeing Company
Project: BP2 SOURCE CONTROL

Client/ ARI ID	Date Sampled	Matrix	Prep Date Anal Date	RL	Result
PL2SC-EB1-032709 OS61A 09-7570	03/27/09	Water	03/30/09 04/01/09	20.0	20.0 U
MB-033009 Method Blank	NA	Water	03/30/09 04/01/09	20.0	20.0 U

Reported in ng/L

RL-Analytical reporting limit
U-Undetected at reported detection limit

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
DISSOLVED METALS
Page 1 of 1

Sample ID: PL2SC-EB1-032709
DUPLICATE

Lab Sample ID: OS61A
LIMS ID: 09-7570
Matrix: Water
Data Release Authorized:
Reported: 04/01/09

QC Report No: OS61-The Boeing Company
Project: BP2 SOURCE CONTROL

Date Sampled: 03/27/09
Date Received: 03/27/09

MATRIX DUPLICATE QUALITY CONTROL REPORT

Analyte	Analysis Method	Sample	Duplicate	RPD	Control Limit	Q
Mercury	7470A	20.0 U	20.0 U	0.0%	+/- 20.0	L

Reported in ng/L

*-Control Limit Not Met
L-RPD Invalid, Limit = Detection Limit

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
DISSOLVED METALS

Sample ID: PL2SC-EB1-032709
MATRIX SPIKE

Lab Sample ID: OS61A
LIMS ID: 09-7570
Matrix: Water
Data Release Authorized:
Reported: 04/01/09

QC Report No: OS61-The Boeing Company
Project: BP2 SOURCE CONTROL

Date Sampled: 03/27/09
Date Received: 03/27/09

MATRIX SPIKE QUALITY CONTROL REPORT

Analyte	Analysis Method	Sample	Spike	Spike Added	% Recovery	Q
Mercury	7470A	20.0 U	99.4	100	99.4%	

Reported in ng/L

N-Control Limit Not Met
H-% Recovery Not Applicable, Sample Concentration Too High
NA-Not Applicable, Analyte Not Spiked

Percent Recovery Limits: 75-125%

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
DISSOLVED METALS
Page 1 of 1

Sample ID: LAB CONTROL

Lab Sample ID: OS61LCS
LIMS ID: 09-7570
Matrix: Water
Data Release Authorized:
Reported: 04/01/09

QC Report No: OS61-The Boeing Company
Project: BP2 SOURCE CONTROL

Date Sampled: NA
Date Received: NA

BLANK SPIKE QUALITY CONTROL REPORT

Analyte	Analysis Method	Spike Found	Spike Added	% Recovery	Q
Mercury	7470A	196	200	98.0%	

Reported in ng/L

N-Control limit not met
Control Limits: 80-120%

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
Dissolved Mercury by Method SW7470A

Data Release Authorized:
Reported: 04/01/09
Date Received: 03/28/09
Page 1 of 1

QC Report No: OS73-The Boeing Company
Project: BOEING PLANT 2 SOURCE CONTROL

Client/ ARI ID	Date Sampled	Matrix	Prep Date Anal Date	RL	Result
PL2SC-W-B-032809 OS73A 09-7658	03/28/09	Water	03/31/09 04/01/09	20.0	20.0 U
PL2SC-W-J505-032809 OS73B 09-7659	03/28/09	Water	03/31/09 04/01/09	20.0	20.0 U
MB-033109 Method Blank	NA	Water	03/31/09 04/01/09	20.0	20.0 U

Reported in ng/L

RL-Analytical reporting limit
U-Undetected at reported detection limit

Analytical Resources, Incorporated
Analytical Chemists and Consultants

May 5, 2009

Will Ernst
The Boeing Company
Energy and Environmental Affairs
P.O. Box 3707, M/S 7A-WH
Seattle, WA 98124-2207

RE: Boeing Plant 2 Source Control
ARI ID: OW01

Dear Will:

Please find enclosed the original *Chain of Custody* (COC) record and final data package for the project referenced above.

Sample receipt information and analytical details are addressed in the *Case Narrative*.

Copies of the reports and all associated raw data will be kept on file at ARI. If you have any questions or require additional information, please contact me at your convenience.

Sincerely,
ANALYTICAL RESOURCES, INC.

Kelly Bottem
Client Services Manager
(206) 695-6211
kellyb@arilabs.com

KB/kb

Enclosures

cc: Kent Angelos, Golder Associates Inc., 18300 NE Union Hill Road, Suite 200, Redmond, WA 98052-3333

Chain of Custody
Documentation

prepared
for

The Boeing Company

Project: BP2 SOURCE CONTROL

ARI JOB NO: OW01

prepared
by

Analytical Resources, Inc.

Chain of Custody Record & Laboratory Analysis Request

ARI Assigned Number: CW09	Turn-around Requested: standard	Page: 1 of 1	
ARI Client Company: Boeing	Phone:	Date: 4/17/09	Ice Present? n/a
Client Contact: Will Ernst		No. of Coolers:	Cooler Temps: ambient
Client Project Name: BP2 Source Control			
Client Project #:	Samplers: L. Shea, J. Lamberts		

Analytical Resources, Incorporated
Analytical Chemists and Consultants
4611 South 134th Place, Suite 100
Tukwila, WA 98168
206-695-6200 206-695-6201 (fax)

Sample ID	Date	Time	Matrix	No. Containers	Analysis Requested: SMS metals	Analysis Requested: PCBs	Notes/Comments
PL2SC-SS-J505-041709	4/17/09	1200	Filter Bag	1	X	X	

Comments/Special Instructions	Relinquished by: (Signature)	Received by: (Signature)	Relinquished by: (Signature)	Received by: (Signature)
SMS metals per QAPP (includes Hg)	Printed Name: J. Lamberts	Printed Name: Jonathon Walter	Printed Name:	Printed Name:
	Company: Golder	Company: ARI	Company:	Company:
	Date & Time: 4/17/09 115 pm	Date & Time: 4/17/09 1315	Date & Time:	Date & Time:

Analytical Resources, Incorporated
Analytical Chemists and Consultants

Cooler Receipt Form

ARI Client: Boeing
Project Name: BP2 Source Control
COC No(s): _____ (NA)
Delivered by: Fed-Ex UPS Courier ~~Hand Delivered~~ Other: _____
Assigned ARI Job No: _____
Tracking No: _____ (NA)

Preliminary Examination Phase:

Were intact, properly signed and dated custody seals attached to the outside of to cooler?	YES	(NO)
Were custody papers included with the cooler?	(YES)	NO
Were custody papers properly filled out (ink, signed, etc.)	(YES)	NO

Temperature of Cooler(s) (°C) (recommended 2.0-6.0 °C for chemistry)..... AMB
If cooler temperature is out of compliance fill out form 00070F
Temp Gun ID#: _____

Cooler Accepted by: JW Date: 4/17/09 Time: 1315

Complete custody forms and attach all shipping documents

Log-In Phase:

Was a temperature blank included in the cooler?		YES	(NO)
What kind of packing material was used? ... Bubble Wrap Wet Ice Gel Packs (Baggies) Foam Block Paper Other: _____			
Was sufficient ice used (if appropriate)?	(NA)	YES	NO
Were all bottles sealed in individual plastic bags?		(YES)	NO
Did all bottles arrive in good condition (unbroken)?		(YES)	NO
Were all bottle labels complete and legible?		(YES)	NO
Did the number of containers listed on COC match with the number of containers received?		(YES)	NO
Did all bottle labels and tags agree with custody papers?		(YES)	NO
Were all bottles used correct for the requested analyses?		(YES)	NO
Do any of the analyses (bottles) require preservation? (attach preservation sheet, excluding VOCs)...	(NA)	YES	NO
Were all VOC vials free of air bubbles?	(NA)	YES	NO
Was sufficient amount of sample sent in each bottle?		(YES)	NO

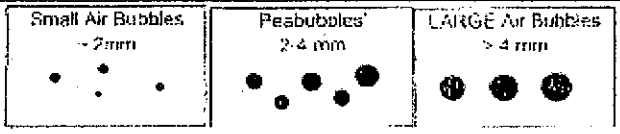
Samples Logged by: MM Date: 4/17/09 Time: 1345

*** Notify Project Manager of discrepancies or concerns ***

Sample ID on Bottle	Sample ID on COC	Sample ID on Bottle	Sample ID on COC

Additional Notes, Discrepancies, & Resolutions:

By: Date:



Small → "sm"
Peabubbles → "pb"
Large → "lg"
Headspace → "hs"

Case Narrative

prepared
for

The Boeing Company

Project: BP2 SOURCE CONTROL

ARI JOB NO: OW01

prepared
by

Analytical Resources, Inc.

ANALYTICAL
RESOURCES
INCORPORATED

Case Narrative

Project: Boeing Plant 2 Source Control
ARI ID: OW01
Matrix: Filter Bag / Soil
Date: May 5, 2009

Sample Receipt Information

One solid matrix sample was received in good condition at ARI on 04/17/09 under ARI sample delivery group OW01. One cooler arrived at an ambient temperature.

Select samples were analyzed for the parameters listed below, as requested on the COC.

PCBs by Method 8082:

The sample was extracted on 4/22/09 and analyzed on 4/30/09 within the method recommended holding times.

Initial calibration (s): All analytes of interest were within method acceptance criteria.

Continuing calibration (s): Are in control.

Samples: There were no anomalies associated with these samples.

Surrogates: All surrogate recoveries were in control.

LCS(s): All percent recoveries for the analytes of interest were within compliance.

Method Blank: The method blank was free of contamination.

Total Metals by Methods 6010B and 7000 series

The samples were digested on 4/20/09. The digests were analyzed between 4/23/09 and 5/1/09 within the method recommended holding times.

Samples: No anomalies were encountered for these samples.

LCS/Blank Spike(s): All percent recoveries were within compliance.

Method Blank(s): Are in control.

Standard Reference: All percent recoveries were within compliance.

Data Reporting Qualifiers

Effective 12/28/04

Inorganic Data

U Indicates that the target analyte was not detected at the reported concentration

* Duplicate RPD is not within established control limits

B Reported value is less than the CRDL but ≥ the Reporting Limit

N Matrix Spike recovery not within established control limits

NA Not Applicable, analyte not spiked

H The natural concentration of the spiked element is so much greater than the concentration spiked that an accurate determination of spike recovery is not possible

L Analyte concentration is ≤5 times the Reporting Limit and the replicate control limit defaults to ±1 RL instead of the normal 20% RPD

Organic Data

U Indicates that the target analyte was not detected at the reported concentration

* Flagged value is not within established control limits

B Analyte detected in an associated Method Blank at a concentration greater than one-half of ARI's Reporting Limit or 5% of the regulatory limit or 5% of the analyte concentration in the sample.

J Estimated concentration when the value is less than ARI's established reporting limits

D The spiked compound was not detected due to sample extract dilution

NR Spiked compound recovery is not reported due to chromatographic interference

E Estimated concentration calculated for an analyte response above the valid instrument calibration range. A dilution is required to obtain an accurate quantification of the analyte.

S Indicates an analyte response that has saturated the detector. The calculated concentration is not valid; a dilution is required to obtain valid quantification of the analyte

NA The flagged analyte was not analyzed for

NS The flagged analyte was not spiked into the sample

M Estimated value for an analyte detected and confirmed by an analyst but with low spectral match parameters. This flag is used only for GC-MS analyses

M2 The sample contains PCB congeners that do not match any standard Aroclor pattern. The PCBs are identified and quantified as the Aroclor whose pattern most closely matches that of the sample. The reported value is an estimate.

N The analysis indicates the presence of an analyte for which there is presumptive evidence to make a "tentative identification"

Y The analyte is not detected at or above the reported concentration. The reporting limit is raised due to chromatographic interference. The Y flag is equivalent to the U flag with a raised reporting limit.

C The analyte was positively identified on only one of two chromatographic columns. Chromatographic interference prevented a positive identification on the second column

P The analyte was detected on both chromatographic columns but the quantified values differ by ≥40% RPD with no obvious chromatographic interference

Geotechnical Data

A The total of all fines fractions. This flag is used to report total fines when only sieve analysis is requested and balances total grain size with sample weight.

F Samples were frozen prior to particle size determination

SM Sample matrix was not appropriate for the requested analysis. This normally refers to samples contaminated with an organic product that interferes with the sieving process and/or moisture content, porosity and saturation calculations

SS Sample did not contain the proportion of "fines" required to perform the pipette portion of the grain size analysis

W Weight of sample in some pipette aliquots was below the level required for accurate weighting

LCS SOLUTIONS

03/31/09

LABE	SOLN ID	TEST	CONC. UG/ML	SOLVENT	EXP.
1	1549-3	PCB	20	ACETONE	10/10/09
2#	1472-3	BCOC PEST	10	ACETONE	07/20/08
3	1579-3	PEST	02/04/20	ACETONE	09/23/09
4	1576-3	LOW PEST	0.2/0.4/2	ACETONE	07/31/09
5	1580-2	EPH	1500	MECL2	01/29/10
6	1559-2	PCP	12.5/125	ACETONE	11/05/09
7	1589-1	ABN	100	ACETONE	03/09/10
8	1566-1	TBT	2.5	MECL2	12/04/09
9	1567-3	PORE TBT	.125/.25	MECL2	12/04/09
10	1578-3	ABN ACID	100/200	MEOH	10/21/09
11	1591-1	TPHD	15000	ACETONE	03/26/10
12	1583-1	ABN BASE	200	ACETONE	02/05/10
13	1573-2	LOW PCB	2	ACETONE	10/10/09
14	1547-1	LOW ABN ACID	10/20	MEOH	04/10/09
15	1591-3	SIM PNA	15/75	MEOH	08/28/09
16*	1502-2	DIOXANE	100	MEOH	02/26/10
17	1516-2	1248 PCB	20	ACETONE	05/07/09
18	1591-4	LOW SIM PNA	1.5	ACETONE	08/28/09
19	1574-4	AK103	7500	MECL2	12/02/09
20	1572-2	PNA	100	ACETONE	12/26/09
21	1593-3	SKY/BHT	100	MEOH	03/31/10
22	1570-1	HERB	12.5/12500	MEOH	12/22/09
23	1505-1	LOW ABN BASE	20	MEOH	03/20/09
24	1573-4	LOW ABN	10	ACETONE	08/01/09
25#	1481-1	DIPHENYL	100	MEOH	07/20/08
26*	1545-2	OP-PEST	25	MEOH	02/16/10
27#	1495-1	STEROLS	200	MEOH	12/29/08
28#	1494-1	ADD. PEST	4	ACETONE	01/23/09
29#	1496-3	DECANES	100	MEOH	02/12/09
30#	1497-2	EDB/DBCP	2	ACETONE	02/12/09
31	1510-3	TERPINEOL	100	MEOH	03/21/09

LCS SOLUTIONS

03/31/09

32	1576-2	GUAIACOL	50-200	ACETONE	06/05/09
33	1522-1	RESIN ACID	250	ACETONE	06/11/09
34	1530-2	CONGENERS	1	ACETONE	07/23/09
50	1571-1	FULL RESIN	250	ACETONE	06/10/09
*=REVERIFIED SOLUTION					
#=PROJECT SPECIFIC					

SURR SOLUTIONS

03/31/09

LABEL	SOLN ID	TEST	CONC. UG/ML	SOLVENT	EXP.
A	1584-5	ABN	100/150	MEOH	02/18/10
B	1572-1	SIM PNA	15/75	MEOH	08/28/09
C	1559-1	SIM ABN	25/37.5	MEOH	03/13/09
D	1573-3	LOW PCB	0.2	ACETONE	07/31/09
E*	1478-1	HERB	62.5	MEOH	09/21/09
F	1574-3	PCP	12.5	ACETONE	01/06/10
G*	1534-1	1,4DIOXANE	100	MEOH	02/26/10
H*	1545-1	OP-PEST	25	MEOH	02/16/10
I	1559-4	LOW S. PNA	1.5	MEOH	08/28/09
J	1566-5	TBT-PORE	0.125	MECL2	12/04/09
K	1538-1	MED PCB	20	ACETONE	07/31/09
L	1584-4	TBT	2.5	MECL2	12/04/09
M	1578-1	EPH	1500	MECL2	12/09/09
N	1538-2	PCB	2	ACETONE	07/31/09
O	1567-4	TPH	450	MECL2	09/24/09
P	1560-3	HCID	2250	MECL2	09/24/09
Q	1497-3	EDB	2	ACETONE	02/12/09
R	1521-4	RESIN ACID	250	ACETONE	06/11/09
S	1568-5	PBDE	.25	MEOH	12/11/09
T	*reverified solution				
U					
V					
W					
X					
Y					
Z					

Data Summary Package

prepared
for

The Boeing Company

Project: BP2 SOURCE CONTROL

ARI JOB NO: OW01

prepared
by

Analytical Resources, Inc.

PCB ANALYSIS

Analytical Resources, Incorporated
Analytical Chemists and Consultants

Organic Extractions Laboratory Analyst Notes

ARI Job No.: OW01 Client ID: The Boeing Company

Parameter: PSDDA PCB Client Project: BP2 Source Control

SOP Number(s): 3505 No Anomalies:

List problems, concerns, corrective actions and any other pertinent information

(weight for 558.4)

Sample wet weight - 649.70g 4/20/09 AF.

Metals split - 5.05 g

Dry Weight w/ plastic ring - 169.62g

Plastic ring weight - 24.72

Dry Weight without plastic ring - 144.88g

Sample B = viscous. HC 4-24-09

B - Hi vol volume acid cleaned - WW 4/27/09

B - Emulsion formed w/ water wash portion of Sulfer clean. Centrifuged leaving ~~3 layer~~ WW 4/27/09

3 layers, cloudy yellow solvent (1mL split taken for SPE), white layer and clear waterlayer WW 4/27/09

Analyst Initials:		Date:	

ORGANICS ANALYSIS DATA SHEET
PCB by GC/ECD Method SW8082

ANALYTICAL RESOURCES INCORPORATED

Sample ID: PL2SC-SS-J505-041709
SAMPLE

Lab Sample ID: OW01B
LIMS ID: 09-9612
Matrix: Filter Bag
Data Release Authorized: VTS
Reported: 05/01/09

QC Report No: OW01-The Boeing Company
Project: BP2 SOURCE CONTROL

Date Sampled: 04/17/09
Date Received: 04/17/09

Date Extracted: 04/22/09
Date Analyzed: 04/30/09 12:43
Instrument/Analyst: ECD5/JGR
GPC Cleanup: No
Sulfur Cleanup: Yes
Acid Cleanup: Yes

Sample Amount: 1.00 Filter Bag
Final Extract Volume: 5.0 mL
Dilution Factor: 50.0
Silica Gel: Yes

CAS Number	Analyte	RL	Result
12674-11-2	Aroclor 1016	25	< 25 U
53469-21-9	Aroclor 1242	25	< 25 U
12672-29-6	Aroclor 1248	25	< 25 U
11097-69-1	**Aroclor 1254**	**25**	**29**
11096-82-5	**Aroclor 1260**	**25**	**47**
11104-28-2	Aroclor 1221	25	< 25 U
11141-16-5	Aroclor 1232	25	< 25 U

Reported in Total µg

PCB Surrogate Recovery

Decachlorobiphenyl	D
Tetrachlorometaxylene	D

OW01 : 0001 U

ANALYTICAL RESOURCES INCORPORATED

SW8082/PCB SURROGATE RECOVERY SUMMARY

Matrix: Filter Bag

QC Report No: OW01-The Boeing Company
Project: BP2 SOURCE CONTROL

Client ID	DCBP	TCMX	TOT OUT
MB-042209	79.2%	73.2%	0
LCS-042209	82.0%	77.0%	0
LCSD-042209	80.5%	75.2%	0
PL2SC-SS-J505-041709	D	D	0

	LCS/MB LIMITS	QC LIMITS
(DCBP) = Decachlorobiphenyl	(30-160)	(30-160)
(TCMX) = Tetrachlorometaxylene	(30-160)	(30-160)

Prep Method: SW3550B
Log Number Range: 09-9612 to 09-9612

FORM-II SW8082

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PCB by GC/ECD Method SW8082
Page 1 of 1

Sample ID: LCS-042209
LCS/LCSD

Lab Sample ID: LCS-042209
LIMS ID: 09-9612
Matrix: Filter Bag
Data Release Authorized: VTS
Reported: 05/01/09

QC Report No: OW01-The Boeing Company
Project: BP2 SOURCE CONTROL

Date Sampled: 04/17/09
Date Received: 04/17/09

Date Extracted LCS/LCSD: 04/22/09

Sample Amount LCS: 1.00 Filter Bag
LCSD: 1.00 Filter Bag

Date Analyzed LCS: 04/30/09 12:08
LCSD: 04/30/09 12:26

Final Extract Volume LCS: 5.0 mL
LCSD: 5.0 mL

Instrument/Analyst LCS: ECD5/JGR
LCSD: ECD5/JGR

Dilution Factor LCS: 1.00
LCSD: 1.00

GPC Cleanup: No

Silica Gel: Yes

Sulfur Cleanup: Yes

Acid Cleanup: Yes

Analyte	LCS	Spike Added-LCS	LCS Recovery	LCSD	Spike Added-LCSD	LCSD Recovery	RPD
Aroclor 1016	2.2	2.5	88.0%	2.1	2.5	84.0%	4.7%
Aroclor 1260	2.9	2.5	116%	2.9	2.5	116%	0.0%

PCB Surrogate Recovery

	LCS	LCSD
Decachlorobiphenyl	82.0%	80.5%
Tetrachlorometaxylene	77.0%	75.2%

Reported in Total µg
RPD calculated using sample concentrations per SW846.

4

PCB METHOD BLANK SUMMARY

BLANK NO.

OW01MB1

Lab Name: ANALYTICAL RESOURCES, INC

Client: THE BOEING COMPANY

ARI Job No.: OW01

Project: BP2 SOURCE CONTROL

Lab Sample ID: OW01MB1

Lab File ID: 0430B016

Date Extracted: 04/22/09

Matrix: SOLID

Date Analyzed: 04/30/09

Instrument ID: ECD5

Time Analyzed: 1151

GC Columns: ZB5/ZB35

THIS METHOD BLANK APPLIES TO THE FOLLOWING SAMPLES, MS and MSD:

	CLIENT SAMPLE NO.	LAB SAMPLE ID	DATE ANALYZED
01	OW01LCS1	OW01LCS1	04/30/09
02	OW01LCSD1	OW01LCSD1	04/30/09
03	PL2SC-SS-J5O5-04170	OW01B	04/30/09

ALL RUNS ARE DUAL COLUMN

FORM IV PCB

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PCB by GC/ECD Method SW8082
Page 1 of 1

Sample ID: MB-042209
METHOD BLANK

Lab Sample ID: MB-042209
LIMS ID: 09-9612
Matrix: Filter Bag
Data Release Authorized: VTS
Reported: 05/01/09

QC Report No: OW01-The Boeing Company
Project: BP2 SOURCE CONTROL

Date Sampled: NA
Date Received: NA

Date Extracted: 04/22/09
Date Analyzed: 04/30/09 11:51
Instrument/Analyst: ECD5/JGR
GPC Cleanup: No
Sulfur Cleanup: Yes
Acid Cleanup: Yes

Sample Amount: 1.00 Filter Bag
Final Extract Volume: 5.0 mL
Dilution Factor: 1.00
Silica Gel: Yes

CAS Number	Analyte	RL	Result
12674-11-2	Aroclor 1016	0.5	< 0.5 U
53469-21-9	Aroclor 1242	0.5	< 0.5 U
12672-29-6	Aroclor 1248	0.5	< 0.5 U
11097-69-1	Aroclor 1254	0.5	< 0.5 U
11096-82-5	Aroclor 1260	0.5	< 0.5 U
11104-28-2	Aroclor 1221	0.5	< 0.5 U
11141-16-5	Aroclor 1232	0.5	< 0.5 U

Reported in Total µg

PCB Surrogate Recovery

Decachlorobiphenyl	79.2%
Tetrachlorometaxylene	73.2%

METALS ANALYSIS

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
TOTAL METALS
Page 1 of 1

Sample ID: PL2SC-SS-J5O5-041709
SAMPLE

Lab Sample ID: OW01A
LIMS ID: 09-9611
Matrix: Soil
Data Release Authorized:
Reported: 05/04/09

QC Report No: OW01-The Boeing Company
Project: BP2 SOURCE CONTROL

Date Sampled: 04/17/09
Date Received: 04/17/09

Percent Total Solids: 28.9%

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	RL	mg/kg-dry	Q
3050B	04/20/09	7060A	04/23/09	**7440-38-2**	**Arsenic**	0.8	**7.7**	
3050B	04/20/09	6010B	05/01/09	**7440-43-9**	**Cadmium**	0.7	**3.6**	
3050B	04/20/09	6010B	05/01/09	**7440-47-3**	**Chromium**	2	**214**	
3050B	04/20/09	6010B	05/01/09	**7440-50-8**	**Copper**	0.7	**575**	
3050B	04/20/09	7421	04/27/09	**7439-92-1**	**Lead**	8	**208**	
CLP	04/20/09	7471A	04/24/09	**7439-97-6**	**Mercury**	0.06	**0.40**	
3050B	04/20/09	6010B	05/01/09	7440-22-4	Silver	1	1	U
3050B	04/20/09	6010B	05/01/09	**7440-66-6**	**Zinc**	3	**1,990**	

U-Analyte undetected at given RL
RL-Reporting Limit

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
TOTAL METALS
Page 1 of 1

Sample ID: LAB CONTROL

Lab Sample ID: OW01LCS
LIMS ID: 09-9611
Matrix: Soil
Data Release Authorized:
Reported: 05/04/09

QC Report No: OW01-The Boeing Company
Project: BP2 SOURCE CONTROL

Date Sampled: NA
Date Received: NA

BLANK SPIKE QUALITY CONTROL REPORT

Analyte	Analysis Method	Spike Found	Spike Added	% Recovery	Q
Arsenic	7060A	9.0	10.0	90.0%	
Cadmium	6010B	49.6	50.0	99.2%	
Chromium	6010B	48.6	50.0	97.2%	
Copper	6010B	50.6	50.0	101%	
Lead	7421	10.8	10.0	108%	
Mercury	7471A	0.53	0.50	106%	
Silver	6010B	49.1	50.0	98.2%	
Zinc	6010B	47	50	94.0%	

Reported in mg/kg-dry

N-Control limit not met
NA-Not Applicable, Analyte Not Spiked
Control Limits: 80-120%

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
TOTAL METALS

Sample ID: METHOD BLANK

Lab Sample ID: OW01MB
LIMS ID: 09-9611
Matrix: Soil
Data Release Authorized:
Reported: 05/04/09

QC Report No: OW01-The Boeing Company
Project: BP2 SOURCE CONTROL

Date Sampled: NA
Date Received: NA

Percent Total Solids: NA

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	RL	mg/kg-dry	Q
3050B	04/20/09	7060A	04/23/09	7440-38-2	Arsenic	0.1	0.1	U
3050B	04/20/09	6010B	05/01/09	7440-43-9	Cadmium	0.2	0.2	U
3050B	04/20/09	6010B	05/01/09	7440-47-3	Chromium	0.5	0.5	U
3050B	04/20/09	6010B	05/01/09	7440-50-8	Copper	0.2	0.2	U
3050B	04/20/09	7421	04/27/09	7439-92-1	Lead	0.1	0.1	U
CLP	04/20/09	7471A	04/24/09	7439-97-6	Mercury	0.02	0.02	U
3050B	04/20/09	6010B	05/01/09	7440-22-4	Silver	0.3	0.3	U
3050B	04/20/09	6010B	05/01/09	7440-66-6	Zinc	1	1	U

U-Analyte undetected at given RL
RL-Reporting Limit

TOTAL SOLIDS

Solids Data Entry Report Checked by: MH Date: 4/22/09
Date: 04/21/09 Data Analyst: DM

Solids Determination performed on 04/20/09 by DM

JOB	SAMPLE	CLIENTID	TAREWEIGHT	SAMPDISH	DRYWEIGHT	SOLIDS
OW01	A	PL2SC-SS-J5O5-04170	0.960	2.363	1.365	28.87

Analytical Resources, Incorporated
Analytical Chemists and Consultants

May 22, 2009

Will Ernst
The Boeing Company
Energy and Environmental Affairs
P.O. Box 3707, M/S 7A-WH
Seattle, WA 98124-2207

RE: Boeing Plant 2 Source Control
ARI ID: OY07

Dear Will:

Please find enclosed the original *Chain of Custody* (COC) record and final data package for the project referenced above.

Sample receipt information and analytical details are addressed in the *Case Narrative*.

Copies of the reports and all associated raw data will be kept on file at ARI. If you have any questions or require additional information, please contact me at your convenience.

Sincerely,
ANALYTICAL RESOURCES, INC.

Kelly Bottem
Client Services Manager
(206) 695-6211
kellyb@arilabs.com

KB/kb

Enclosures

cc: Kent Angelos, Golder Associates Inc., 18300 NE Union Hill Road, Suite 200, Redmond, WA 98052-3333

Analytical Resources, Incorporated
Analytical Chemists and Consultants

June 17, 2009

Will Ernst
The Boeing Company
Energy and Environmental Affairs
P.O. Box 3707, M/S 7A-WH
Seattle, WA 98124-2207

RE: Boeing Plant 2 Source Control (Additional Memo)
ARI ID: OY07

Dear Will:

On May 22, 2009, data package OY07 was submitted to Golder Associates Inc. (Golder). During review, Golder noted that the wet and dry weights recorded for filter bag sample **PL2SC-SS-B-050709** resulted in an unusually low water loss percentage upon drying. Suspecting that the filter bag dry weight may have been recorded incorrectly, Golder informed ARI of the anomaly. ARI made every attempt to verify the suspected error, but the entire filter bag had been consumed during the analysis. The analyst could not recall an error and the suspect notes are the only existing documentation.

ARI compared the water loss percentage for this sample to other round 3 filter bag samples (see attached spreadsheet); the comparison indicated that the original data package is likely in error, and that the true dry weight was not 675 g, but 175 g. In addition, Golder calculated the estimated PCB concentration using both dry weight values; a dry weight of 175 g results in a higher estimated PCB concentration than the 675 g value reported (1137 ug/kg vs 0.147 ug/kg), and is thus more conservative.

ARI believes that the dry weight, as originally reported (675 g), is incorrect, and should be corrected to the lower weight (175 g), making it consistent with all previously reported filter bag samples.

Copies of the reports and all associated raw data will be kept on file at ARI. If you have any questions or require additional information, please contact me at your convenience.

Sincerely,
ANALYTICAL RESOURCES, INC.

Kelly Bottem
Client Services Manager
(206) 695-6211
kellyb@arilabs.com

KB/kb
cc: Kent Angelos, Golder Associates Inc., 18300 NE Union Hill Road, Suite 200, Redmond, WA 98052-3333

Filter Bag Weight Analysis for OY07

Stormwater Source Control
Boeing Plant 2

Data Package ID:	**OY07 As Reported**	**OY07 With Assumed Correction**	**OR49**	**OY07**	**OC61**	OM42	**OW01**	**OG77**
Sample ID:	**PL2SC-SS-B-050709**		**PL2SC-SS-A-031909**	**PL2SC-SS-A-050709**	**PL2SC-SS-I-120308**	**PL2SC-SS-J249-021209**	**PL2SC-SS-J505-041709**	**PL2SC-SS-Z-010809**
Filter Bag Wet Weight (g):	681.2	681.2	317.04	679.22	662.03	652.36	649.7	613.84
Metals Split (g):	5.04	5.04	0	5.15	6.52	14.18	5.05	14.21
Filter Bag Dry Weight:	675.9	175.9	112.3	172.02	169.11	170.65	169.62	168.67
Water Loss (g):	0.26	500.26	204.74	502.05	486.4	467.53	475.03	430.96
Water Loss (%):	0.04%	74%	65%	74%	74%	73%	74%	72%

Average Water Loss (Excluding OY07):	72%

Notes:
"Assumed correction" uses a final dry weight of 175.90 g instead of the reported value of 675.90 g.

Chain of Custody
Documentation

prepared
for

The Boeing Company

Project: Stormwater Source Control

ARI JOB NO: OY07

prepared
by

Analytical Resources, Inc.

Chain of Custody Record & Laboratory Analysis Request

ARI Assigned Number: 0907	Turn-around Requested: standard
ARI Client Company: Boeing	Phone:
Client Contact: Will Ernst	
Client Project Name: Stormwater Source Control	
Client Project #:	Samplers: R. J. Lamberts

Page: 1 of 1

Date: 5/7/09 | Ice Present? N/A

No. of Coolers: 0 | Cooler Temps: Amb

Analytical Resources, Incorporated
Analytical Chemists and Consultants
4611 South 134th Place, Suite 100
Tukwila, WA 98168
206-695-6200 206-695-6201 (fax)

Sample ID	Date	Time	Matrix	No. Containers	Analysis Requested: SVOCs	Analysis Requested: PCBs	Notes/Comments
PL2SC-SS-A-050709	5/7/09	0915	Filter Bag	1	X		
PL2SC-SS-B-050709	1	0945	Filter Bag	1	X	X	

Comments/Special Instructions: Metals per QAPP (including Hg)

	Relinquished by:	Received by:	Relinquished by:	Received by:
(Signature)	Jill Lamberts			
Printed Name:	J. Lamberts	A. Volgardsen		
Company:	Golder	ARI		
Date & Time:	5/7/09 1015	5/7/09 1015		

Sample Retention Policy: All samples submitted to ARI will be appropriately discarded no sooner than 90 days after receipt or 60 days after submission of hardcopy data, whichever is longer, unless alternate retention schedules have been established by work-order or contract.

Analytical Resources, Incorporated
Analytical Chemists and Consultants

Cooler Receipt Form

ARI Client: Boeing
COC No(s): _____ (NA)
Assigned ARI Job No: 0407

Project Name: Stormwater Source Control
Delivered by: Fed-Ex UPS Courier (Hand) Delivered Other: _____
Tracking No: _____ (NA)

Preliminary Examination Phase:

Were intact, properly signed and dated custody seals attached to the outside of to cooler?	YES	(NO)
Were custody papers included with the cooler?	(YES)	NO
Were custody papers properly filled out (ink, signed, etc.)	(YES)	NO
Temperature of Cooler(s) (°C) (recommended 2.0-6.0 °C for chemistry) AMB		
If cooler temperature is out of compliance fill out form 00070F	Temp Gun ID#: 1	

Cooler Accepted by: AV Date: 5/7/09 Time: 1015

Complete custody forms and attach all shipping documents

Log-In Phase:

Was a temperature blank included in the cooler?		YES	(NO)
What kind of packing material was used? ... Bubble Wrap Wet Ice Gel Packs Baggies Foam Block Paper Other: trash bag			
Was sufficient ice used (if appropriate)?	NA	YES	(NO)
Were all bottles sealed in individual plastic bags?		(YES)	NO
Did all bottles arrive in good condition (unbroken)?		(YES)	NO
Were all bottle labels complete and legible?		(YES)	NO
Did the number of containers listed on COC match with the number of containers received?		(YES)	NO
Did all bottle labels and tags agree with custody papers?		(YES)	NO
Were all bottles used correct for the requested analyses?		(YES)	NO
Do any of the analyses (bottles) require preservation? (attach preservation sheet, excluding VOCs)...	NA	YES	(NO)
Were all VOC vials free of air bubbles?	(NA)	YES	NO
Was sufficient amount of sample sent in each bottle?		(YES)	NO

Samples Logged by: JH Date: 5/7/09 Time: 1215

*** Notify Project Manager of discrepancies or concerns ***

Sample ID on Bottle	Sample ID on COC	Sample ID on Bottle	Sample ID on COC

Additional Notes, Discrepancies, & Resolutions:

By: Date:

Small → "sm"
Peabubbles → "pb"
Large → "lg"
Headspace → "hs"

Analytical Resources, Incorporated
Analytical Chemists and Consultants

Cooler Temperature Compliance Form

Cooler#: 1 Temperature(°C): Amb

Sample ID	Bottle Count	Bottle Type
PL2SC-SS-A-050709	1	Black Trash Bag w/ Filter Bag Inside
PL2SC-SS-B-050709	1	" " " " " "

Cooler#: Temperature(°C):

Sample ID	Bottle Count	Bottle Type

Cooler#: Temperature(°C):

Sample ID	Bottle Count	Bottle Type

Cooler#: Temperature(°C):

Sample ID	Bottle Count	Bottle Type

Completed by: Date: Time:

Case Narrative

prepared
for

The Boeing Company

Project: Stormwater Source Control

ARI JOB NO: OY07

prepared
by

Analytical Resources, Inc.

ANALYTICAL
RESOURCES
INCORPORATED

Case Narrative

Project: Boeing Plant 2 Source Control
ARI ID: OY07
Matrix: Filter Bag / Soil
Date: May 21, 2009

Sample Receipt Information

Two solid matrix samples were received in good condition at ARI on 05/7/09 under ARI sample delivery group OY07. One cooler arrived at an ambient temperature.

Select samples were analyzed for the parameters listed below, as requested on the COC.

PCBs by Method 8082:

The sample was extracted on 5/11/09 and analyzed on 5/13/09 within the method recommended holding times.

Initial calibration (s): All analytes of interest were within method acceptance criteria.

Continuing calibration (s): Are in control.

Samples: There were no anomalies associated with these samples.

Surrogates: All surrogate recoveries were in control.

LCS(s): All percent recoveries for the analytes of interest were within compliance.

Method Blank: The method blank was free of contamination.

Total Metals by Methods 6010B and 7000 series

The samples were digested between 5/11/09 and 5/13/09. The digests were analyzed between 5/12/09 and 5/18/09 within the method recommended holding times.

Initial calibration (s): The initial CRI is out of control high for Copper. The sample concentrations were greater then ten times the RL and the trailing CRI was in control. All other analytes of interest were within method acceptance criteria and no further corrective action was taken.
Continuing calibration (s): Are in control.

Samples: No anomalies were encountered for these samples.

LCS/Blank Spike(s): All percent recoveries were within compliance.

Method Blank(s): Are in control.

Standard Reference: All percent recoveries were within compliance.

Analytical Resources, Incorporated
Analytical Chemists and Consultants

Organic Extractions Laboratory
Analyst Notes

ARI Job No.: QY07 Client ID: The Boeing Company

Parameter: PCB Client Project: Stormwater Source Control

SOP Number(s): 3505 **No Anomalies:**

List problems, concerns, corrective actions and any other pertinent information

Sample 'A' is prep only as per project Manager. ~~SA~~ 5/8/09

'A' Wet weight = 679.22g

'A' Metals Split = 5.15g

'A' dry weight w/ Plastic Ring = 172.02

'A' Plastic Ring weight = 8.43

'A' dry weight without Plastic Ring = ~~150.95~~ 163.59g

'B' Wet weight = 681.20g

'B' Metals Split = 5.04g

'B' dry weight w/ Plastic Ring = 675.90

'B' Plastic Ring weight = 8.36

'B' ~~plast~~ dry weight without Plastic Ring = 667.54

Sample 'A' was weighed, then archived. ~~SA~~ 5/11/09

Added 5X Normal Surrogate level to Sample 'B' to leave room for dilutions as per Josh R. ~~SA~~ 5/11/09

Analyst Initials:		Date:	

3056F

Revision 006
1/12/07

Data Reporting Qualifiers

Effective 12/28/04

Inorganic Data

U	Indicates that the target analyte was not detected at the reported concentration
*	Duplicate RPD is not within established control limits
B	Reported value is less than the CRDL but ≥ the Reporting Limit
N	Matrix Spike recovery not within established control limits
NA	Not Applicable, analyte not spiked
H	The natural concentration of the spiked element is so much greater than the concentration spiked that an accurate determination of spike recovery is not possible
L	Analyte concentration is ≤5 times the Reporting Limit and the replicate control limit defaults to ±1 RL instead of the normal 20% RPD

Organic Data

U	Indicates that the target analyte was not detected at the reported concentration
*	Flagged value is not within established control limits
B	Analyte detected in an associated Method Blank at a concentration greater than one-half of ARI's Reporting Limit or 5% of the regulatory limit or 5% of the analyte concentration in the sample.
J	Estimated concentration when the value is less than ARI's established reporting limits
D	The spiked compound was not detected due to sample extract dilution
NR	Spiked compound recovery is not reported due to chromatographic interference
E	Estimated concentration calculated for an analyte response above the valid instrument calibration range. A dilution is required to obtain an accurate quantification of the analyte.
S	Indicates an analyte response that has saturated the detector. The calculated concentration is not valid; a dilution is required to obtain valid quantification of the analyte
NA	The flagged analyte was not analyzed for

NS The flagged analyte was not spiked into the sample

M Estimated value for an analyte detected and confirmed by an analyst but with low spectral match parameters. This flag is used only for GC-MS analyses

M2 The sample contains PCB congeners that do not match any standard Aroclor pattern. The PCBs are identified and quantified as the Aroclor whose pattern most closely matches that of the sample. The reported value is an estimate.

N The analysis indicates the presence of an analyte for which there is presumptive evidence to make a "tentative identification"

Y The analyte is not detected at or above the reported concentration. The reporting limit is raised due to chromatographic interference. The Y flag is equivalent to the U flag with a raised reporting limit.

C The analyte was positively identified on only one of two chromatographic columns. Chromatographic interference prevented a positive identification on the second column

P The analyte was detected on both chromatographic columns but the quantified values differ by ≥40% RPD with no obvious chromatographic interference

Geotechnical Data

A The total of all fines fractions. This flag is used to report total fines when only sieve analysis is requested and balances total grain size with sample weight.

F Samples were frozen prior to particle size determination

SM Sample matrix was not appropriate for the requested analysis. This normally refers to samples contaminated with an organic product that interferes with the sieving process and/or moisture content, porosity and saturation calculations

SS Sample did not contain the proportion of "fines" required to perform the pipette portion of the grain size analysis

W Weight of sample in some pipette aliquots was below the level required for accurate weighting

LCS SOLUTIONS

05/15/09

LABEL	SOLN ID	TEST	CONC. UG/ML	SOLVENT	EXP.
1	1549-3	PCB	20	ACETONE	10/10/09
2#	1472-3	BCOC PEST	10	ACETONE	NA
3	1579-3	PEST	02/04/20	ACETONE	09/23/09
4	1594-2	LOW PEST	0.2/0.4/2	ACETONE	09/23/09
5	1580-2	EPH	1500	MECL2	01/29/10
6	1559-2	PCP	12.5/125	ACETONE	11/05/09
7	1597-2	ABN	100	ACETONE	02/01/10
8	1566-1	TBT	2.5	MECL2	12/04/09
9	1567-3	PORE TBT	.125/.25	MECL2	12/04/09
10	1596-2	ABN ACID	100/200	MEOH	10/21/09
11	1591-1	TPHD	15000	ACETONE	03/26/10
12	1597-3	ABN BASE	200	ACETONE	02/05/10
13	1573-2	LOW PCB	2	ACETONE	10/10/09
14*	1547-1	LOW ABN ACID	10/20	MEOH	04/10/10
15	1591-3	SIM PNA	15/75	MEOH	08/28/09
16*	1502-2	DIOXANE	100	MEOH	02/26/10
17#	1516-2	1248 PCB	20	ACETONE	NA
18	1591-4	LOW SIM PNA	1.5	ACETONE	08/28/09
19	1574-4	AK103	7500	MECL2	12/02/09
20	1572-2	PNA	100	ACETONE	12/26/09
21	1593-3	SKY/BHT	100	MEOH	03/31/10
22	1599-1	HERB	12.5/12500	MEOH	08/18/09
23*	1505-1	LW ABN BASE	20	MEOH	03/20/10
24	1573-4	LOW ABN	10	ACETONE	08/01/09
25#	1481-1	DIPHENYL	100	MEOH	NA
26*	1545-2	OP-PEST	25	MEOH	02/16/10
27#	1495-1	STEROLS	200	MEOH	NA
28	1595-1	ADD. PEST	4	ACETONE	09/15/09
29#	1496-3	DECANES	100	MEOH	NA
30#	1497-2	EDB/DBCP	2	ACETONE	NA
31	1596-1	TERPINEOL	100	MEOH	04/03/10

LCS SOLUTIONS

05/15/09

32	1598-1	GUAIACOL	50-200	ACETONE	04/30/10
33	1522-1	RESIN ACID	250	ACETONE	06/11/09
34	1530-2	CONGENERS	1	ACETONE	07/23/09
35	1601-2	ALKYL PNA A	10	MEOH	04/03/10
36	1601-3	ALKYL PNA B	10	MEOH	05/13/10
50	1571-1	FULL RESIN	250	ACETONE	06/10/09
	*=REVERIFIED SOLUTION				
	#=PROJECT SPECIFIC SOLUTION				

SURR SOLUTIONS

05/15/09

LABEL	SOLN ID	TEST	CONC. UG/ML	SOLVENT	EXP.
A	1584-5	ABN	100/150	MEOH	02/18/10
B	1572-1	SIM PNA	15/75	MEOH	08/28/09
C*	1559-1	SIM ABN	25/37.5	MEOH	03/13/10
D	1573-3	LOW PCB	0.2	ACETONE	07/31/09
E*	1478-1	HERB	62.5	MEOH	09/21/09
F	1574-3	PCP	12.5	ACETONE	01/06/10
G*	1534-1	1,4DIOXANE	100	MEOH	02/26/10
H	1594-1	OP-PEST	25	MEOH	04/01/10
I	1559-4	LOW S. PNA	1.5	MEOH	08/28/09
J	1566-5	TBT-PORE	0.125	MECL2	12/04/09
K	1538-1	MED PCB	20	ACETONE	07/31/09
L	1584-4	TBT	2.5	MECL2	12/04/09
M	1578-1	EPH	1500	MECL2	12/09/09
N	1538-2	PCB	2	ACETONE	07/31/09
O	1567-4	TPH	450	MECL2	09/24/09
P	1598-2	HCID	2250	MECL2	01/07/10
Q#	1497-3	EDB	2	ACETONE	NA
R	1521-4	RESIN ACID	250	ACETONE	06/11/09
S	1568-5	PBDE	.25	MEOH	12/11/09
T	1601-1	ALKYL PNA	10	MEOH	11/26/09
U	*=REVERIFIED SOLUTION				
V	#=PROJECT SPECIFIC SOLUTION				
W					
X					
Y					
Z					

Data Summary Package

prepared
for

The Boeing Company

Project: Stormwater Source Control

ARI JOB NO: OY07

prepared
by

Analytical Resources, Inc.

PCB ANALYSIS

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PCB by GC/ECD Method SW8082
Page 1 of 1

Sample ID: PL2SC-SS-B-050709
SAMPLE

Lab Sample ID: OY07B
LIMS ID: 09-10804
Matrix: Filter Bag
Data Release Authorized:
Reported: 05/14/09

QC Report No: OY07-The Boeing Company
Project: Stormwater Source Control

Date Sampled: 05/07/09
Date Received: 05/07/09

Date Extracted: 05/11/09
Date Analyzed: 05/13/09 10:34
Instrument/Analyst: ECD5/JGR
GPC Cleanup: No
Sulfur Cleanup: Yes
Acid Cleanup: Yes

Sample Amount: 1.00 Filter Bag
Final Extract Volume: 5.0 mL
Dilution Factor: 50.0
Silica Gel: Yes

CAS Number	Analyte	RL	Result
12674-11-2	Aroclor 1016	25	< 25 U
53469-21-9	Aroclor 1242	25	< 25 U
12672-29-6	Aroclor 1248	25	< 25 U
11097-69-1	**Aroclor 1254**	**25**	**28**
11096-82-5	**Aroclor 1260**	**25**	**58**
11104-28-2	Aroclor 1221	25	< 25 U
11141-16-5	Aroclor 1232	25	< 25 U

Reported in Total µg

PCB Surrogate Recovery

Decachlorobiphenyl	136%
Tetrachlorometaxylene	118%

ANALYTICAL RESOURCES INCORPORATED

SW8082/PCB SURROGATE RECOVERY SUMMARY

Matrix: Filter Bag

QC Report No: OY07-The Boeing Company
Project: Stormwater Source Control

Client ID	DCBP	TCMX	TOT OUT
MB-051109	87.8%	72.2%	0
LCS-051109	86.0%	72.0%	0
LCSD-051109	91.8%	78.0%	0
PL2SC-SS-B-050709	136%	118%	0

	LCS/MB LIMITS	QC LIMITS
(DCBP) = Decachlorobiphenyl	(30-160)	(30-160)
(TCMX) = Tetrachlorometaxylene	(30-160)	(30-160)

Prep Method: SW3550B
Log Number Range: 09-10804 to 09-10804

FORM-II SW8082

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PCB by GC/ECD Method SW8082
Page 1 of 1

Sample ID: LCS-051109
LCS/LCSD

Lab Sample ID: LCS-051109
LIMS ID: 09-10804
Matrix: Filter Bag
Data Release Authorized:
Reported: 05/14/09

QC Report No: OY07-The Boeing Company
Project: Stormwater Source Control

Date Sampled: 05/07/09
Date Received: 05/07/09

Date Extracted LCS/LCSD: 05/11/09

Date Analyzed LCS: 05/13/09 10:00
LCSD: 05/13/09 10:17
Instrument/Analyst LCS: ECD5/JGR
LCSD: ECD5/JGR
GPC Cleanup: No
Sulfur Cleanup: Yes

Sample Amount LCS: 1.00 Filter Bag
LCSD: 1.00 Filter Bag
Final Extract Volume LCS: 5.0 mL
LCSD: 5.0 mL
Dilution Factor LCS: 1.00
LCSD: 1.00
Silica Gel: Yes
Acid Cleanup: Yes

Analyte	LCS	Spike Added-LCS	LCS Recovery	LCSD	Spike Added-LCSD	LCSD Recovery	RPD
Aroclor 1016	2.1	2.5	84.0%	2.2	2.5	88.0%	4.7%
Aroclor 1260	3.1	2.5	124%	3.3	2.5	132%	6.2%

PCB Surrogate Recovery

	LCS	LCSD
Decachlorobiphenyl	86.0%	91.8%
Tetrachlorometaxylene	72.0%	78.0%

Reported in Total µg
RPD calculated using sample concentrations per SW846.

4

PCB METHOD BLANK SUMMARY

BLANK NO.

OY07MBS1

Lab Name: ANALYTICAL RESOURCES, INC — Client: THE BOEING COMPANY

ARI Job No.: OY07 — Project: STORMWATER SOURCE CO

Lab Sample ID: OY07MBS1 — Lab File ID: 0513B004

Date Extracted: 05/11/09 — Matrix: SOLID

Date Analyzed: 05/13/09 — Instrument ID: ECD5

Time Analyzed: 0943 — GC Columns: ZB5/ZB35

THIS METHOD BLANK APPLIES TO THE FOLLOWING SAMPLES, MS and MSD:

	CLIENT SAMPLE NO.	LAB SAMPLE ID	DATE ANALYZED
01	OY07LCSS1	OY07LCSS1	05/13/09
02	OY07LCSDS1	OY07LCSDS1	05/13/09
03	PL2SC-SS-B-050709	OY07B	05/13/09

ALL RUNS ARE DUAL COLUMN

ANALYTICAL RESOURCES INCORPORATED

ORGANICS ANALYSIS DATA SHEET
PCB by GC/ECD Method SW8082
Page 1 of 1

Sample ID: MB-051109
METHOD BLANK

Lab Sample ID: MB-051109
LIMS ID: 09-10804
Matrix: Filter Bag
Data Release Authorized:
Reported: 05/14/09

QC Report No: OY07-The Boeing Company
Project: Stormwater Source Control

Date Sampled: NA
Date Received: NA

Date Extracted: 05/11/09
Date Analyzed: 05/13/09 09:43
Instrument/Analyst: ECD5/JGR
GPC Cleanup: No
Sulfur Cleanup: Yes
Acid Cleanup: Yes

Sample Amount: 1.00 Filter Bag
Final Extract Volume: 5.0 mL
Dilution Factor: 1.00
Silica Gel: Yes

CAS Number	Analyte	RL	Result
12674-11-2	Aroclor 1016	0.5	< 0.5 U
53469-21-9	Aroclor 1242	0.5	< 0.5 U
12672-29-6	Aroclor 1248	0.5	< 0.5 U
11097-69-1	Aroclor 1254	0.5	< 0.5 U
11096-82-5	Aroclor 1260	0.5	< 0.5 U
11104-28-2	Aroclor 1221	0.5	< 0.5 U
11141-16-5	Aroclor 1232	0.5	< 0.5 U

Reported in Total µg

PCB Surrogate Recovery

Decachlorobiphenyl	87.8%
Tetrachlorometaxylene	72.2%

METALS ANALYSIS

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
TOTAL METALS

Sample ID: PL2SC-SS-A-050709
SAMPLE

Lab Sample ID: OY07C
LIMS ID: 09-10843
Matrix: Soil
Data Release Authorized:
Reported: 05/22/09

QC Report No: OY07-The Boeing Company
Project: Stormwater Source Control

Date Sampled: 05/07/09
Date Received: 05/07/09

Percent Total Solids: 18.1%

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	RL	mg/kg-dry	Q
3050B	05/13/09	200.8	05/14/09	**7440-38-2**	**Arsenic**	1	**29**	
3050B	05/11/09	6010B	05/18/09	**7440-43-9**	**Cadmium**	1	**31**	
3050B	05/11/09	6010B	05/18/09	**7440-47-3**	**Chromium**	3	**124**	
3050B	05/11/09	6010B	05/18/09	**7440-50-8**	**Copper**	1	**182**	
3050B	05/13/09	200.8	05/14/09	**7439-92-1**	**Lead**	5	**175**	
CLP	05/11/09	7471A	05/12/09	**7439-97-6**	**Mercury**	0.1	**0.4**	
3050B	05/11/09	6010B	05/18/09	7440-22-4	Silver	2	2	U
3050B	05/11/09	6010B	05/18/09	**7440-66-6**	**Zinc**	5	**2,500**	

U-Analyte undetected at given RL
RL-Reporting Limit

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
TOTAL METALS

Sample ID: PL2SC-SS-B-050709
SAMPLE

Lab Sample ID: OY07D
LIMS ID: 09-10844
Matrix: Soil
Data Release Authorized:
Reported: 05/22/09

QC Report No: OY07-The Boeing Company
Project: Stormwater Source Control

Date Sampled: 05/07/09
Date Received: 05/07/09

Percent Total Solids: 23.8%

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	RL	mg/kg-dry	Q
3050B	05/13/09	200.8	05/14/09	**7440-38-2**	**Arsenic**	0.8	**10.1**	
3050B	05/11/09	6010B	05/18/09	**7440-43-9**	**Cadmium**	0.8	**7.5**	
3050B	05/11/09	6010B	05/18/09	**7440-47-3**	**Chromium**	2	**388**	
3050B	05/11/09	6010B	05/18/09	**7440-50-8**	**Copper**	0.8	**254**	
3050B	05/13/09	200.8	05/14/09	**7439-92-1**	**Lead**	4	**512**	
CLP	05/11/09	7471A	05/12/09	**7439-97-6**	**Mercury**	0.1	**0.3**	
3050B	05/11/09	6010B	05/18/09	**7440-22-4**	**Silver**	1	**2**	
3050B	05/11/09	6010B	05/18/09	**7440-66-6**	**Zinc**	4	**1,810**	

U-Analyte undetected at given RL
RL-Reporting Limit

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
TOTAL METALS **Sample ID: METHOD BLANK**

Lab Sample ID: OY07MB
LIMS ID: 09-10843
Matrix: Soil
Data Release Authorized:
Reported: 05/22/09

QC Report No: OY07-The Boeing Company
Project: Stormwater Source Control

Date Sampled: NA
Date Received: NA

Percent Total Solids: NA

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	RL	mg/kg-dry	Q
3050B	05/13/09	200.8	05/14/09	7440-38-2	Arsenic	0.2	0.2	U
3050B	05/11/09	6010B	05/18/09	7440-43-9	Cadmium	0.2	0.2	U
3050B	05/11/09	6010B	05/18/09	7440-47-3	Chromium	0.5	0.5	U
3050B	05/11/09	6010B	05/18/09	7440-50-8	Copper	0.2	0.2	U
3050B	05/13/09	200.8	05/14/09	7439-92-1	Lead	1	1	U
CLP	05/11/09	7471A	05/12/09	7439-97-6	Mercury	0.02	0.02	U
3050B	05/11/09	6010B	05/18/09	7440-22-4	Silver	0.3	0.3	U
3050B	05/11/09	6010B	05/18/09	7440-66-6	Zinc	1	1	U

U-Analyte undetected at given RL
RL-Reporting Limit

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET
TOTAL METALS
Page 1 of 1

Sample ID: LAB CONTROL

Lab Sample ID: OY07LCS
LIMS ID: 09-10843
Matrix: Soil
Data Release Authorized:
Reported: 05/22/09

QC Report No: OY07-The Boeing Company
Project: Stormwater Source Control

Date Sampled: NA
Date Received: NA

BLANK SPIKE/BLANK SPIKE DUPLICATE QUALITY CONTROL REPORT

Analyte	Analysis Method	Spike Found	Spike Dup Found	Spike Added	Spike Recovery	Spike Dup Recovery	RPD	Q
Arsenic	200.8	24.4	25.0	25.0	97.6%	100%	2.4%	
Cadmium	6010B	51.8	52.0	50.0	104%	104%	0.4%	
Chromium	6010B	51.1	50.9	50.0	102%	102%	0.4%	
Copper	6010B	51.5	51.5	50.0	103%	103%	0.0%	
Lead	200.8	25	26	25	100%	104%	3.9%	
Mercury	7471A	0.60	0.59	0.50	120%	118%	1.7%	
Silver	6010B	49.2	49.2	50.0	98.4%	98.4%	0.0%	
Zinc	6010B	50	50	50	100%	100%	0.0%	

Reported in mg/kg-dry

N-Control limit not met
Control Limits: 80-120%

TOTAL SOLIDS

Solids Data Entry Report Checked by: KM Date: 5/12/09
Date: 05/12/09 Data Analyst: MH

Solids Determination performed on 05/11/09 by KM

JOB	SAMPLE	CLIENTID	TAREWEIGHT	SAMPDISH	DRYWEIGHT	SOLIDS
OY07	C	PL2SC-SS-A-050709	0.995	2.391	1.248	18.12
OY07	D	PL2SC-SS-B-050709	0.953	2.298	1.273	23.79

ATTACHMENT C

DATA VALIDATION REPORT

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BOEING PLANT 2 – STORMWATER SOURCE CONTROL

SAMPLING ROUND 3 (11/2008 – 05/2009)

DATA VALIDATION QA/QC REVIEW

Table of Contents

1. INTRODUCTION

A total of eight stormwater samples including a field duplicate, seven filter bag samples, and nine equipment blank samples were collected November 2008 through May of 2009. This sampling was conducted as part of the 1994 Administrative Order on Consent between Boeing and EPA Region X and details are specified in the *Revised Stormwater Source Control Work Plan – Attachment A – Sampling and Analysis Plan* (Golder and Floyd| Snider, 2007). The purpose of the stormwater sampling is to identify potential sources and extent of contamination to the Duwamish Waterway. Samples were analyzed by Analytical Resources Incorporated (ARI) of Tukwila, Washington for the following parameters:

- Semivolatile organic compounds (SVOC) by EPA Method 8270D GC/MS
- Polynuclear Aromatic Hydrocarbons (PNAs) by EPA Method 8270D GC/MS SIM
- Polychlorinated biphenyls (PCBs) by EPA Method 8082
- Metals (Arsenic, Cadmium, Chromium, Copper, Mercury, Lead, Silver, and Zinc) by EPA Methods 6010B, 7000 Series, and 200.8.
- pH by EPA Method 150.1.

Samples were analyzed in accordance with procedures described in *Test Methods for Evaluating Solid Waste, Physical/Chemical Methods (USEPA SW-846, 3rd edition) 8270D, 8270D-SIM, 8082, 6010B, 7060, 7421, 7470, and EPA Method 200.8, Revision 5.5; Determination of Trace Elements in Water and Wastes by Inductively Coupled Plasma-Mass Spectrometry.*

2. SAMPLE DELIVERY GROUPS, SAMPLES, AND ANALYSES

Samples were analyzed and results reported by the laboratory in batch numbers as summarized below:

NZ46/NZ56 (PCBs and Dissolved Metals):

PL2SC-EB1-111108 PL2SC-EB2-111108

OB32/OB33 (Dissolved Metals):

PL2SC-W-I-112008

OB37/OB38 (PCBs and Dissolved Metals):

PL2SC-EB3-112108

OC61/OC62 (PCBs, Total and Dissolved Metals):

PL2SC-SS-I-120308 PL2SC-W-EB2-120308

OG55/OG57 (SVOCs, PAHs, pH, and Dissolved Metals):

PL2SC-W-G-010609 PL2SC-W-V-010609 PL2SC-W-DUP-010609

OB70/OG74 (Dissolved Metals and pH):

PL2SC-W-Z-010709

OG77 (PCBs and Metals):

PL2SC-SS-Z-010809

OH84 (PCBs and Dissolved Metals):

PL2SC-EB1-011309 PL2SC-EB3-011309

OM42 (PCBs and Metals):

PL2SC-SS-J249-021209

ON49/ON53 (PCBs and Dissolved Metals):

PL2SC-EB3-021909

OO10/OO11 (Dissolved Metals):

PL2SC-W-J249-022309

OO85/OO87 (PCBs and Dissolved Metals):

PL2SC-EB1-022709 PL2SC-SS-J249-022709 (not analyzed)

OP48/OP51 (Dissolved Metals):

PL2SC-W-A-030509

OR49 (PCBs and Metals):

PL2SC-SS-A-031909

OS60/OS61 (PCBs and Dissolved Metals):

PL2SC-EB1-032709

OS73/OS79 (Dissolved Metals):

PL2SC-W-B-032809 PL2SC-W-J505-032809

OW01 (PCBs and Metals):

PL2SC-SS-J505-041709

OY07 (PCBs and Metals):

PL2SC-SS-A-050709 (re-sampled for metals) PL2SC-SS-B-050709

Quality assurance/quality control (QA/QC) reviews of laboratory data were performed in the laboratory in accordance with the laboratory quality assurance program plan. The data validation QA/QC review focused primarily on laboratory result summary sheets and quality control summary sheets to ensure that work plan data quality objectives were met for the project. Data validation was conducted in accordance with the criteria outlined in the National Functional Guidelines for Organic Data Review (EPA 1999) and the National Functional Guidelines for Inorganic Data Review (EPA 2004), modified to include method specific requirements of the laboratory analytical methods. Raw data sheets were reviewed as necessary to confirm conditions reported and to support application of qualifiers to analytical results.

The validation level specified in the *Revised Stormwater Source Control Work Plan – Attachment A - Sampling and Analysis Plan* (SAP) is a Level 1 which is considered a basic review. Level 2, a more detailed (per SAP Tables 4-7) validation was performed per Golder's request (April 4, 2007). The following is a summary of quality control elements associated with each analytical fraction and the status of that element as a result of the data validation process.

3. SAMPLING, DOCUMENTATION AND REPORTING

- It was noted during review of the *Revised Stormwater Source Control Work Plan – Attachment A - Sampling and Analysis Plan* (SAP) that various compounds were not analyzed or did not meet requested reporting limits for SVOCs and PNAs. In some cases action levels were set to the laboratory reporting limit (RL) as laboratory RLs were greater than National Recommended Water Quality Criteria for Priority Toxic Pollutants (NRWQC) criteria.

- Table 7 of the SAP specifies that ARI sufficiently demonstrate analyst capability and method detection limit (MDL) studies for EPA Methods 8270D and 8270D SIM. ARI's Laboratory Quality Assurance Plan (LQAP) specifies standard operating procedures and other elements of ARI's training program. Internal and/or external performance evaluation samples are used periodically to assess staff competency. Unacceptable results or insufficient number of performance evaluation samples will result in remedial or additional training as specified in ARI's LQAP. ARI MDL studies are performed and calculated in accordance with 40 CFR Part 136, Appendix B and are periodically updated as necessary and/or according to regulatory requirements.

- All SDGs: Recorded cooler temperatures occasionally exceeded the recommended temperature ($4^{\circ}C \pm 2^{\circ}C$) for sample preservation. No action was taken since the samples are delivered to the laboratory on the same day as sample collection.

- SDGs OC61, OG77, OM42, OR49, OW01, and OY07: Filter bag samples (also referred to as suspended solids) were collected over extended periods of time (1 to 2 week period or longer when necessary) and were "collected" on a given day. Chain of custody date represents the date the filter bag was removed from the system and submitted to the lab. Filter bag samples were analyzed for PCBs and metals.

- All SDGs: In early 2007, due to ongoing zinc contamination within ARI's metals laboratory, zinc reporting level for EPA Method 6010B was revised from 6 µg/L to 10 µg/L (0.6 mg/kg to 1 mg/kg for solids). The revised reporting limit is slightly higher than

the approved quality assurance project plans. No action was taken as this detection limit is well below the action level of 81 µg/L for water (960 mg/kg for solids).

- Various SDGs: Metal results for water samples are reported with mg/L instead of µg/L units. ARI indicates that this due to internal reporting procedures and project continuity. Efforts are being made by ARI to ensure consistent reporting. No action was taken other than to alert the data user.

- SDGs NZ56, OB33, OB38, OC62, OG57, OG74, OH86, ON53, OO10, OO87, OP51, OS61, and OS79: Refer to these SDGs for dissolved mercury results.

- SDG NZ46/NZ56: Equipment blank (PL2SC-EB1-111108) does not correspond to any samples. Sampler was found covered with an oily substance in the catch basin shortly after setup, was dismantled and re-built once the location (18-249) was cleaned (comm. with L. Shea). Equipment blank (PL2SC-EB2-111108) corresponds to samples in SDGs OB32/OB33 and OC61 (water and filter bag samples, respectively).

- SDG OB37/OB38: Equipment blank (PL2SC-EB3-112108) corresponds to samples in SDGs OG70/OG74 and OG77 (water and filter bag samples, respectively).

- SDG OC61/OC62: Equipment blank (PL2SC-EB2-120308) corresponds to samples in SDGs OS73/OS79 and OW01 (water and filter bag samples, respectively).

- SDGs OG55/OG57: Equipment blanks are not associated with these samples as they were collected by hand or peristaltic pump with dedicated tubing.

- SDG OH84/OH86: Equipment blank (PL2SC-EB1-011309) corresponds to samples in SDGs OO10/OO11 and OM42 (water and filter bag samples, respectively). Equipment blank (PL2SC-EB3-011309) does not correspond to any samples. Results for this equipment blank necessitated cleaning of the equipment and resampling based on Cu and Zn detects.

- SDG ON49/ON53: Equipment blank (PL2SC-EB3-021909) corresponds to samples in SDGs OS73/OS79 and OY07 (water and filter bag samples, respectively). This equipment blank is the new one collected after the Cu and Zn detects found in the equipment blank from SDG OH84/OH86.

- SDG OO85/OO87: Equipment blank (PL2SC-EB1-022709) corresponds to samples in SDGs OP48/OP51 and OR49 (water and filter bag samples, respectively).

- SDG OS60/OS61: Equipment blank (PL2SC-EB1-032709) corresponds to samples in SDG OY07 (filter bag sample).

- SDG OB32/OB33: Upon sample receipt, it was noted that there was a sample ID discrepancy between the Mercury bottle and the chain of custody: the bottle said ‘PL2CS’ while the chain of custody stated ‘PL2SC’. ARI resolved the discrepancy to ‘PL2SC’.

- SDG OO85/OO87: There was a note from ARI on the chain of custody about a sample ID discrepancy. The lab had resolved a sample time discrepancy on sample PL2SC-W-J249-022309 of 1630 versus 1130. The correct time was 1130.

- SDG OO85/OO87: A filter bag PL2SC-SS-J249-022309 was submitted but put on hold. The Golder project manager cancelled analysis of this sample because a filter bag was taken from the same location (in SDG OM42) before a water sample was collected. The filter bag was collected before the water sample because the filter bag had become clogged. As a result, a new filter bag (submitted in this SDG, but not analyzed) was placed in the sampler in order to collect a water sample during the subsequent wet event (comm. with L. Shea).

- SDG OR49: The sample ID was listed incorrectly on the chain of custody as PL2SC-SS-A-030509. It was changed by Golder to PL2SC-SS-A-031909 upon receipt.

- SDG OR49: PCB analysis was requested erroneously according to the work plan and analyzed before it was noticed by Golder. Boeing was notified of the discrepancy. Also, there was not enough volume for metals analysis, so the sampling apparatus had to be set up again and a new filter bag collected as part of SDG OY07.

- SDGs OG55 and OB70: pH analysis was requested for the samples submitted for these SDGs since the field meter was not in working order on the day of sample collection. The DV performed a cursory review of the sample results and found that transcriptions, holding times, and associated QC were in control. The only item of note is that sample PL2SC-W-DUP-010609 on SDG OG55 was not analyzed as requested. The Golder project manager was contacted and it was observed that normally, in the field, a duplicate sample would not have a second pH reading taken when the sample was collected. No further action was required.

- SDG OY07: The lab reports PCB data as Total µg and does not incorporate the moisture content or sample weight in the data package. Upon receipt of the data, Golder calculates the concentration of PCBs in µg/kg-solids based on handwritten filter bag wet and dry weight data provided by the laboratory. For sample PL2SC-SS-B-050709, the filter bag "dry weight" and "dry weight without plastic ring" were reported as 675.90 g and 667.54 g, respectively. The wet weight was reported as 681.20 g, resulting in a water loss value of 0.04 %. This value was inconsistent with historical water losses (ranging from 65 to 74%). The lab was contacted to confirm these values since a wet weight of 175.90 g and 167.54 g would be more consistent with historical values. The lab agreed with the suspicion, but had no way of verifying this, as the analysis was over and the filter bag had been consumed. Unfortunately, the dry weight value is required to calculate the PCB concentration in the bag. As a result, ARI provided a letter explaining the situation and recommending the use of 175.90g and 167.54 g for the "dry weight" and "dry weight without plastic ring" values. The letter is attached within Attachment B of the final report to be submitted to the EPA.

- It should be noted that field duplicates were not collected for suspended solids since filter bag samples are collected over an extended time period making collection impossible.

4. SEMIVOLATILE ORGANIC COMPOUNDS

The laboratory provided a full data package for the SVOC analyses, the items reviewed during validation are summarized below.

4.1 Analytical Methods – *acceptable*

Samples for SVOC analysis were analyzed by gas chromatography/mass spectrometry (GC/MS) using EPA SW846 Method 8270D.

4.2 Sample Holding Times – *acceptable*

All samples were extracted within 7 days for waters of sample collection and analyzed within 40 days from extraction to analysis.

4.3 Laboratory Reporting Limits

The laboratory achieved the reporting limits (RLs) required by the approved SAP (Golder and Floyd|Snider, 2007) with the following exceptions:

- SDG OG55: Thirteen target compounds: aniline, azobenzene, benzidine, 1,4-dioxane, retene, tributyl phosphate, triphenyl phosphate, alpha-terpineol, butyl diphenyl phosphate, butylatedhydroxytoluene, dibutyl phenyl phosphate, pyridine, and n-nitrosodimethylamine were not analyzed for as requested on Table 3 of the SAP.

- SDG OG55: Water reporting limits for target compounds 2,4,6-trichlorophenol, 2,4-dinitrotoluene, 3,3'-dichlorobenzidine, bis-(2-chloroethyl)ether, hexachlorobenzene, nitroso-di-n-proplyamine, and pentachlorophenol were higher (by a factor of 10X) than requested because they were analyzed via GC/MS instead of GC/MS SIM as requested on Table 3 of the SAP. For these 8 compounds, the action levels are less than the RLs:

Compound	SAP Reporting Limit (µg/L)	OG55 Reporting Limit (µg/L)	Action Level (µg/L)
2,4,6-trichlorophenol	0.5	5	2.4
2,4-dinitrotoluene	0.5	5	3.4
3,3'-dichlorobenzidine	0.5	5	0.5
bis-(2-chloroethyl)ether	0.1	1	0.53
hexachlorobenzene	0.1	1	0.1
nitroso-di-n-proplyamine	0.5	5	0.51
pentachlorophenol	0.5	5	3

4.4 Instrument Calibration and Tuning

A review of the instrument calibration, calibration frequency, and tuning was performed. All of the calibration criteria for the target analytes, as listed on Table 7 of the SAP, were met with the following exceptions:

Sample	Compound	Qualification	Reason
OG55 PL2SC-W-G-010609	Benzoic Acid	UR/J	ICAL $R^2 < 0.995$.

4.5 Internal Standards Recovery - *acceptable*

Internal standard areas and retention times for all field samples, associated quality control, and calibration data were within established quality control limits.

4.6 Blank Contamination – *acceptable*

The method blanks were free of contamination.

4.7 Surrogate Recovery – *acceptable*

All surrogate recoveries were within control limits with the following exceptions:

4.8 Matrix Spike Compound Recovery – *acceptable*

Matrix Spike/Matrix Spike Duplicate (MS/MSD) analyses were not performed. Refer to LCS/LCSD results for a measure of precision and accuracy.

4.9 Laboratory Control Sample Recovery – *acceptable*

Laboratory control/laboratory control duplicate samples (LCS/LCSD) were evaluated using ARI control limits. LCS/LCSD % recoveries and RPD were acceptable and within specified criteria.

4.10 Field Duplicate Sample Analysis

Field duplicate samples were not collected and analyzed for SVOCs due to reasons (limited volume and high variability) described in the approved SAP Section 3.1.4.

5. POLYNUCLEAR AROMATICS

The laboratory provided a full data package for the PNA analyses, the items reviewed during validation are summarized below.

5.1 Analytical Methods – *acceptable*

Samples for PNA analysis were analyzed by selected ion monitoring (SIM) gas chromatography/mass spectrometry (GC/MS) using EPA SW846 Method 8270D SIM.

5.2 Sample Holding Times – *acceptable*

All samples were extracted within 7 days for waters (14 for soils) of sample collection and analyzed within 40 days from collection to analysis.

5.3 Laboratory Reporting Limits

The laboratory achieved the reporting limits (RLs) required by the approved SAP (Golder and Floyd|Snider, 2007) with the following exceptions:

- SDG OG55: Nine target compounds 2,4,6-trichlorophenol, 2,4-dinitrotoluene, 3,3'-dichlorobenzidine, benzidine, bis-(2-chloroethyl)ether, hexachlorobenzene, n-nitrosodimethylamine, nitroso-di-n-proplyamine, and pentachlorophenol were not

analyzed via EPA Method 8270D SIM as stipulated on Table 3 of the SAP. Seven of the nine target compounds listed above were analyzed by EPA Method 8270D, but the requested reporting limits were not met (see section 4.3 above for details). The remaining two target compounds (benzidine and n-nitrosodimethylamine) were not analyzed by the lab (see section 4.3 above). No action required since these compounds are not analyzed by 8270D SIM , thus the method was listed incorrectly in the SAP.

- SDG OY07: LCSD percent recovery was out of control and greater than the work plan control limits of 50-130%. No action was necessary since the ARI control limits have been updated since the work plan was written.

5.4 Instrument Calibration and Tuning – *acceptable*

A review of the instrument calibration, calibration frequency, and tuning was performed. All of the calibration criteria for the target analytes, as listed on Table 7 of the SAP, were met.

5.5 Internal Standards Recovery – *acceptable*

Internal standard areas and retention times for all field samples, associated quality control, and calibration data were within established quality control limits.

5.6 Blank Contamination – *acceptable*

The method blanks were free of contamination.

5.7 Surrogate Recovery – *acceptable*

All surrogate recoveries were within control limits.

5.8 Matrix Spike Compound Recovery – *acceptable*

Matrix Spike/Matrix Spike Duplicate (MS/MSD) analyses were not performed. Refer to LCS/LCSD results for a measure of precision and accuracy.

5.9 Laboratory Control Sample Recovery – *acceptable*

Laboratory control/laboratory control duplicate samples (LCS/LCSD) were evaluated using ARI control limits. LCS/LCSD % recoveries and RPD were acceptable and within specified criteria.

5.10 Internal Standards Recovery – *acceptable*

Internal standard areas and retention times for all field samples, associated quality control, and calibration data were within established quality control limits.

5.11 Field Duplicate Sample Analysis

Field duplicate samples were not collected and analyzed for PNAs due to reasons (limited volume and high variability) described in the approved SAP Section 3.1.4.

6. POLYCHLORINATED BIPHENYLS

The laboratory provided a full data package for the PCB analysis and the items reviewed during validation are summarized below.

6.1 Analytical Methods – *acceptable*

Samples for PCB analysis were analyzed by gas chromatography/mass spectrometry (GC/MS) using EPA SW846 Method 8082.

6.2 Sample Holding Times – *acceptable*

All samples were prepared and analyzed within 14 days of sample collection (soil samples) or within 7 days of sample collection (water samples).

6.3 Reporting

The following sampling, documentation, and reporting discrepancies are noted:

- Analyst notes indicated that a large volume of acid was necessary to perform cleanup on filter bag samples. No further action was required other than to note.

6.4 Laboratory Reporting Limits – *acceptable*

The laboratory achieved the reporting limits (RLs) required by the approved SAP (Golder and Floyd|Snider, 2007).

The reporting limits were not met in cases in which the samples were analyzed at dilutions due to high concentrations of target compounds. No action was taken.

6.5 Instrument Calibration – *acceptable*

A review of the instrument calibration was performed. All of the calibration criteria were met. It should be noted that the approved SAP (Golder and Floyd|Snider, 2007) indicates that continuing calibration verification should be performed every six samples and at the end of the analytical sequence. While USEPA Method 8082 (December 1996) *recommends* that a calibration standard be performed after each group of 10 samples the method *requires* that a calibration standard must be analyzed after each group of 20 samples. Calibration standard analysis frequency was performed according to USEPA Method 8082 criteria.

6.6 Internal Standards Recovery – *acceptable*

Internal standard areas and retention times for all field samples, associated quality control, and calibration data were within established quality control limits.

6.7 Blank Contamination – *acceptable*

The method blanks and associated equipment blanks were free of target compounds.

6.8 Surrogate Recovery

All surrogate recoveries were within control limits except for the following:

- SDG OC61: PCB surrogate % recoveries for Sample PL2SC-SS-I-120308 were "diluted out" due to sample matrix interference and subsequent dilution. No action was taken on this basis. Method blank and laboratory control sample surrogate recoveries are acceptable.

- SDG OG77: PCB surrogate % recoveries (PL2SC-SS-Z-010809) were "diluted out" due to sample matrix interference and subsequent dilution. No action was taken on this basis. Method blank and laboratory control sample surrogate recoveries are acceptable.

- SDG OM42: PCB surrogate % recoveries (PL2SC-SS-J249-021209) were "diluted out" due to sample matrix interference and subsequent dilution. No action was taken on this basis. Method blank and laboratory control sample surrogate recoveries are acceptable.

- SDG OW01: PCB surrogate % recoveries (PL2SC-SS-J505-041709) were "diluted out" due to sample matrix interference and subsequent dilution. No action was taken on this basis. Method blank and laboratory control sample surrogate recoveries are acceptable.

6.9 Matrix Spike Compound Recovery – *acceptable*

Matrix Spike/Matrix Spike Duplicate (MS/MSD) analyses were not performed on suspended solids and stormwater due to reasons (limited volume and high variability) described in the approved SAP Section 3.1.4. Refer to LCS/LCSD results for a measure of precision and accuracy.

6.10 Laboratory Control Sample Recovery – *acceptable*

Laboratory control samples (LCS) were evaluated using ARI's control limit criteria. It should be noted that Table 4 of the SAP specifies PCB acceptance criteria for solids. ARI control limit criteria are as stringent if not more stringent than limits specified in Table 4. LCS/LCSD % recoveries and RPD were acceptable and within specified criteria.

6.11 Field Duplicate Sample Analysis

Field duplicate samples were not collected and analyzed for PCBs due to reasons (limited volume and high variability) described in the approved SAP Section 3.1.4.

7. INORGANICS

The laboratory provided a full data package for the inorganic analysis; the items reviewed during validation are summarized below.

7.1 Analytical Methods – *acceptable*

Samples for total and dissolved metals analysis were prepared using EPA Methods 3010A, 3050B, 7000A, 200.8, or acid digestion. Metals analysis was completed by EPA Methods 6010B, 7000 Series, and 200.8. Samples for trace mercury analysis were prepared and analyzed by cold vapor atomic absorption spectrometry (CVAA) using EPA Method 7470A.

7.2 Sample Holding Times – *acceptable*

All samples were prepared and analyzed within the recommended holding period from the date of collection; 180 days for metals and 28 days for mercury. All holding time criteria were met.

7.3 Laboratory Reporting Limits

The laboratory achieved the reporting limits (RLs) required by the approved SAP (Golder and Floyd|Snider, 2007) with the following discussion:

- In early 2007, due to ongoing zinc contamination within ARI's metals laboratory, zinc reporting level for EPA Method 6010B was revised from 6 µg/L to 10 µg/L (0.6 mg/kg to 1 mg/kg for solids). The revised reporting limit is slightly higher than the approved quality assurance project plans. No action was taken.

- The reporting limits were not met in cases in which the samples were analyzed at dilutions due to high concentrations of target compounds or interferences. No action was taken.

7.4 Initial and Continuing Calibration Verification – *acceptable*

All initial calibration, initial calibration verification (ICV) and continuing calibration verification (CCV) sample analysis results for total and dissolved metals analyses were within 10% of the initial calibration. CCV samples were performed every 10 samples and at the end of an analytical sequence. Instrumental precision criteria as specified on SAP Tables 5 and 6 were met.

7.5 Blank Contamination

The equipment, method, and continuing calibration blanks were free of target compounds with the following exceptions and discussion:

Samples	Analyte	Qualification
OB32 PL2SC-W-I-112008	Zn (60 µg/L)	J+ – Elevated (estimated) result due to equipment blank contamination (SDG NZ46 – 10 µg/L)
OO10 PL2SC-W-J249-022309	Cu (8 µg/L)	J+ – Elevated (estimated) result due to equipment blank contamination (SDG OH84 – 3 µg/L)
OS79 PL2SC-W-J505-032809	Cu (10 µg/L)	J+ – Elevated (estimated) result due to equipment blank contamination (SDG OC61 – 9 µg/L)

Early 2007 ARI had some ongoing zinc contamination within their metals laboratory thus zinc was analyzed via EPA Method 200.8 instead of EPA Method 6010B. Zinc reporting limits for EPA Method 200.8 are less than EPA Method 6010B reporting limit of 6 µg/L (historical reporting limit) at 4 µg/L. ARI resolved the internal zinc contamination and effective March 4, 2007 EPA Method 6010B reporting limit for zinc is 10 µg/L (Method Detection Limit and Reporting Limit Summary for ICP-OES). No action was taken other than to note this.

7.6 Laboratory Control Sample Recovery – *acceptable*

LCS (blank spike) samples were performed with each analytical batch. All LCS recoveries and relative percent differences (RPDs) were acceptable and within the QC limits of 80 to 120 percent.

7.7 Matrix Spike/Matrix Spike Duplicate Analysis – *acceptable*

Matrix Spike (MS) analysis was performed on selected stormwater and suspended solid samples. Blank spike data was used to assess accuracy in cases where matrix spike quality control was not performed (in most cases due to limited sample volume) by ARI. The metals MS percent recoveries were acceptable.

7.8 Duplicate Analysis – *acceptable*

Laboratory duplicate analysis was performed on selected water and suspended solid samples. Field duplicate data was used to assess precision on water samples associated with SDG OG55/OG57. Laboratory duplicate analysis was not performed on the remaining SDGs for a number of reasons which include a) precision analysis was unnecessary on SDGs where the sole sample was an equipment blank or b) limited sample volume. Duplicate analysis criteria were met with the following exceptions:

- SDG OG55: Copper sample and laboratory duplicate (PL2SC-W-V-010609) results were 4 and 3 µg/, with an RPD of 28.6%. No qualifier is necessary due to samples being < 5X the RL and there is higher variability at lower concentrations.

- SDG OG55: Copper sample and field duplicate (PL2SC-W-V-010609 and PL2SC-W-DUP-010609) results were 4 and 3 µg/L, with an RPD of 28.6%. No qualifier is necessary due to samples being < 5X the RL.

- SDG OG55: Arsenic sample and field duplicate (PL2SC-W-V-010609 and PL2SC-W-DUP-010609) results were 2 and 1 µg/L, with an RPD of 66.7%. No qualifier is necessary due to samples being < 5X the RL.

7.9 Interference Check Sample Analysis – *acceptable*

All interference check sample analysis results for total metals were within 20% of the true value, analyzed at the appropriate frequencies.

7.10 Linear Range Check Standard – *acceptable*

The linear range check standard analyzed for ICP analyses was within ±10%.

7.11 ICP Serial Dilution Analysis – *acceptable*

All serial dilution results were less than 10% difference between the initial and final results and less than 50 times the sample IDL.

7.12 Internal Standard Analysis

Internal standard recoveries for metals were not assessed in part because this data is not summarized by ARI (it is not achievable with current LIMS setup) and because this data is only available in the raw data package. If internal standard recovery is outside criteria the laboratory

follows standard operating procedures (consistent with the referenced method) to identify and address the issue. Typically steps include flushing the instrument with a rinse blank followed by analyzing a calibration blank to assess internal standard responses, and based on these results (determining that instrument drift isn't occurring) reanalyzing the sample at a dilution. Since associated quality control was within criteria an assessment of internal standards is not necessary for a Level 1 review.

7.13 Field Duplicate Sample Analysis – *acceptable*

Field duplicate sample pair is as follows:

Laboratory SDG	Sample	Field Duplicate Sample
OG55/OG57	PL2SC-W-V-010609	PL2SC-W-DUP-010609

Work plan goals for precision were met for dissolved metals. See further discussion in section 7.8 above.

8. DATA QUALIFIERS

Data qualifiers applied by the laboratory have been removed from the data summary report sheets and superseded by data validation qualifiers as follows:

The following qualifiers were used to modify the data quality and usefulness of individual analytical results.

U – The constituent was analyzed for, but was not detected above the reported sample quantitation limit.

J – The constituent was positively identified and detected; however, the concentration reported is an estimated value because the result is less than the quantitation limit or quality control criteria were not met.

J+ – The result is an estimated quantity, but the result may be biased high.

UJ – The constituent was not detected; the associated quantitation limit is an estimated value because quality control criteria were not met.

R – Data are rejected due to significant exceedance of quality control criteria. The analyte may or may not be present. Additional sampling and analysis may be required to determine the presence or absence of the constituent. For statistical reasons, rejected values are not included in the database.

UY – PCB Methods Only. The laboratory uses the Y qualifier when interferences (usually the presence of the overlapping PCB Aroclor at high concentrations) cause the detection limit to be raised. The Y-flagged Aroclor may be present at concentrations less than equal to the limit reported, but in the opinion of the analyst, insufficient information is present to confirm the detection according to the method's protocols. The concentration should be treated as a non-detected value at a raised detection limit. The "U" has been added to the lab's "Y" qualifier to stress that the sample should be treated as a non-detected value. The reporting limit is elevated due to interference. The result is not detected.

9. DATA ASSESSMENT

Data review and validation was performed by an experienced quality assurance chemist independent of the analytical laboratory and not directly involved in the project. This is to certify that I have examined the analytical data and based on the information provided to me by the laboratory, in my professional judgment, the data are acceptable for use except where indicated by data qualifiers, which may modify the usefulness of those individual values.

May 8, 2009
Jill Lamberts Date
Staff Environmental Scientist
Golder Associates Inc.

June 15, 2009
Kent M. Angelos Date
Principal and Project Director
Golder Associates Inc.

10. REFERENCES

EPA 1999, USEPA Contract Laboratory Program, National Functional Guidelines for Organic Data Review, EPA-540/R-99/008, October, 1999.

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