The Boeing Company
P.O. Box 3707
Seattle, WA 98124-2207

October 11, 2011
9L-22-N410-JLF-172

Washington State Department of Ecology
Northwest Regional Office
Hazardous Waste and Toxics Reduction Program
3190 160th Avenue SE
Bellevue, Washington 98008-5452

Attn: Byung Maeng, P.E.

RE: EVALUATION OF ARSENIC IN GROUNDWATER
STRIKER PROPERTY SOUTH
BOEING SPACE CENTER
KENT, WASHINGTON

Dear Mr. Maeng:

The Boeing Company (Boeing) recently submitted a request to the Washington State Department of Ecology (Ecology) for removal of the Striker South Property (subject property) from the Boeing Space Center (BSC) Resource Conservation and Recovery Act (RCRA) Interim Status Facility (WAD 061670766; Boeing 2011). As part of its review, Ecology requested additional information regarding the arsenic concentrations detected in groundwater at the BSC. This letter provides a summary of the available data for arsenic in groundwater at the BSC and our evaluation of the nature and occurrence of the detected concentrations.

BACKGROUND

Groundwater sampling was conducted at the subject property in 2010 and 2011 as part of due diligence prior to potential sale of a portion of the BSC known as the Striker Property, which includes the subject property. Dissolved arsenic was detected in groundwater samples collected throughout the subject property at concentrations ranging from 0.3 micrograms per liter (µg/L) to 114 µg/L, and the concentrations detected at many locations were greater than the screening level of 5 µg/L, which was developed based on the Model Toxics Control Act (MTCA) Method B cleanup level for protection of groundwater as drinking water (Landau Associates 2010). The investigations conducted to date, which included assessment to evaluate the nature and extent of the arsenic concentrations detected in groundwater, have not identified a potential source of arsenic at the subject property or at the BSC. Based on available data, and as discussed below, the elevated concentrations of arsenic in groundwater are isolated, reflect area-wide conditions, are not attributable to sources at the BSC, and do not pose a risk to human health or the environment.

ARSENIC DATA FROM PREVIOUS INVESTIGATIONS AT BOEING SPACE CENTER

Boeing gathered and reviewed available arsenic groundwater data collected during previous investigations at the BSC, including the subject property. The available arsenic data for the BSC are summarized in Table 1. Available arsenic data for the Striker Property are presented on Figure 1.

Building 18-03

Between 1992 and 1994, groundwater samples were collected for laboratory analysis from five monitoring wells installed on the east side of Building 18-03, in the area of a former chrome waste underground storage tank (UST) system. Dissolved arsenic was detected in the samples at concentrations ranging from 16 µg/L to 25 µg/L (Figure 1; Weston 1994). In a letter dated February 27, 1995, Ecology accepted certification for clean closure of the tank system (Ecology 1995).

Former Gun Club

In October 1998, groundwater samples were collected from four direct-push borings during site characterization activities at the BSC Gun Club, which was formerly located directly north of the Striker Property (in the current location of the stormwater detention pond). The detected concentrations of dissolved arsenic ranged from 13 µg/L to 42 µg/L (Landau Associates 1999). In October 1999, following soil remediation activities in the summer of 1999, groundwater samples were collected and analyzed from three monitoring wells installed in the former source area. The dissolved arsenic concentrations detected in the groundwater samples ranged from 6.7 µg/L to 12.4 µg/L. The wells were re-sampled in March 2000 and the samples were analyzed for total and dissolved arsenic. The detected concentrations of total arsenic ranged from 4 µg/L to 23 µg/L; the dissolved arsenic concentrations were only slightly lower than the total concentrations and ranged from 3 µg/L to 19 µg/L. The results of the 1999 groundwater monitoring were included in the final cleanup report submitted to Ecology in April 2000 (AGI 2000). The results of the 2000 groundwater monitoring were included in an addendum to the final cleanup report (discussed below).

In April 2000, AGI Technologies prepared an addendum to the final cleanup report for the Gun Club at the request of Ecology. The addendum presented an evaluation of the source of metals detected in groundwater and concluded that the arsenic detected in groundwater at the BSC comes from natural sources. A copy of the addendum is attached. In August 2000, based on the data presented in the addendum, Ecology issued a No Further Action (NFA) determination for the Gun Club facility under the Voluntary Cleanup Program (VCP). The NFA letter acknowledged that "arsenic concentrations in groundwater that exceed MTCA Method A limits are likely the result of nature, and not the result of a known release at the Gun Club site." A copy of the NFA letter is attached.

Building 18-54

In April 2009, three monitoring wells were installed in the area of Building 18-54 (located east of the Striker Property) to document groundwater conditions prior to upgrades to an existing substation by Puget Sound Energy. Dissolved arsenic was detected in the

groundwater samples collected from each of the wells at concentrations ranging from 24 µg/L to 51 µg/L (Boeing 2001; GeoEngineers 2009).

DISSOLVED ARSENIC AT STRIKER SOUTH PROPERTY

The dissolved arsenic concentrations detected in the groundwater samples collected at the Striker South Property are shown on Figure 1. The highest concentrations of arsenic were detected in the groundwater samples collected from an undeveloped portion of the Striker South Property, between Building 18-20 to the north and Building 18-03 to the south. Arsenic was detected at concentrations about 20 times greater than the screening level in this area (114 µg/L at DP-5 and 111 µg/L at DP-27). There has been no handling, use, or storage of any arsenic-containing material in this area. Waste profile records for the contents of the former chrome waste UST system at Building 18-03, which is located about 600 feet to the southeast of this area, indicate that the waste stream included arsenic. Analytical results for a sample of the tank contents indicate that total arsenic was detected at a concentration of 34.9 milligrams per liter (34,900 µg/L) (Weston 1994). As noted above, during the closure of the UST system, arsenic was detected at concentrations ranging from 16 µg/L to 25 µg/L in samples collected from monitoring wells in the immediate vicinity of the UST system. The detected concentrations of dissolved arsenic in groundwater samples collected from direct-push borings DP-28 through DP-30 (located between the former UST system and direct-push borings DP-5 and DP-27) ranged from 1.1 µg/L to 31.9 µg/L. Based on the investigations conducted in the area and the associated groundwater data, the elevated concentrations of arsenic detected in groundwater at DP-5 and DP-27 appear to be isolated and are not associated with the former UST system, which is the only known potential source of arsenic on the Striker South Property.

Elevated concentrations of arsenic (65.4 µg/L at DP-31 and 43.8 µg/L at DP-11) were also detected in groundwater samples collected from locations in the southwest, undeveloped portion of the Striker South Property. There has been no development in this area and no handling, use, or storage of any arsenic-containing material. Arsenic was detected at concentrations below the screening level in two samples collected from the immediate vicinity of DP-31 and DP-11 (2.8 µg/L at DP-32 and 0.3 µg/L at DP-33); therefore, the elevated concentrations of arsenic appear to be isolated and not associated with a release. As with the other locations at the subject property, the investigations conducted and the associated groundwater data indicate that the elevated concentrations of arsenic detected in groundwater at DP-31 and DP-11 appear to be isolated and are not associated with known or potential sources of arsenic on the Striker South Property.

CONCLUSIONS

Dissolved arsenic is present in groundwater at the Striker South Property at concentrations greater than the screening level. Based on the investigations conducted to date and the available analytical and historical data, the elevated concentrations of arsenic detected in groundwater are isolated, are the result of regional conditions, and are not the result of sources associated with Boeing operations.

Groundwater at the BSC is not used for drinking water. Boeing's purchase and sale agreement with the prospective buyer of the Striker Property includes a restriction on the use of groundwater. As an added level of protection, Boeing is willing to pursue a formal environmental covenant to restrict the use of groundwater. The arsenic present in groundwater at the Striker Property does not pose a potential threat to human health or the environment; therefore, Boeing requests that the site not be listed on the Confirmed and Suspected Contaminated Sites List.

We would appreciate the opportunity to discuss the information presented in this letter with you and to answer questions that you may have regarding the detected concentrations of arsenic in groundwater at the Striker South Property. Please e-mail or call me to schedule a time to discuss this request.

Sincerely,

Joe Flaherty
Project Manager
EHS Remediation Group
(206) 769-5987
joseph.l.flaherty@boeing.com

REFERENCES

AGI. 2000. Report: *Volume 1, Final Report, Soil Cleanup, Boeing, Boeing Kent Space Center Gun Club, 20403 68th Avenue South, Kent Washington*. Prepared for The Boeing Company. AGI Technologies. April 17.

Boeing. 2011. Letter: *Request for Removal of the Striker Property South From the Boeing Space Center RCRA Interim Status Facility (WAD 061670766)*. From J. Flaherty, Boeing EHS Remediation Group, Seattle, Washington, to B. Maeng, Washington State Department of Ecology, Hazardous Waste and Toxics Reduction Section, Bellevue, Washington. July 21.

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ATTACHMENTS

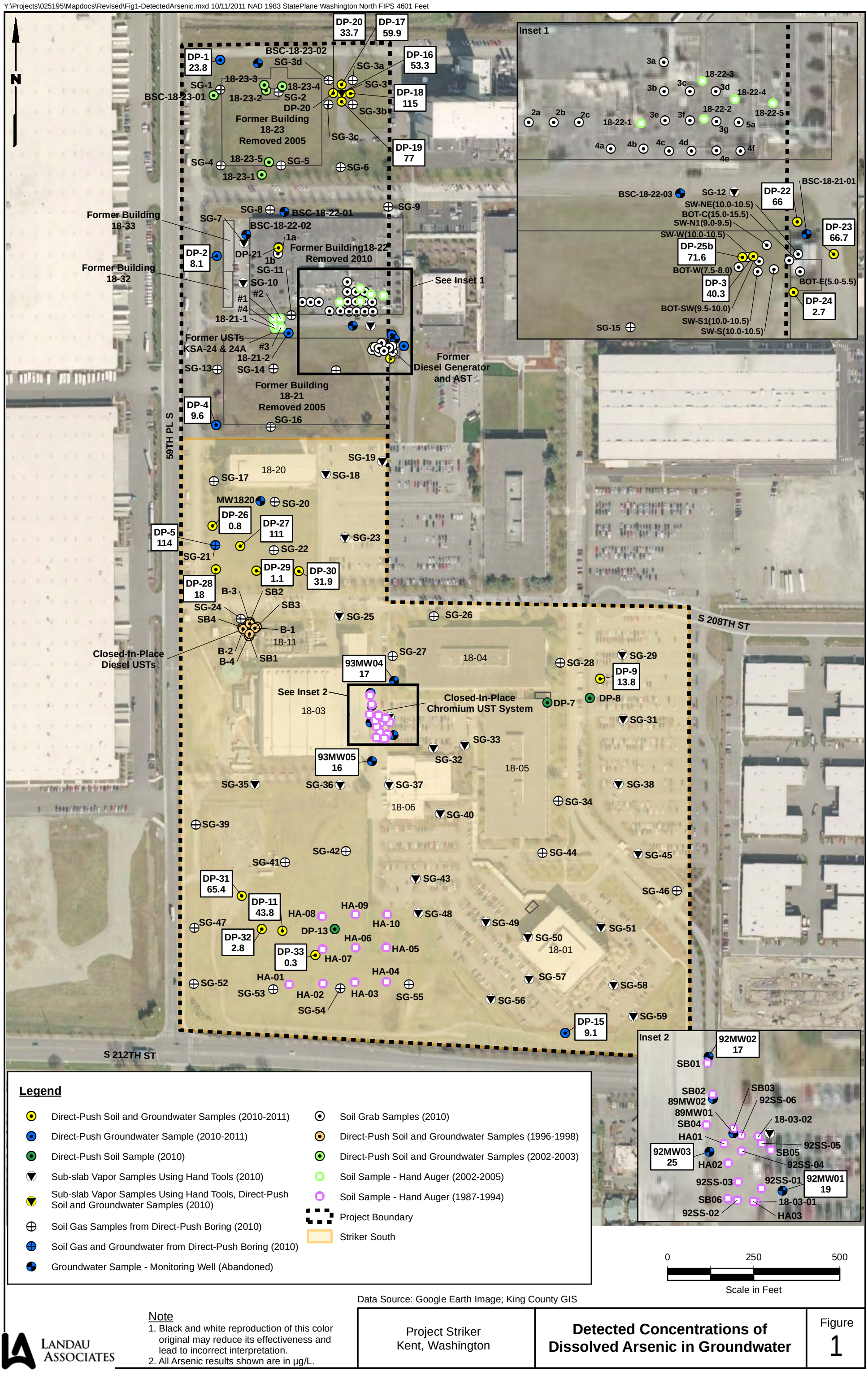
Figure 1: Detected Concentrations of Dissolved Arsenic in Groundwater

Table 1: Detected Concentrations of Dissolved Arsenic in Groundwater

AGI Letter Report: *Groundwater Monitoring and Evaluation Addendum, Boeing Space Center Gun Club Soil Cleanup, Kent Washington*. April 28, 2000.

Washington State Department of Ecology Letter: *No Further Action Determinatio*n, Boeing Space Center Gun Club, Kent, Washington. August 22, 2000.

Y:\Projects\025195\Mapdocs\Revised\Fig1-DetectedArsenic.mxd 10/11/2011 NAD 1983 StatePlane Washington North FIPS 4601 Feet



Legend

- Direct-Push Soil and Groundwater Samples (2010-2011)
- Direct-Push Groundwater Sample (2010-2011)
- Direct-Push Soil Sample (2010)
- Sub-slab Vapor Samples Using Hand Tools (2010)
- Sub-slab Vapor Samples Using Hand Tools, Direct-Push Soil and Groundwater Samples (2010)
- Soil Gas Samples from Direct-Push Boring (2010)
- Soil Gas and Groundwater from Direct-Push Boring (2010)
- Groundwater Sample - Monitoring Well (Abandoned)
- Soil Grab Samples (2010)
- Direct-Push Soil and Groundwater Samples (1996-1998)
- Direct-Push Soil and Groundwater Samples (2002-2003)
- Soil Sample - Hand Auger (2002-2005)
- Soil Sample - Hand Auger (1987-1994)
- Project Boundary
- Striker South

0 250 500

Scale in Feet

Data Source: Google Earth Image; King County GIS

Note
1. Black and white reproduction of this color original may reduce its effectiveness and lead to incorrect interpretation.
2. All Arsenic results shown are in µg/L.

LANDAU ASSOCIATES

Project Striker
Kent, Washington

Detected Concentrations of Dissolved Arsenic in Groundwater

Figure 1

TABLE 1
DETECTED CONCENTRATIONS OF DISSOLVED ARSENIC IN GROUNDWATER
BOEING STRIKER PROPERTY
KENT, WASHINGTON

Sample ID	Date	Dissolved Arsenic (µg/L)
KSC-DP-1	7/28/2010	**23.8**
KSC-DP-2	7/30/2010	**8.1**
KSC-DP-3	7/30/2010	**40.3**
KSC-DP-4	7/29/2010	**9.6**
KSC-DP-5	7/30/2010	**114**
KSC-DP-9	7/29/2010	**13.8**
KSC-DP-11	7/30/2010	**43.8**
KSC-DP-15	7/30/2010	**9.1**
KSC-DP-16	7/30/2010	**53.3**
KSC-DP-17	1/27/2011	**59.9**
KSC-DP-18	1/27/2011	**115**
KSC-DP-19	1/27/2011	**77**
KSC-DP-20	1/27/2011	**33.7**
KSC-DP-22	1/26/2011	**66**
KSC-DP-23	1/26/2011	**66.7**
KSC-DP-24	1/26/2011	**2.7**
KSC-DP-25b	1/26/2011	**71.6**
KSC-DP-26	1/25/2011	**0.8**
KSC-DP-27	1/25/2011	**111**
KSC-DP-28	1/25/2011	**18**
KSC-DP-29	1/25/2011	**1.1**
KSC-DP-30	1/25/2011	**31.9**
KSC-DP-31	1/26/2011	**65.4**
KSC-DP-32	1/26/2011	**2.8**
KSC-DP-33	1/26/2011	**0.3**
Building 18-03		
92MW-01	11/21/1994	**19**
92MW-02	11/21/1994	**17**
92MW-03	11/21/1994	**25**
93MW-04	11/21/1994	**17**
93MW-05	11/21/1994	**16**
Building 18-54		
MW-1	4/27/2009	**27**
MW-2	4/27/2009	**24**
MW-3	4/27/2009	**51**
Gun Club		
P-1	10/26/1998	**42**
P-2	10/26/1998	**13**
P-3	10/26/1998	**18**
P-4	10/26/1998	**21**
KGC-MW-1	3/6/2000	**19**
KGC-MW-2	3/6/2000	**3**
KGC-MW-3	3/6/2000	**12**

Bold = Detected compound.

Box = indicates detected concentration exceeds screening level (5 µg/L).

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April 28, 2000

14,327.321

Mr. Brian Anderson
The Boeing Company
Shared Services Group
Post Office Box 3707, MC7A-WW
Seattle, Washington 98124-2207

Dear Brian:

Addendum
Groundwater Monitoring and Evaluation
Boeing Space Center Gun Club Soil Cleanup
Kent, Washington

This letter report provides additional groundwater information collected subsequent to completion of soil cleanup and reporting for a gun club operated by Boeing employees at the Kent Space Center. Low levels of lead and arsenic have been detected in shallow site groundwater. As requested by the Washington Department of Ecology (Ecology) after review of the draft soil cleanup report, this addendum further evaluates the source of metals in groundwater.

ADDENDUM BACKGROUND

Soil cleanup at the gun club was completed during late summer, early fall 1999 by stabilization and removal of 4 to 12 inches of soil from a 19.2 acre area. Conservative Model Toxics Control Act (MTCA) residential cleanup levels were met with shallow excavation depths indicating that contaminants of concern (lead and polycyclic aromatic hydrocarbons [cPAH]) had not appreciably migrated. Following soil cleanup, site groundwater in the most highly impacted source areas was evaluated by installation and sampling of three shallow groundwater monitoring wells (approximately 20 feet below ground surface). For reference, monitor well logs are included as an attachment. Well locations were chosen on the basis that source areas had not been altered and had been continuous since the early 1970's. Consequently, if groundwater had been impacted at all by gun club chemicals of concern, we expected to see impacts in the source center areas.

Water samples were collected in October 1999 and were analyzed for lead, arsenic, and carcinogenic (cPAH). The lead and cPAH were the primary chemicals of concern for gun club soils, but arsenic was also included as an analyte since it had been detected in groundwater in a precleanup assessment (Landau, 1999). The post cleanup groundwater sampling results were presented as part of the soil cleanup report (AGI, 2000). These results indicated very low lead concentrations below MTCA Method A (5 parts per billion [ppb]), except one duplicate sample which contained 6 ppb lead. CPAH was not detected in any of the three wells. Arsenic was detected at relatively low ppb levels ranging from 3 to 16 micrograms per liter (µg/L). Based on discussions with Ecology, additional

actions were requested to address or further define the source of very low lead and arsenic concentrations in shallow groundwater at the site. In summary, the following actions have been completed in support of this groundwater addendum:

- The three onsite groundwater monitoring wells were resampled by Boeing on March 6, 1999 and analyzed for both total and dissolved lead and arsenic.
- Further research was performed to establish typical background arsenic and lead concentrations in soil and shallow groundwater within the Kent area and Green River Valley.

KENT GUN CLUB GROUNDWATER SAMPLING

The three onsite monitoring wells, KGC-MW1 through KGC-MW3, were repurged and sampled in early March 2000 using low-flow techniques and a peristaltic pump. This sampling event would be considered a wet season event, versus the dry season performed in October 1999. Groundwater levels, as measured from top of casing, for each of the sampling events are listed as follows:

Well No.	October 25, 1999	March 6, 2000
KGC-MW1	15.3 feet	9.12 feet
KGC-MW2	14.81 feet	6.13 feet
KGC-MW3	14.17 feet	7.47 feet

Groundwater levels rose 6 to 8 feet during the winter between October and March, with the static water table occurring 5 to 7 feet below ground surface.

During the March 2000 sampling event, dissolved metals samples were collected to further evaluate whether metals concentrations could be affected by soil turbidity within the groundwater samples. The three shallow wells produce very low quantities of slightly silty water, since the first water-bearing zone encountered is fine-grained silts and silty sands. Dissolved metal samples were field-filtered with a 45 micron filter to remove suspended solids.

Results of the October 1999 and March 2000 sampling event are summarized in **Table 1**. The original lab reports and Quality Assurance/Quality Control review are included as an attachment. In summary, March 2000 arsenic concentrations range from 4 to 23 µg/L with dissolved arsenic concentrations being slightly lower than totals. These results are consistent with the October 1999 sampling event. Total lead concentrations from the three wells were 2 to 3 µg/L in March 2000 and dissolved concentrations were not detectable.

Total lead concentrations are below the MTCA Method A cleanup level of 5 µg/L and sampling data also indicates that lead detected may be associated with slight to moderate soil turbidity present in the water samples collected. The lead results are typical of background in the Kent Valley and likely have no relationship to lead from gun club cleanup operations. Based on this, these levels do not require further action for the site. Arsenic concentrations slightly exceed the MTCA Method A cleanup levels for groundwater, but the arsenic appears to be associated with regional background conditions, as described in following paragraphs. Both the lead and arsenic are below current drinking water standards (Maximum Contaminant Levels [MCL]) which are 15 µg/L for lead and 50 µg/L for arsenic.

REGIONAL AND LOCAL OCCURRENCES OF ARSENIC AND LEAD IN GROUNDWATER AND SOIL

Groundwater

Arsenic is a naturally occurring source of regional groundwater contamination in Washington State (Ecology, 1999). Turney and others (1995) identified arsenic concentrations ranging from less than 1 to 77µg/L in 64 percent of wells sampled in East King County. Elevated concentrations of arsenic have been documented in other areas of Western Washington, including Snohomish County, which had listed groundwater concentrations as high as 15,000 µg/L. Information obtained from the Washington State Department of Health (WSDH) database showed significant arsenic in many area wells. Specifically, the WSDH database notes nine water supply wells in the vicinity of the Gun Club (Township 22, Range 4E and Range 5E) with 2 to 25 µg/L arsenic (see **Table 2**).

The source of the arsenic in the groundwater comes from natural sources. The highest concentrations of arsenic are associated with igneous or volcanic "bedrock" or with sedimentary deposits containing igneous material (Turney, 1995). Although bedrock does not outcrop near the Kent Space Center and is buried beneath 800 to 1,000 feet of sediment in the area (Hill & Othberg, 1974), the uppermost sedimentary deposits in the Kent Valley are derived from the Cascade Mountains and have a high proportion of volcanic fragments. In fact, the uppermost sediments are colloquially termed the "Duwamish Sand" based on a characteristic black color speckled with red. The black particulates originate from basalts and other volcanic materials and the red particles are derived from andesite.

Significant regional lead comparison data were not available, since most testing observed had detection levels of 5 µg/L and site lead levels are below this level. Also, since the drinking water standard for lead is 15 µg/L, lead has not been a significant regional concern. However, the WSDH database did have several wells in the Kent area with lead, as shown in **Table 3**.

Soil

Based on review of gun club assessment data, site soil background levels for lead and arsenic can be generally determined. Site soil samples that did not appear to be impacted by gun club contaminants contained about 5 mg/kg arsenic and 10 mg/kg lead. These values are consistent with Ecology publication, *Natural Background Soil Metals Concentrations in Washington*. In this document, the Puget Sound 90th percentile value for arsenic and lead are 7.8 and 16.8, respectively. Consequently, the natural soil background concentrations of lead and arsenic in soil can contribute to groundwater detections; particularly if groundwater samples contain soil turbidity introduced by sampling procedures.

DATA FROM SHALLOW KENT VALLEY GROUNDWATER MONITORING WELLS

In order to further verify that arsenic levels and lead levels are the result of a regional condition and not onsite contamination, we also obtained locally available shallow groundwater monitoring well data. Specifically, groundwater data were available from another area of the Boeing Kent Space Center facility and the Boeing Auburn Facility, which is also located in the Green River Valley.

Kent Space Center

During the early 1990's, Boeing closed a micromation tank at the Kent Space Center. The site is approximately 3,000 feet southeast and likely upgradient of the gun club. Arsenic and lead results are shown in **Table 4**. Three shallow wells were installed and groundwater was tested for metals during two sampling events (December 1992 and January 1993). Arsenic concentrations (3 to 21 µg/L) have not been linked to any contamination source at the site and can only be explained by the regional occurrence of arsenic in groundwater. Lead levels ranging from 1 to 30 µg/L were detected. The samples with 1 to 6 µg/L of lead are consistent with a background condition. Several higher detections in the first round could have been related to site impacts.

Boeing Auburn

The Boeing Auburn facility is also located to the south and upgradient in the Green River Valley. Due to various environmental actions, groundwater monitoring in the shallow water zone has been ongoing for many years and a similar arsenic and lead background condition has been noted. August 1999 groundwater data from the Boeing Auburn facility showed eight out of 27 samples collected exhibited concentrations of arsenic and lead in the groundwater. The arsenic concentrations ranged from 5 to 20 µg/L; lead ranged from 2 to 9 µg/L and was detected in most wells where arsenic exceeded 5 µg/L. These arsenic and lead concentrations have not been linked to any contamination source at the site, and can best be explained by the regional occurrence of arsenic and lead in groundwater. This data is very similar to that observed at the gun club.

SUMMARY AND CONCLUSIONS

Based on additional sampling performed at the gun club, further research of regional information and data sources; and obtaining other site-specific shallow groundwater data from two Boeing sites upgradient and within the Green River Valley; we believe that conclusive statements can be made regarding metals concentration and shallow groundwater at the gun club site as follows:

- Lead

  The October 1999 and March 2000 sampling results indicate that lead is below MTCA Method A cleanup levels and drinking water standards during both the dry and wet seasons, and that low levels detected are associated with sample turbidity and natural soil background conditions. The lead detected is associated with soil turbidity since dissolved lead concentrations were not detectable.

- Arsenic

  Low levels of arsenic in site groundwater occur in the dissolved phase and exceed the MTCA Method A cleanup level of 5 µg/L, but are below current drinking water quality standards of 50 µg/L. Further research performed for this addendum indicates that arsenic concentrations in the ranges detected are commonly found as natural background conditions throughout the area and region and specifically within the Green River Valley. Background arsenic concentrations at two upgradient Boeing sites in the Green River Valley were similar to those of the gun club.

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In summary, this addendum supports the statement that Boeing Gun Club activities did not adversely impact site groundwater.

Sincerely,

AGI Technologies, a CDM Company

Jessica R. Garofalo
Staff Geologist

Martin E. Carlson, P.E.
Principal Engineer

cc: Mr. Ron Timm, Ecology

enclosures

REFERENCES

REFERENCES

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TABLES

Table 1
Arsenic, Lead and CPAHs in Site Groundwater
Quantified by EPA Method 7060,7421, and 8270
Boeing/Kent Gun Club
Kent, Washington

Sample I.D.	Sample Date	Total Metals Arsenic µg/L	Total Metals Lead µg/L	Turbidity NTU	Dissolved Metals Arsenic µg/L	Dissolved Metals Lead µg/L	Turbidity NTU
KGC-MW1-10/99	10/26/99	10	2	--	--	--	--
KGC-MW1-000306	03/06/00	23.0	2.0	40	19.0	ND	1.5
KGC-MW2-10/99	10/26/99	6	ND	--	--	--	--
KGC-MW2-000306	03/06/00	4.0	2.0	68	3.0	ND	0.5
KGC-MW3-10/99	10/26/99	12	1	--	--	--	
KGC-MW4-10/99 (Duplicate)**	10/26/99	14	6	--	--	--	--
KGC-MW3-000306	03/06/00	15.0	3.0	57	12.0	ND	0.5
Method A Cleanup Level [a]		5	5		5	5	

Compound	Sample I.D. KGC-MW1 10/99 µg/L	KGC-MW2 10/99 µg/L	KGC-MW3 10/99 µg/L
Naphthalene	ND	ND	ND
2-Methylnaphthalene	ND	ND	ND
Acenaphthylene	ND	ND	ND
Acenaphthene	ND	ND	ND
Fluorene	ND	ND	ND
Phenanthrene	ND	ND	ND
Anthracene	ND	ND	ND
Fluoranthene	ND	ND	ND
Pyrene	ND	ND	ND
Benzo[a]anthracene*	ND	ND	ND
Chrysene*	ND	ND	ND
Benzo[b]fluoranthene*	ND	ND	ND
Benzo[k]fluoranthene*	ND	ND	ND
Benzo[a]pyrene*	ND	ND	ND
Indeno[1,2,3-cd]pyrene*	ND	ND	ND
Dibenz[a,h]anthracene*	ND	ND	ND
Benzo{g,h,I]perylene*	ND	ND	ND
Total CPAHs	ND	ND	ND
Method A Cleanup Level [a] (total cPAHs)	0.1	0.1	0.1

Notes:

*Carcinogenic PAH (cPAH).
**Sample is a duplicate of MW-3.
Detection limit for lead and PAH is 1µg/L and 0.1 µg/L, respectively.
Shaded value exceeds cleanup level.
a) Washington Administrative Code Chapter 173-340 Model Toxics Control Act Cleanup Regulation Method A suggested cleanup level for groundwater.
µg/L - microgram per liter.
ND - not detected.
-- not analyzed.

AGI TECHNOLOGIES

Table 2
Arsenic Concentrations in Groundwater, Public Water Systems in T22N, R4E and R5E, King County
Washington State Department of Health Data Base
Boeing/Kent Gun Club
Kent, Washington

Township	Range	Section	QTR	Name	Sample Number	Result (mg/L)
22	04E	8	NENE	HIGHLINE WATER DISTRICT	12015	0.023
22	04E	8	NWSE	KING COUNTY WATER DISTRICT #54	9819	0.0034
22	04E	9	NENE	HIGHLINE WATER DISTRICT	12015	0.023
22	05E	14	NESW	REICHEL/SCANLON SYSTEM	15394	0.028
22	05E	21	SWSW	KING COUNTY WATER DISTRICT 111	14784	0.01
22	05E	21	SWSW	KING COUNTY WATER DISTRICT 111	15401	0.009
22	05E	21	SWSW	KING COUNTY WATER DISTRICT 111	15402	0.006
22	05E	21	SWSW	KING COUNTY WATER DISTRICT 111	15403	0.006
22	05E	21	SWSW	KING COUNTY WATER DISTRICT 111	15404	0.005
22	05E	21	SWSW	KING COUNTY WATER DISTRICT 111	15405	0.007
22	05E	27	NWNW	LAKE MERIDIAN ESTATES (MHP)	28012	0.025
22	05E	27	NWNW	SUNSET PARK WATER CO	14734	0.012
22	05E	27	NWNW	SUNSET PARK WATER CO	15568	0.011
22	05E	32	SWSE	CRESTVIEW WEST WATER SYSTEM	15268	0.005
22	05E	32	SWSE	CRESTVIEW WEST WATER SYSTEM	15269	0.005
22	05E	32	SWSE	CRESTVIEW WEST WATER SYSTEM	15269	0.0101
22	05E	33	SWSW	CRESTVIEW TRACTS #3	34528	0.012

Note:
mg/L - milligram per liter.

AGI TECHNOLOGIES

Table 3
Lead Concentrations in Groundwater, Public Water Systems in T22N, R4E and R5E, King County
Washington State Department of Health Data Base
Boeing/Kent Gun Club
Kent, Washington

Township	Range	Section	QTR	Pws-Id	Pws-Name	Sample Number	Results (mg/L)
22	04E	6	NWNW	64816	OLSON, M	6855	0.002
22	04E	6	NWNW	64816	OLSON, M	6855	0.005
22	04E	8	NENE	40650	HIGHLINE WATER DISTRICT	535	0.004
22	04E	8	NENE	40650	HIGHLINE WATER DISTRICT	536	0.004
22	04E	8	NENE	40650	HIGHLINE WATER DISTRICT	6006	0.002
22	04E	8	NENE	40650	HIGHLINE WATER DISTRICT	6008	0.007
22	04E	8	NENE	40650	HIGHLINE WATER DISTRICT	6009	0.006
22	04E	8	NENE	40650	HIGHLINE WATER DISTRICT	6012	0.003
22	04E	8	NENE	40650	HIGHLINE WATER DISTRICT	6013	0.008
22	04E	8	NENE	40650	HIGHLINE WATER DISTRICT	6016	0.007
22	04E	8	NENE	40650	HIGHLINE WATER DISTRICT	6017	0.002
22	04E	8	NENE	40650	HIGHLINE WATER DISTRICT	6018	0.0036
22	04E	8	NENE	40650	HIGHLINE WATER DISTRICT	6019	0.0009
22	04E	8	NENE	40650	HIGHLINE WATER DISTRICT	6020	0.003
22	04E	8	NENE	40650	HIGHLINE WATER DISTRICT	6024	0.004
22	04E	8	NENE	40650	HIGHLINE WATER DISTRICT	6028	0.002
22	04E	8	NENE	40650	HIGHLINE WATER DISTRICT	6170	0.002
22	04E	8	NENE	40650	HIGHLINE WATER DISTRICT	8579	0.003
22	04E	8	NENE	40650	HIGHLINE WATER DISTRICT	12015	0.005
22	04E	8	NENE	40650	HIGHLINE WATER DISTRICT	28272	0.004
22	04E	8	NENE	40650	HIGHLINE WATER DISTRICT	28273	0.004
22	04E	8	NENE	40650	HIGHLINE WATER DISTRICT	28274	0.002
22	04E	8	NENE	40650	HIGHLINE WATER DISTRICT	28275	0.003
22	04E	8	NENE	40650	HIGHLINE WATER DISTRICT	28276	0.014
22	04E	8	NENE	40650	HIGHLINE WATER DISTRICT	28278	0.003
22	04E	8	NENE	40650	HIGHLINE WATER DISTRICT	28280	0.005
22	04E	8	NENE	40650	HIGHLINE WATER DISTRICT	28281	0.011
22	04E	8	NENE	40650	HIGHLINE WATER DISTRICT	28282	0.011
22	04E	8	NENE	40650	HIGHLINE WATER DISTRICT	28283	0.01
22	04E	8	NENE	40650	HIGHLINE WATER DISTRICT	28284	0.014
22	04E	8	NENE	40650	HIGHLINE WATER DISTRICT	28286	0.004
22	04E	8	NENE	40650	HIGHLINE WATER DISTRICT	28288	0.005

AGI TECHNOLOGIES

Table 3
Lead Concentrations in Groundwater, Public Water Systems in T22N, R4E and R5E, King County
Washington State Department of Health Data Base
Boeing/Kent Gun Club
Kent, Washington

Township	Range	Section	QTR	Pws-Id	Pws-Name	Sample Number	Results (mg/L)
22	04E	8	NENE	40650	HIGHLINE WATER DISTRICT	28289	0.003
22	04E	8	NENE	40650	HIGHLINE WATER DISTRICT	28290	0.008
22	04E	8	NENE	40650	HIGHLINE WATER DISTRICT	28291	0.005
22	04E	8	NENE	40650	HIGHLINE WATER DISTRICT	28292	0.003
22	04E	8	NENE	40650	HIGHLINE WATER DISTRICT	28294	0.007
22	04E	8	NENE	40650	HIGHLINE WATER DISTRICT	28295	0.004
22	04E	8	NENE	40650	HIGHLINE WATER DISTRICT	28296	0.005
22	04E	8	NENE	40650	HIGHLINE WATER DISTRICT	28297	0.003
22	04E	8	NENE	40650	HIGHLINE WATER DISTRICT	28298	0.003
22	04E	8	NENE	40650	HIGHLINE WATER DISTRICT	28299	0.057
22	04E	8	NENE	40650	HIGHLINE WATER DISTRICT	28300	0.01
22	04E	8	NENE	40650	HIGHLINE WATER DISTRICT	28301	0.002
22	04E	8	NENE	40650	HIGHLINE WATER DISTRICT	28302	0.005
22	04E	8	NENE	40650	HIGHLINE WATER DISTRICT	28303	0.005
22	04E	8	NENE	40650	HIGHLINE WATER DISTRICT	28306	0.004
22	04E	8	NENE	40650	HIGHLINE WATER DISTRICT	28308	0.017
22	04E	8	NENE	40650	HIGHLINE WATER DISTRICT	28309	0.004
22	04E	8	NENE	40650	HIGHLINE WATER DISTRICT	28313	0.014
22	04E	8	NENE	40650	HIGHLINE WATER DISTRICT	28314	0.003
22	04E	8	NENE	40650	HIGHLINE WATER DISTRICT	28730	0.003
22	04E	8	NENE	40650	HIGHLINE WATER DISTRICT	28830	0.003
22	04E	8	NENE	40650	HIGHLINE WATER DISTRICT	28836	0.004
22	04E	8	NENE	40650	HIGHLINE WATER DISTRICT	29210	0.004
22	04E	8	NENE	40650	HIGHLINE WATER DISTRICT	29212	0.003
22	04E	8	NENE	40650	HIGHLINE WATER DISTRICT	29216	0.004
22	04E	8	NENE	40650	HIGHLINE WATER DISTRICT	29219	0.006
22	04E	8	NENE	40650	HIGHLINE WATER DISTRICT	29573	0.012
22	04E	8	NENE	40650	HIGHLINE WATER DISTRICT	29574	0.005
22	04E	8	NENE	40650	HIGHLINE WATER DISTRICT	29575	0.006
22	04E	17	SWSE	51930	MASONIC RETIREMENT CENTER	70807	0.003
22	04E	17	SWSE	51930	MASONIC RETIREMENT CENTER	70808	0.004
22	04E	17	SWSE	51930	MASONIC RETIREMENT CENTER	70810	0.005

AGI TECHNOLOGIES

Table 3
Lead Concentrations in Groundwater, Public Water Systems in T22N, R4E and R5E, King County
Washington State Department of Health Data Base
Boeing/Kent Gun Club
Kent, Washington

Township	Range	Section	QTR	Pws-Id	Pws-Name	Sample Number	Results (mg/L)
22	04E	17	SWSE	51930	MASONIC RETIREMENT CENTER	70812	0.002
22	04E	17	SWSE	51930	MASONIC RETIREMENT CENTER	70813	0.004
22	04E	17	SWSE	51930	MASONIC RETIREMENT CENTER	70814	0.004
22	04E	17	SWSE	51930	MASONIC RETIREMENT CENTER	70815	0.018
22	04E	17	SWSE	51930	MASONIC RETIREMENT CENTER	70816	0.002
22	05E	27	NWNW	23341	LAKE MERIDIAN ESTATES (MHP)	5440	0.002
22	05E	27	NWNW	23341	LAKE MERIDIAN ESTATES (MHP)	5445	0.003
22	05E	27	NWNW	23341	LAKE MERIDIAN ESTATES (MHP)	6031	0.004
22	05E	27	NWNW	23341	LAKE MERIDIAN ESTATES (MHP)	7410	0.001
22	05E	28	NWSE	53800	MERIDIAN MEADOWS	4186	0.002
22	05E	28	NWSE	53800	MERIDIAN MEADOWS	22735	0.002
22	05E	28	NWSE	53800	MERIDIAN MEADOWS	22739	0.002
22	05E	28	NWSE	53800	MERIDIAN MEADOWS	22740	0.002
22	05E	28	NWSE	53800	MERIDIAN MEADOWS	24317	0.008
22	05E	28	NWSE	53800	MERIDIAN MEADOWS	24318	0.002
22	05E	28	NWSE	53800	MERIDIAN MEADOWS	24319	0.002
22	05E	28	NWSE	53800	MERIDIAN MEADOWS	24320	0.004
22	05E	28	NWSE	53800	MERIDIAN MEADOWS	24321	0.016
22	05E	28	NWSE	53800	MERIDIAN MEADOWS	24322	0.007
22	05E	28	NWSE	53800	MERIDIAN MEADOWS	24323	0.002
22	05E	28	NWSE	53800	MERIDIAN MEADOWS	24325	0.003
22	05E	28	NWSE	53800	MERIDIAN MEADOWS	24326	0.007
22	04E	32	NENE	57396	MINTER VIEW WATER SYSTEM	11341	0.015
22	04E	32	NENE	57396	MINTER VIEW WATER SYSTEM	24838	0.004
22	04E	32	NENE	57396	MINTER VIEW WATER SYSTEM	24839	0.002
22	04E	32	NENE	57396	MINTER VIEW WATER SYSTEM	26255	0.004
22	04E	32	NENE	57396	MINTER VIEW WATER SYSTEM	33389	0.004
22	04E	32	NENE	57396	MINTER VIEW WATER SYSTEM	33920	0.001
22	04E	32	NENE	57396	MINTER VIEW WATER SYSTEM	33921	0.002
22	04E	32	NENE	57396	MINTER VIEW WATER SYSTEM	33922	0.002
22	04E	32	NENE	57396	MINTER VIEW WATER SYSTEM	33923	0.002
22	04E	32	NENE	57396	MINTER VIEW WATER SYSTEM	33924	0.002

AGI TECHNOLOGIES

Table 3
Lead Concentrations in Groundwater, Public Water Systems in T22N, R4E and R5E, King County
Washington State Department of Health Data Base
Boeing/Kent Gun Club
Kent, Washington

Township	Range	Section	QTR	Pws-Id	Pws-Name	Sample Number	Results (mg/L)
22	05E	33	NWSW	19000	DERBYSHIRE SCENIC ACRES	17	0.001
22	05E	33	NWSW	19000	DERBYSHIRE SCENIC ACRES	17	0.003
22	05E	33	NWSW	19000	DERBYSHIRE SCENIC ACRES	17	0.0059
22	05E	33	NWSW	19000	DERBYSHIRE SCENIC ACRES	18	0.0017
22	05E	33	NWSW	19000	DERBYSHIRE SCENIC ACRES	18	0.002
22	05E	33	NWSW	19000	DERBYSHIRE SCENIC ACRES	19	0.007
22	05E	33	NWSW	19000	DERBYSHIRE SCENIC ACRES	21	0.001
22	05E	33	NWSW	19000	DERBYSHIRE SCENIC ACRES	22	0.002
22	05E	33	NWSW	19000	DERBYSHIRE SCENIC ACRES	23	0.001
22	05E	33	NWSW	19000	DERBYSHIRE SCENIC ACRES	23	0.002
22	05E	33	NWSW	19000	DERBYSHIRE SCENIC ACRES	24	0.154
22	05E	33	NWSW	19000	DERBYSHIRE SCENIC ACRES	25	0.009
22	05E	33	NWSW	19000	DERBYSHIRE SCENIC ACRES	25	0.011
22	05E	33	NWSW	19000	DERBYSHIRE SCENIC ACRES	26	0.015
22	05E	33	NWSW	19000	DERBYSHIRE SCENIC ACRES	26	0.016
22	05E	33	NWSW	19000	DERBYSHIRE SCENIC ACRES	9984	0.001
22	05E	33	NWSW	19000	DERBYSHIRE SCENIC ACRES	9986	0.005
22	05E	33	NWSW	19000	DERBYSHIRE SCENIC ACRES	9988	0.001
22	05E	33	NWSW	19000	DERBYSHIRE SCENIC ACRES	9989	0.002
22	05E	33	NWSW	19000	DERBYSHIRE SCENIC ACRES	9990	0.002
22	05E	33	NWSW	19000	DERBYSHIRE SCENIC ACRES	9992	0.005
22	05E	33	NWSW	19000	DERBYSHIRE SCENIC ACRES	9993	0.001
22	05E	33	NWSW	19000	DERBYSHIRE SCENIC ACRES	9994	0.003
22	05E	35	SESW	94170	WELCHS WATER ASSOCIATION	22435	0.006
22	05E	35	SESW	94170	WELCHS WATER ASSOCIATION	22436	0.006
22	05E	35	SESW	94170	WELCHS WATER ASSOCIATION	22437	0.007
22	05E	35	SESW	94170	WELCHS WATER ASSOCIATION	22438	0.003
22	05E	35	SESW	94170	WELCHS WATER ASSOCIATION	22919	0.003
22	05E	35	SESW	94170	WELCHS WATER ASSOCIATION	22920	0.004
22	05E	35	SESW	94170	WELCHS WATER ASSOCIATION	22922	0.002
22	05E	35	SESW	94170	WELCHS WATER ASSOCIATION	22923	0.005

Note:
mg/L - milligram per liter.

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Table 4
Total Arsenic and Lead in Offsite Groundwater
Quantified by EPA Method 600/4-79-020 206.2
Boeing/Kent Gun Club
Kent, Washington

18-03 Building, Kent Space Center

Sample I.D.	Sample Date	Arsenic µg/L	Lead µg/L
92MW-01	12/15/92	10.0	1.0
92MW-02	12/15/92	13.0	30.0
92MW-03	12/15/92	12.0	18.0
92MW-1-02	01/29/93	21.0	5.0
92MW-2-02	01/29/93	3.0	6.0
92MW-3-02	01/29/93	14.0	1.0
Method A Cleanup Level [a]		5.0	5.0

Boeing Auburn Facility

Sample I.D.	Sample Date	Arsenic µg/L	Lead µg/L
AGW032-990830	08/30/99	20.0	ND
AGW049-990831	08/31/99	13.0	7.0
AGW068-990831	08/31/99	12.0	9.0
AGW038-990831	08/31/99	11.0	ND
AGW065-990831	08/31/99	11.0	ND
AGW081-990830	08/30/99	7.0	4.0
AGW082-990830	08/30/99	3.0	3.0
AGW083-990830	08/30/99	6.0	2.0
AGW080-990830	08/30/99	5.0	ND
Method A Cleanup Level [a]		5.0	5.0

Notes:

Boeing Auburn facility data provide only the most recent available sampling round arsenic and lead detections. These detections are consistent over the last 5 years of monitoring.

Detection limit for arsenic and lead is 1.0 µg/L.

Shaded value exceeds cleanup level.

a) Washington Administrative Code Chapter 173-340 Model Toxics Control Act Cleanup Regulation Method A suggested cleanup level for groundwater.

µg/L - microgram per liter.

ND - not detected.

-- not analyzed.

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MONITOR WELL LOGS

UNIFIED SOIL CLASSIFICATION SYSTEM

MAJOR DIVISIONS				TYPICAL NAMES
COARSE GRAINED SOILS (More than half is larger than No. 200 Sieve)	GRAVELS (More than half coarse fraction is larger than No. 4 sieve size)	Clean gravels with little or no fines	GW	Well graded gravels, gravel-sand mixtures
			GP	Poorly graded gravels, gravel-sand mixtures
		Gravels with over 12% fines	GM	Silty gravels, poorly graded gravel-sand-silt mixtures
			GC	Clayey gravels, poorly graded gravel-sand-clay mixtures
	SANDS (More than half coarse fraction is smaller than No. 4 sieve size)	Clean sands with little or no fines	SW	Well graded sands, gravelly sands
			SP	Poorly graded sands, gravelly sands
		Sands with over 12% fines	SM	Silty sand, poorly graded sand-silt mixtures
			SC	Clayey sands, poorly graded sand-clay mixtures
FINE GRAINED SOILS (More than half is smaller than No. 200 Sieve)	SILTS AND CLAYS (Liquid limit less than 50)		ML	Inorganic silts and very fine sands, rock flour, silty or clayey fine sands, or clayey silts with slight plasticity
			CL	Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, silty clays, lean clays
			OL	Organic clays and organic silty clays of low plasticity
	SILTS AND CLAYS (Liquid limit greater than 50)		MH	Inorganic silts, micaceous or diatomaceous fine sandy or silty soils, elastic silts
			CH	Inorganic clays of high plasticity, fat clays
			OH	Organic clays of medium to high plasticity, organic silts
HIGHLY ORGANIC SOILS			PT	Peat and other highly organic soils

SAMPLE

- "Undisturbed"
- Bulk/Grab
- Not Recovered
- Recovered, Not Retained

CONTACT BETWEEN UNITS

- Well Defined Change
- Gradational Change
- Obscure Change
- End of Exploration

BLOWS PER FOOT

Hammer is 140 pounds with 30-inch drop, unless otherwise noted

- S - SPT Sampler (2.0-Inch O.D.)
- T - Thin Wall Sampler (2.8-Inch Sample)
- H - Split Barrel Sampler (2.4-Inch Sample)

MOISTURE DESCRIPTION

- Dry - Considerably less than optimum for compaction
- Moist - Near optimum moisture content
- Wet - Over optimum moisture content
- Saturated - Below water table, in capillary zone, or in perched groundwater

PHYSICAL PROPERTY TESTS

Consol	-	Consolidation
LL	-	Liquid Limit
PL	-	Plastic Limit
Gs	-	Specific Gravity
SA	-	Size Analysis
TxS	-	Triaxial Shear
TxP	-	Triaxial Permeability
Perm	-	Permeability
Po	-	Porosity
MC	-	Moisture Content
MD	-	Moisture/Density
DS	-	Direct Shear
VS	-	Vane Shear
Comp	-	Compaction

UU - Unconsolidated, Undrained
CU - Consolidated, Undrained
CD - Consolidated, Drained

AGI TECHNOLOGIES

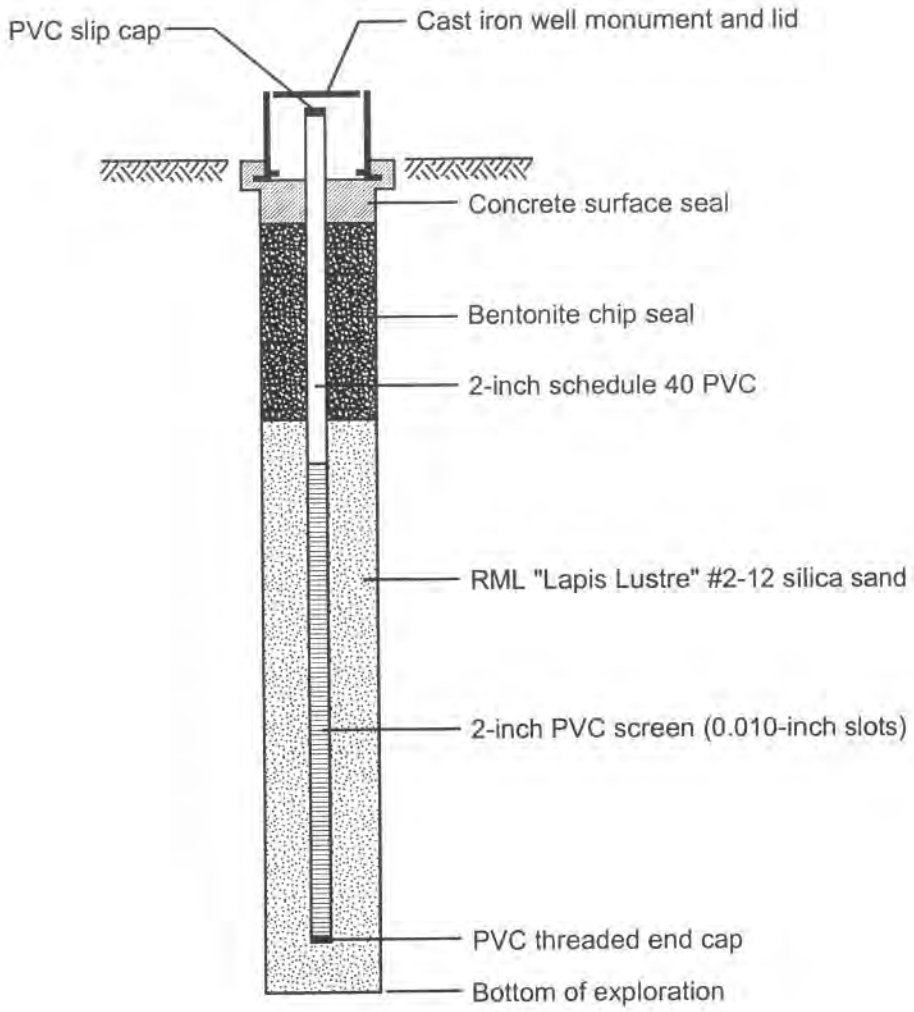
Soil Classification/Legend

Boeing/Kent Gun Club
Kent, Washington

PLATE **D1**

PROJECT NO.	DRAWN	DATE	APPROVED	REVISED	DATE
14,327.317	PJS	1/19/00	MEC		

soilcleg.cdr



AGI TECHNOLOGIES

Monitoring Well Construction

Boeing/Kent Gun Club
Kent, Washington

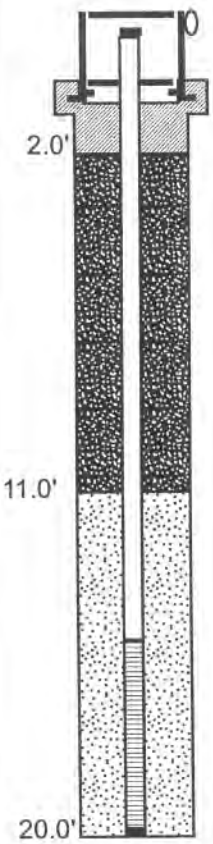
PLATE **D2**

PROJECT NO.	DRAWN	DATE	APPROVED	REVISED	DATE
14,327.317	PJS	1/19/00	MEC		

Wellcons.cdr

Equipment CME 55 Limited Access

Land Surface Elevation _____ Date 10/21/99



Sheen	OVM	Blows per Foot	Depth (feet)	Sample	
			0		BROWN SILTY GRAVEL (GM) (logged from auger return).
					Becomes dark gray and 4 feet.
			5		DARK GRAY SILTY SAND (SM) medium dense, moist; fine grained.
		11			DARK GRAY SANDY SILT (ML) stiff, moist.
			10		
		7			Becomes greenish gray, wet.
					DARK GRAY SILTY SAND (SM) loose, saturated; fine grained.
			15		
		9			GRAY SANDY SILT (ML) stiff, wet; with thin interlayers of saturated fine DARK GRAY SAND (SP-SM).
			20		
		20			Boring terminated at 21.5 feet bgs. Groundwater encountered at 13 feet bgs.
			25		
			30		
			35		
			40		

AGI TECHNOLOGIES

Log of Monitoring Well MW1

Boeing/Kent Gun Club
Kent, Washington

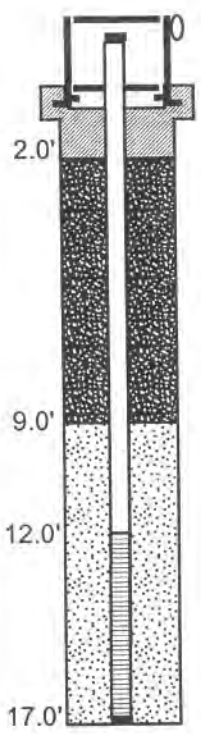
PLATE **D3**

PROJECT NO.	DRAWN	DATE	APPROVED	REVISED	DATE
14,327.317	PJS	1/19/00	MSC		

4327317wl.cdr

Equipment CME 55 Limited Access

Land Surface Elevation _____ Date 10/21/99



Sheen	OVM	Blows per Foot	Depth (feet)	Sample	
			0		BROWN SILTY GRAVEL (GM).
		9	5		RED-BROWN SANDY SILT (ML) stiff, moist.
		9	10		Becomes gray.
					GRAY SILTY SAND (SM) loose, saturated; fine grained, with SANDY SILT (ML) interlayers.
		20	15		Boring terminated at 17 feet bgs. Groundwater encountered at 11 feet bgs.
			20		
			25		
			30		
			35		
			40		

AGI TECHNOLOGIES

Log of Monitoring Well MW1

Boeing/Kent Gun Club
Kent, Washington

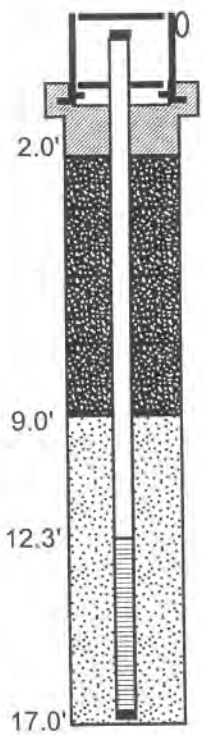
PLATE **D4**

PROJECT NO.	DRAWN	DATE	APPROVED	REVISED	DATE
14,327.317	PJS	1/19/00	MSC		

4327317wl.cdr

Equipment CME 55 Limited Access

Land Surface Elevation _____ Date 10/21/99



Sheen	OVM	Blows per Foot	Depth (feet)	Sample	
			0		BROWN SILTY GRAVEL (GM). BROWN SILTY SAND (SM). DARK GRAY SILTY GRAVEL (GM). BROWN SAND (SP-SM) loose, moist.
		8	5		GRAY SILT (ML) stiff, moist; slightly plastic, trace organics.
		6	10		GRAY SILTY SAND (SM) loose, saturated; fine grained.
			15		No recovery.
		13	17		Boring terminated at 17 feet bgs. Groundwater encountered at 10 feet bgs.
			20		
			25		
			30		
			35		
			40		

AGI TECHNOLOGIES

Log of Monitoring Well MW1

Boeing/Kent Gun Club
Kent, Washington

PLATE **D5**

PROJECT NO.	DRAWN	DATE	APPROVED	REVISED	DATE
14,327.317	PJS	1/19/00	MSC		

4327317wl.cdr

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CHEMISTRY DATA

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QUALITY ASSURANCE/QUALITY CONTROL

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QUALITY ASSURANCE REPORT

PROJECT AND SAMPLE INFORMATION

Project Name:	Kent Gun Club
Project No.:	14,327.321
Lab Name:	Analytical Resources, Incorporated
Lab Number:	BJ29
Sample No.:	KGC MW1-000306, KGC MW2-000306, KGC MW3-000306
Matrix:	Water

QUALITY ASSURANCE SUMMARY

All data were of known quality and acceptable for use.

ANALYTICAL METHODS

Parameters	Technique	Method
Arsenic	AA/GF	EPA 7060
Lead	AA/GF	EPA 7421

TIMELINESS

All samples were extracted and analyzed within recommended holding times.

Parameters	Date Sampled	Date Extracted	Date Analyzed	Time Until Extraction	Time Until Analysis
Dissolved Arsenic	3/06/00	3/07/00	3/07/00	1	1(180)
Dissolved Lead	3/06/00	3/07/00	3/07/00	1	1(180)
Total Arsenic	3/06/00	3/07/00	3/09/00	1	3(180)
Total Lead	3/06/00	3/07/00	3/09/00	1	3(180)

NR - not reported.
NA - not applicable.
( ) - numbers in parenthesis indicate recommended holding time in days.

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QUALITY ASSURANCE REPORT

PROJECT AND SAMPLE INFORMATION

Project Name: Kent Gun Club
Project No.: 14,937.073
Lab Name: Analytical Resources, Incorporated
Lab Number: BJ29

FIELD QUALITY CONTROL SAMPLES

Field Duplicates: None

Rinsate: None.

Trip Blank: None.

LAB QUALITY CONTROL SAMPLES

Method Blanks: No analytes were detected at or above ARI reporting limits.

Blank Spikes: Blank Spike recoveries were within ARI control limit criteria.

Duplicates: None.

Surrogates: None.

Laboratory Control Sample: None.

SIGNATURES

Prepared by Bobby Hillis Date 4/07/00

Checked by Ray Sadowski Date 4/7/00

Analytical Resources, Incorporated
Analytical Chemists and Consultants

March 10, 2000

Brian Anderson
The Boeing Company
P.O. Box 3707, M/S 7A-XA
Seattle, WA 98124-2207

RE: Project: Kent Gun Club
ARI Job: BJ29

Dear Brian:

Please find enclosed sample custody records and analytical results for the above referenced project. Analytical Resources, Inc. accepted three water samples in good condition on March 6, 2000.

The samples were analyzed for total and dissolved metals (arsenic and lead) referencing EPA methods 7060 and 7421. No analytical complications were noted.

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

Sincerely,

ANALYTICAL RESOURCES, INC.

Jeff Reitan
Client Services Manager
jeff@arilabs.com

JJR/sl
Enclosure

cc: Martin Carlson, AGI Technologies Inc. (Bellevue, WA)

Chain of Custody Record & Laboratory Analysis Request

1327
3321

Date: 3-6-00
Page 1 of 1
Number of coolers: 1
Cooler Temp: 3.5

Analytical Resources, Incorporated
Analytical Chemist and Consultants
400 Ninth Avenue North
Seattle, WA 98109-4708
(206) 621-6490
(206) 621-7523 (Fax)

ARI Client: BOEING Phone#:
Client Contact: BRIAN ANDERSON
Client Project ID: KENT GUN CLUB
Samplers: CH. HARDY, KG. CHAPUT

	Sample ID	Date	Time	Matx	No Cont	Lab ID	Total Pb & As	Dissolved Pb & As	Analysis Required						Notes/Comments
1	KGCMW1-000306	3-6-00	14:45	A	2		✓	✓							00-2962 to 00-2967 BJ29
2	KGCMW3-000306	3-6-00	15:35	A	2		✓	✓							Dissolved Metals were Field Filtered
3	KGCMM2-000306	3-6-00	16:20	A	2		✓	✓							
4															
5															
6															
7															

ARI Project No:
T.A.T. Requested: RUSH ASAP
Comments/Special Instructions: Report Results to Brian Anderson

Relinquished by: (Signature)	Relinquished by: (Signature)	Relinquished by: (Signature)
Printed Name: Ken Chaput	Printed Name:	Printed Name:
Company: Boeing	Company:	Company:
Date: 3-6-00 Time: 1720	Date: Time:	Date: Time:
Received by: (Signature)	**Received by: (Signature)**	**Received by: (Signature)**
Printed Name: Carrie McDougal	Printed Name:	Printed Name:
Company: ARI	Company:	Company:
Date: 3/6/00 Time: 1720	Date: Time:	Date: Time:

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET **Sample No: KGCMW1-000306**
TOTAL METALS

Lab Sample ID: BJ29A
LIMS ID: 00-2962
Matrix: Water

QC Report No: BJ29-Boeing Corporate SHEA
Project: Kent Gun Club

Date Sampled: 03/06/00
Date Received: 03/06/00

Data Release Authorized:
Reported: 03/10/00

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	RL	mg/L
7060	03/07/00	7060	03/09/00	**7440-38-2**	**Arsenic**	0.001	**0.023**
3020	03/07/00	7421	03/09/00	**7439-92-1**	**Lead**	0.001	**0.002**

U Analyte undetected at given RL

RL Reporting Limit

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET **Sample No: KGCMW3-000306**
TOTAL METALS

Lab Sample ID: BJ29B
LIMS ID: 00-2963
Matrix: Water

QC Report No: BJ29-Boeing Corporate SHEA
Project: Kent Gun Club

Date Sampled: 03/06/00
Date Received: 03/06/00

Data Release Authorized:
Reported: 03/10/00

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	RL	mg/L
7060	03/07/00	7060	03/09/00	**7440-38-2**	**Arsenic**	0.001	**0.015**
3020	03/07/00	7421	03/09/00	**7439-92-1**	**Lead**	0.001	**0.003**

U Analyte undetected at given RL

RL Reporting Limit

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET **Sample No: KGCMW2-000306**
TOTAL METALS

Lab Sample ID: BJ29C
LIMS ID: 00-2964
Matrix: Water

QC Report No: BJ29-Boeing Corporate SHEA
Project: Kent Gun Club

Date Sampled: 03/06/00
Date Received: 03/06/00

Data Release Authorized:
Reported: 03/10/00

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	RL	mg/L
7060	03/07/00	7060	03/09/00	**7440-38-2**	**Arsenic**	0.001	**0.004**
3020	03/07/00	7421	03/09/00	**7439-92-1**	**Lead**	0.001	**0.002**

U Analyte undetected at given RL

RL Reporting Limit

ANALYTICAL RESOURCES INCORPORATED

INORGANICS ANALYSIS DATA SHEET **Sample No: Method Blank**
TOTAL METALS

Lab Sample ID: BJ29MB
LIMS ID: 00-2962
Matrix: Water

QC Report No: BJ29-Boeing Corporate SHEA
Project: Kent Gun Club

Date Sampled: NA
Date Received: NA

Data Release Authorized:
Reported: 03/10/00

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	RL	mg/L
7060	03/07/00	7060	03/09/00	7440-38-2	Arsenic	0.001	0.001 U
3020	03/07/00	7421	03/09/00	7439-92-1	Lead	0.001	0.001 U

U Analyte undetected at given RL

RL Reporting Limit

INORGANICS ANALYSIS DATA SHEET
TOTAL METALS

ANALYTICAL RESOURCES INCORPORATED

Lab Sample ID: BJ29LCS
LIMS ID: 00-2962
Matrix: Water

QC Report No: BJ29-Boeing Corporate SHEA
Project: Kent Gun Club

Data Release Authorized:
Reported: 03/10/00

BLANK SPIKE QUALITY CONTROL REPORT

Analyte	Spike mg/L	Spike Added	% Recovery	Q
Arsenic	0.107	0.100	107%	
Lead	0.112	0.100	112%	

'Q' codes: N = control limit not met

Control Limits: 80-120%

ANALYTICAL RESOURCES INCORPORATED

INORGANIC ANALYSIS DATA SHEET **Sample No: KGCMW1-000306**
DISSOLVED METALS

Lab Sample ID: BJ29D
LIMS ID: 00-2965
Matrix: Water

QC Report No: BJ29-Boeing Corporate SHEA
Project: Kent Gun Club

Date Sampled: 03/06/00
Date Received: 03/06/00

Data Release Authorized:
Reported: 03/10/00

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	RL	mg/L
7000	03/07/00	7060	03/07/00	**7440-38-2**	**Arsenic**	0.001	**0.019**
7000	03/07/00	7421	03/07/00	7439-92-1	Lead	0.001	0.001 U

U Analyte undetected at given RL

RL Reporting Limit

ANALYTICAL RESOURCES INCORPORATED

INORGANIC ANALYSIS DATA SHEET **Sample No: KGCMW3-000306**
DISSOLVED METALS

Lab Sample ID: BJ29E
LIMS ID: 00-2966
Matrix: Water

QC Report No: BJ29-Boeing Corporate SHEA
Project: Kent Gun Club

Date Sampled: 03/06/00
Date Received: 03/06/00

Data Release Authorized:
Reported: 03/10/00

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	RL	mg/L
7000	03/07/00	7060	03/07/00	**7440-38-2**	**Arsenic**	0.001	**0.012**
7000	03/07/00	7421	03/07/00	7439-92-1	Lead	0.001	0.001 U

U Analyte undetected at given RL

RL Reporting Limit

ANALYTICAL RESOURCES INCORPORATED

INORGANIC ANALYSIS DATA SHEET **Sample No: KGCMW2-000306**
DISSOLVED METALS

Lab Sample ID: BJ29F
LIMS ID: 00-2967
Matrix: Water

QC Report No: BJ29-Boeing Corporate SHEA
Project: Kent Gun Club

Date Sampled: 03/06/00
Date Received: 03/06/00

Data Release Authorized:
Reported: 03/10/00

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	RL	mg/L
7000	03/07/00	7060	03/07/00	**7440-38-2**	**Arsenic**	0.001	**0.003**
7000	03/07/00	7421	03/07/00	7439-92-1	Lead	0.001	0.001 U

U Analyte undetected at given RL

RL Reporting Limit

ANALYTICAL RESOURCES INCORPORATED

INORGANIC ANALYSIS DATA SHEET **Sample No: Method Blank**
DISSOLVED METALS

Lab Sample ID: BJ29MB
LIMS ID: 00-2965
Matrix: Water

QC Report No: BJ29-Boeing Corporate SHEA
Project: Kent Gun Club

Date Sampled: NA
Date Received: NA

Data Release Authorized:
Reported: 03/10/00

Prep Meth	Prep Date	Analysis Method	Analysis Date	CAS Number	Analyte	RL	mg/L
7000	03/07/00	7060	03/09/00	7440-38-2	Arsenic	0.001	0.001 U
7000	03/07/00	7421	03/07/00	7439-92-1	Lead	0.001	0.001 U

U Analyte undetected at given RL

RL Reporting Limit

INORGANICS ANALYSIS DATA SHEET
DISSOLVED METALS

ANALYTICAL RESOURCES INCORPORATED

Lab Sample ID: BJ29LCS
LIMS ID: 00-2965
Matrix: Water

QC Report No: BJ29-Boeing Corporate SHEA
Project: Kent Gun Club

Data Release Authorized:
Reported: 03/10/00

BLANK SPIKE QUALITY CONTROL REPORT

Analyte	Spike mg/L	Spike Added	% Recovery	Q
Arsenic	0.020	0.020	100%	
Lead	0.020	0.020	100%	

'Q' codes: N = control limit not met
NA = Not applicable - analyte not spiked

Control Limits: 80-120%

STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY
Northwest Regional Office, 3190 - 160th Ave S.E. • Bellevue, Washington 98008-5452 • (425) 649-7000

August 22, 2000

Mr. Brian Anderson
The Boeing Company
Shared Services Group
P.O. Box 3707, M/C 7A-WW
Seattle, WA. 98124-2207

Dear Mr. Anderson.

Re: Voluntary Cleanup Program Review
Boeing Space Center Gun Club, 20403 68th Ave. S., Kent, WA.

Thank you for submitting the results of your voluntary cleanup for review by the State of Washington's Department of Ecology (Ecology). Ecology appreciates your initiative in pursuing this administrative option under the Model Toxics Control Act (MTCA).

Ecology's Toxics Cleanup Program has reviewed the following information regarding the former Boeing Space Center Gun Club facility, located at 20403 68th Ave. S., Kent, WA.:

1. Report titled "Final Report: Site Characterization Study, Kent Gun Club, Kent, Washington", prepared for Boeing Environmental Affairs, Bellevue, WA., by Landau Associates, Inc., Edmonds, WA., and dated February 22, 1999.

2. Report titled "Work Plan, Soil Remediation, Boeing Kent Space Center Gun Club, 20403 68th Avenue South, Kent, Washington: Contract No. ENV-G-99KSC-417", prepared for The Boeing Company, Seattle, WA., by AGI Technologies, Bellevue, WA., and dated July 14, 1999.

3. Report titled "Final Report, Soil Cleanup, Boeing Kent Space Center Gun Club, 20403 68th Avenue South, Kent, Washington: Volumes 1 & 2: Contract No. ENV-G-99KSC-417", prepared for The Boeing Company, Seattle, WA., by AGI Technologies, Bellevue, WA., and dated April 17, 2000.

4. Report titled "Addendum: Groundwater Monitoring and Evaluation, Boeing Space Center Gun Club Soil Cleanup, Kent, Washington", prepared for The Boeing Company, Seattle, WA., by AGI Technologies, Bellevue, WA., and dated April 28, 2000.

The report listed above will be kept in the Central Files of the Northwest Regional Office (NWRO) of Ecology for review by appointment only. Appointments can be made by calling Sally Perkins at the NWRO at (425) 649-7190.

Based on the information in the reports listed above, Ecology has determined that, at this time, the releases of lead and carcinogenic polynuclear aromatic hydrocarbons (cPAH) into soil and groundwater no longer poses a threat to human health or the environment. Furthermore, it has been determined that arsenic concentrations in groundwater that exceed MTCA Method A limits are likely the result of nature, and not the result of a known release at the Gun Club site.

Therefore, Ecology is issuing this determination that no further remedial action is necessary at this site under MTCA, chapter 70.105D RCW. Please note that because your actions were not, or will not be conducted under a consent decree with Ecology, this letter is not a settlement by the state under RCW 70.105D.040(4) and is not binding on the agency.

Ecology's no further action determination is made only with respect to the releases identified in the independent remedial action reports listed above. This no further action determination applies only to the areas of the property affected by the releases identified in the reports listed above for the property at 20403 68th Ave. S., Kent, WA. It does not apply to any other releases at the property, any other areas on the property, nor any other properties owned or operated by The Boeing Company.

Ecology will update its database to reflect this "No Further Action" determination. Your site will not appear in future publications of the Confirmed and Suspected Contaminated Sites Report (previously known as the Affected Media and Contaminants Report). Ecology does not assume

any liability for any release, threatened release or other conditions at the site, or for any actions taken or omitted by any person or his/her agents or employees with regard to the release, threatened release, or other conditions at the site.

Again, thank you for taking the initiative to voluntarily address the contamination at your site. Your efforts are recognized by Ecology as a positive step in our work to protect human health and the environment in the State of Washington.

If you have any questions regarding this letter, please contact me at 425-649-7185.

Sincerely,

Ronald W. Timm

Ronald W. Timm
Hydrogeologist III
Toxics Cleanup Program

RWT