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Memorandum

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		Project:	SRRTTF7
То:	Spokane River Regional Toxics Task Force	CC:	

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SUBJECT: Groundwater PCB Sources Upgradient of Kaiser Trentwood Facility: Task 5A & 5B Findings

This technical memorandum summarizes the findings of Tasks 5A and 5B, which were conducted in support of the efforts related to the identification of groundwater PCB sources upgradient of the Kaiser Aluminum Trentwood facility (Kaiser). The overall purpose of Task 5 is to determine if PCB data that are being collected upgradient of the Kaiser facility indicate an upgradient PCB source, and, if a source is present, could it be contributing a PCB loading to the Spokane River. Task 5 is being implemented in phases to provide information and direction for subsequent sub-tasks. The first two phases of Task 5 (i.e., subtasks A and B) were conducted in March through May 2018 to address the following objectives:

- **Task 5A** Conduct on-site reconnaissance of existing monitoring well locations and the associated river reach, and conduct necessary information collection activities in support of efforts to be undertaken related to Sub-task 5B through Sub-task 5D.
- **Task 5B** Compile installation details for the five upgradient monitoring wells at Kaiser (RM-MW-5S, MW-4, MW-11, MW-10 and MW-5, from north to south) and confirm, if appropriate, that these monitoring wells are not impacted by any on-site conditions. At a minimum, well installation data to be compiled includes location (latitude/longitude), boring logs, well construction details and soil chemistry data. Prepare a technical memorandum containing all information compiled and findings of background assessment.

Compile all available information from Ecology and any other sources on existing monitoring wells upgradient of the Kaiser facility or adjacent upgradient areas that may exist for purposes of potential future groundwater contour mapping, modeling, or sampling.

Task 5A &B Activities

The following activities were conducted to address the objectives of subtasks 5A and 5B:

- 1. Updated the draft well location maps that initially were developed in 2015 using preliminary well location information provided by the Washington State Department of Ecology (Ecology) from their online well database. The updated well location maps are displayed on aerial photo and topographic base maps, and also identify stretches of gaining, losing and transitional reaches within the Spokane River in the vicinity of Kaiser (refer to Figures 1 and 2). The gaining, losing and transitional river reaches were identified per information obtained from the City of Spokane (Lynn Schmidt, July 2015 correspondence).
- 2. Conducted site visit on March 6, 2018, which included:

- a. Review of Kaiser files to collect and synthesize well location information, well construction data, boring logs and soil chemistry information for Kaiser background monitoring wells MW-04, MW-06, MW-11, MW-10 and MW-05 and nearby onsite cross-gradient well RM-MW-05S and boring INDBG-SB-1, which is located near a former dry well (refer to locations on Figures 1 and 2).
- Review of Kaiser files to identify and initially locate offsite wells within approximately 1.5 miles of the Kaiser plant area based on well logs and information provided in the Ecology well database¹ and in the Groundwater Remedial Investigation Report (HartCrowser, 2012)². A topographic map and boring log location information were used to initially spot candidate offsite background wells on a topographic map.
- c. Driving tour of Kaiser plant to view current onsite monitoring well locations.
- d. Driving tour of surrounding area to attempt to visually confirm locations of offsite wells identified in 2b above.
- 3. Pre- and post- site visit coordination with Mike Hermanson (Spokane County) to coordinate on current knowledge of nearby offsite wells and to obtain available well location information used in the County's hydrogeologic modeling database.
- 4. Scanning and georeferencing of select historical Kaiser aerial photos for use in identifying potential historical PCB source areas.
- 5. Post-site visit coordination with Kaiser to identify and address lingering data gaps and questions about onsite and offsite well locations.
- 6. Final cross check against Ecology online database for boring logs located in the following Township-Range-Section areas:
 - a. T25N-R44E Sections 1, 2, 3, 10, 11 and 12
 - b. T25N-R45E Sections 6 and 7
 - c. T26N-R44E Sections 34, 35 and 36
 - d. T26N-R45E Sections 31 and 32

Known Kaiser Site Conditions and Assumptions

To address the goal of evaluating select Kaiser wells and identifying offsite candidate wells for potential background monitoring of groundwater PCB impacts, this evaluation was conducted based on the following known site conditions and assumptions:

- 1. Monitoring for groundwater impacts is generally limited to the upper portion of the unconsolidated Spokane Aquifer, which consists of Pleistocene glacial flood deposits (HartCrowser, 2012); consequently, bedrock groundwater wells were not included for consideration in this evaluation.
- 2. Groundwater flow direction in the unconsolidated Spokane Aquifer is from east-northeast to westsouthwest across the Kaiser property towards the Spokane River, and the potentiometric surface ranges in elevation from approximately 1945 ft to 1920 ft (NAVD88) from east to west across the Kaiser property (HartCrowser, 2012).

¹ Washington State Department of Ecology Well Report Viewer: https://fortress.wa.gov/ecy/waterresources/map/WCLSWebMap/default.aspx

² HartCrowser, May 2012. Final Site-Wide Groundwater Remedial Investigation, Kaiser Trentwood Facility, Spokane Valley, Washington.

- 3. Candidate background monitoring wells are assumed to be located on the north side of the Spokane River only and primarily within the gaining reach of the Spokane River, as shown in Figures 1 and 2 (i.e., east of N. York Road and west of Sullivan Road). Additional candidate background monitoring wells were identified on the north side of the river along the transitional and losing river reaches (i.e., east of N. Sullivan Road and west of N. Barker Road).
- 4. No residential water wells are included in this evaluation.

Results

The results of this evaluation are summarized in Tables 1a and 1b, which identify candidate background monitoring wells by well owner and according to their locations on the north side of the Spokane River relative to river reach (i.e., gaining, losing or transitional), Kaiser groundwater flow direction (i.e., upgradient or cross-gradient) and by well status (active or abandoned, see Tables 1a and 1b, respectively). Candidate wells that are known (or assumed to be) active based on available information are shown with a circle symbol on Figures 1 and 2. For completeness, Table 1b includes wells that formerly existed but have been decommissioned/abandoned; these locations are identified with a square symbol on Figures 1 and 2. Decommissioned/abandoned wells are included in the event that historical information from these locations may be useful for future evaluations.

Available boring logs and well construction information for known and assumed active wells are provided in Attachment A. Attachment B provides available boring logs and well construction information for decommissioned/abandoned wells. Attachment C provides an inventory of all boring information that was downloaded from the Ecology online database for the final cross check of available information for select sections in T25N-R44E, T25N-R45E, T26N-R44E and T26N-R45E.

Figure 3 shows the current well locations superimposed on a series of four historical aerial photos dated 1938, 1946, 1950 and 2016. These photos extend east/upgradient from Kaiser to include some of the Spokane Industrial Park area. The 1946 and 1950 aerial photos are annotated with red hatched areas that indicate earth disturbance activities in the vicinity of Kaiser background wells MW-04, MW-06 and MW-11; this disturbed area is associated with a former Kaiser borrow pit that dates to the time of the plant construction. It currently is known as the East Landfill area, which was used for the disposal of black dross (waste oxides). Kaiser did not produce or dispose PCBs in this area (personal communication, B. Leber - Kaiser, May 2018).

Figure 4 provides a north to south trending geologic profile that depicts the geology and well construction of Kaiser background wells MW-4, MW-6, MW-11, MW-10 and MW-5. For comparison, Figure 5 is a representative northeast to southwest trending geologic profile of onsite monitoring wells located downgradient of the background wells (HartCrowser, 2012). Figure 6 provides a west to east trending geologic profile of onsite Kaiser shallow monitoring well RM-MW-5S and boring INDBG-SB-1, and is annotated with soil boring PCB data collected from three sample intervals in INDBG-SB-1 and with groundwater PCB data collected for RM-MW-5S.

Findings and Conclusions

A total of 39 candidate background wells associated with 14 owners were identified that are known or assumed to be active, including the five Kaiser background wells and Kaiser well RM-MW-5S (see Table 1a). An additional 13 decommissioned/abandoned wells associated with four owners were identified (see Table 1b). Candidate background wells were evaluated and ranked based on the depth and length of the well screen/perforated interval relative to the groundwater potentiometric surface, as well as upgradient or cross gradient proximity to Kaiser or other potential source areas (specifically, the Spokane Industrial Park area). As shown in Figure 5, Kaiser onsite shallow monitoring wells screens generally straddle the

water table; consequently, shallow wells with relatively short screen/perforated intervals that are situated at or very near the water table likely would have the best construction for monitoring low level background PCB impacts. Long screen/perforated lengths and/or deep wells are likely to result in more dilute groundwater samples or would be situated below shallow impacted groundwater zones. In general, a background monitoring well screen/perforated interval should straddle or be near an elevation of approximately 1938 to 1945 ft. Many of the wells listed in Table 1b are ruled out as good candidates for background monitoring because the wells screens generally are significantly deeper than this elevation range. Three wells that currently are being monitored by Spokane County were not selected because of their locations in the losing reach of the river (SAJB-210410 and SC-185311) or the location is too far downstream (SC-APK309 (451632)).

The following well owners were identified as having the best candidate active monitoring wells for evaluating background PCB concentrations in shallow groundwater upgradient or cross-gradient to the main Kaiser plant area (see yellow highlighted wells in Table 1a):

- Kaiser (background wells MW-04, MW-06, MW-10, MW-11 and MW-05). These wells are situated directly upgradient to the main Kaiser plant area and historically have shown very infrequent PCB impacts, and with a congener signature that is different from that of downgradient groundwater within the impacted plant area. Consequently, groundwater samples from these wells generally appear to be un-impacted by on-site conditions; however, no PCB soil data are available for these locations. In addition, the April and October 2008 potentiometric surface that is depicted in Figure 4 shows that the upper portions of the well screens/perforated intervals for these wells either straddle or are very near the water table. In particular, MW-10 and MW-11 may be more favorable for monitoring background impacts because they have the shortest screen lengths. In contrast, MW-04, MW-06 and MW-05 have long perforated intervals that extend up to 50 feet below the water table. However, these wells could still be used for background monitoring of shallow groundwater if the upper screen intervals are carefully sampled or isolated from the deeper well sections to avoid sample dilution. In addition, as noted above, MW-04, MW-096 and MW-11 are located in or very near the East Landfill area where earth moving activities occurred in 1938, 1946 and 1950. Onsite shallow monitoring well RM-MW-5S likely is located too near plant operations to serve as a background monitoring well because the PCB soil data from nearby boring INDBG-SB-1 show impacts in the S-2 sample (refer to Figure 6).
- Cominco (COM-292797). This well may be a good candidate for background monitoring because it is located immediately upgradient to Kaiser background wells MW-11, MW-10 and MW-05 and has a relatively shallow well screen (~1903 to 1931 feet). Although wells COM-150837 and COM-150838 also are located immediately upgradient to Kaiser background wells, they are screened/perforated from approximately 1859 to 1889 and approximately 1878 to 1894 feet below grade, respectively, which is much deeper than the 1938 to 1945 feet target range. However, all screen elevations for the COM-series wells are estimates from non-surveyed ground elevation data and the status of these wells could not be field verified during the March 2018 site visit.
- **East Valley School (EVS-APK310 (45136).** This well currently is being monitored by Spokane County. It is located cross-gradient to Kaiser to the north and has a well construction and screened interval elevation very similar to the shallow monitoring wells used onsite at Kaiser.
- Union Pacific (UP-MW-1 (688497, UP-MW2 (688493) and UP-MW3 (688495)). These wells are located cross-gradient to the south of the Kaiser and Cominco background monitoring wells. They have well constructions and screened interval elevations very similar to the shallow monitoring wells used onsite at Kaiser.

• Sullivan Park – Spokane Aquifer Joint Board (SAJB) well SA-AEK214 (189642). This well currently is being monitored by Spokane County. It is located cross-gradient to Kaiser to the south near the Spokane River and has a well construction and screened interval elevation very similar to the shallow monitoring wells used onsite at Kaiser.

Although residential well logs are not included in this evaluation, the information provided in Attachment C shows that approximately 20 residential wells are located on the north side of the Spokane River, and upgradient/cross-gradient of Kaiser to the north and east. Approximately half of these wells are screened in unconsolidated sands and gravels and the rest are deep bedrock wells. Further to the north of Kaiser in the higher elevations of northern half of T-25N-R44E Sections 34 and 35, residential wells generally are very deep and completed in bedrock.



Figure 1. Aerial photo location map for active and decommissioned/abandoned wells on the north side of the Spokane River and upgradient and cross-gradient to Kaiser Aluminum.

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Figure 2. Topographic location map for active and decommissioned/abandoned wells on the north side of the Spokane River and upgradient and cross-gradient to Kaiser Aluminum.

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Figure 3. Historical aerial photos (1938, 1946, 1950 and 2016) showing locations of active and decommissioned/abandoned wells upgradient and cross-gradient to Kaiser Aluminum.

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Figure 4. North to south geologic profile of Kaiser background monitoring wells.

SOUTH

	MW-5	
	6" perf steel	Elevation (ft)
		- 2025
		- 2000
		2030
		= 2025
		2020
		2015
		2010
	·H	2005
		= 2000
		1005
		= 1995
		1990
Gravel		= 1985
		1980
		= 1975
		= 1970
		= 1965
		- 1960
		= 1955
		1950
sandy Gravel		= 1945
		1940
		1935
		 1930
Gravel		1925
		- 1920
	V	
		= 1915
		1910
		= 1905
		1900
		1895
		 1890
		1995
	120'	- 1003
		1880
		= 1875
		_ 1870

Local Geologic Cross Section B-B'

Figure 5. Representative northest to southwest trending geologic profile of onsite Kaiser Aluminum wells (from HartCrowser, 2012).

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Water Level, October 2008

Saturated Sand and Gravel (Spokane Valley-Rathdrum Prairle Aquifer)

Bedrock (Metamorphic Complex)

50

Vertical Scale In Feet

Vertical Exaggeration x 10

100

NOTES:

Figure 6. West to east geologic profile of Kaiser shallow monitoring well RM-MW-5S and boring INDBG-SB-1.

Table 1a. Summary of background monitoring well evaluation: known (or assumed) active wells (page 1 of 2).

Well Owner/ Well Name*	River Reach	Position Relative to Kaiser	Well Type*	Well Latitude	Well Longitude	Location Notes	Date Installed	Ground Elevation (ft)	Top of Casing Elevation (ft)	Depth of Well Screen Interval (ft below grade)	Elevation of Well Screen Interval (ft)	Well Material ^	Well Diam. (in)	Screen Type	Monitored by Spokane County	Depth to GW (ft-ATD)
KaiserAluminum Trentw	vood														•	. ,
RM-MW-5S (???)	gaining	Cross-gradient	R	47.689953	-117.2125661	[1]	14-Oct-03	2001	2003.14	66 - 91	1939-1894	PVC?	2?	??		72
MW-04 (155289)	gaining	Upgradient	R	47.689310	-117.2020240	[1]	10-Oct-79	2014	2015.92	75 - 120	1939-1894	SS	6	perforated		94
MW-06 (155281)	gaining	Upgradient	R	47.6891260	-117.2006630	[1]	2-Feb-81	2018	2019.66	70 - 111	1948-1906	SS	6	perforated		81
MW-11 (209496)	gaining	Upgradient	R	47.6866450	-117.2025230	[1]	6-Jun-91	2001.5	2001.21	63.4 – 78.4	1938 -1923	PVC	2	0.020		70
MW-10 (209471)	gaining	Upgraident	R	47.6847670	-117.2023040	[1]	14-Jun-90	2009.7	2011.8	64 - 79	1946 - 1933	PVC	2	0.020		70
MW-05 (155285)	gaining	Cross-gradient	R	47.6815100	-117.2034870	[1]	13-Oct-79	2008	2009.55	75 – 120	1933-1888	SS	6	perforated		85
Cominco American, Inc.																
COM-150837	gaining	Upgradient	Dom/Ind	47.6842	-117.1985	[2]	27-Mar-74	~2009 [3]	unknown	120 - 150	~1889 - 1859	metal	18	perforated		69.5
COM-150838	gaining	Upgradient	Ind	47.6843	-117.1985	[2]	3-Nov-87	~2008 [2]	unknown	114 - 130	~1894 - 1878	SS	10	0.070		78
COM-292797	gaining	Upgradient	unknown	47.6852	-117.1999	[2]	20-Sep-56	~2011 [2]	unknown	80 - 108	~1931 - 1903	blk pipe	10	perforated		74
Trentwood Irrigation District																
TID-3 (293224)	gaining	Cross-gradient	Mun	47.700810	-117.20190	[3]	6-Mar-63	~2033 [5]	unknown	112 - 138	~1921 - 1895	metal	20	perforated		98
TID-2 (159763)	gaining	Cross-gradient	Mun	47.698078	-117.220499	[2]	1-Sep-47	~2012 [5]	unknown	120 - 147	~1892 - 1865	metal	12	perforated		81
TID-4 (159762)	gaining	Cross-gradient	Mun	47.698219	-117.228709	[2]	15-Sep-66	~1991 [5]	unknown	88 - 118	~1903 - 1873	metal	16	perforated		77
TID-5 (159765)	gaining	Cross-gradient	Mun	47.697293	-117.196476	[2]	15-Feb-68	~2035 [5]	unknown	110 - 145	~1925 - 1890	metal	16	perforated		104
TID-1/TID-6 (159761)	gaining	Cross-gradient	Mun	47.697539	-117.202394	[2]	20-Jul-81	~2036 [5]	unknown	128 - 154	~1908 - 1882	SS	20	.010150		102.6
East Valley School																
EVS-APK310 (451636)	gaining	Cross-gradient	R	47.70065419	-117.195922	[2]	15-Jun-06	2059.88 [2]	2059.51 [2]	105 - 125	1955 - 1935	PVC	2	0.020	<mark>yes</mark>	112.6
Spokane County																
SC-APK309 (451632)	gaining	Cross-gradient	R	47.698031	-117.2396015	[2]	12-Jun06	1967.49 [2]	1969.2 [2]	110 - 120	1858 - 1848	PVC	2	0.010	yes	60
SC-185311	losing	Cross-gradient	R	47.67927222	-117.1541361	[2]	29-Oct-98	2004.86 [2]	2004.86 [2]	40 - 80	1965 - 1925	PVC?	2	0.010	yes	unknown
Union Pacific																
UP-MW1 (688497)	gaining	Cross-gradient	R	47.67843	-117.1973	[4]	22-Oct-10	2004.76 [2,3]	2004.37 [2]	48 - 73	1957 - 1932	PVC	2	0.010		63
UP-MW2 (688493)	gaining	Cross-gradient	R	47.67729	-117.2016	[4]	20-Oct-10	1999.88 [2,3]	2002.04 [2]	54 - 79	1946 - 1910	PVC	2	0.010		67
UP-MW3 (688495)	gaining	Cross-gradient	R	47.67719	-117.2032	[4]	21-Oct-10	1985.88 [2,3]	1988.51 [2]	39 - 64	1947 - 1922	PVC	2	0.010		64
Hillyard Processing																
Hillyard (159430)	gaining	Cross-gradient	Mun	47.67781	-117.2011	[3]	12-Jan-66	~2000 [5]	unknown	106 - 120	~1894 - 1880	Metal?	10	perf		60
Sullivan Park – Spokane	Aquifer Joint B	loard				(0)										
SP-AEK214 (189642)	gaining	Cross-gradient	R	47.67376944	-117.1981166	[2]	28-Sep-98	~1966 [6]	1967.2 [2]	26 - 66	1940 - 1900	PVC	2	0.010	yes	34
Spokane Industrial Park	9			47.002407	447 400046	[2]	10.6 70			2 4602			4.2			7612//
SIP-1 (158983)	transitional	Up-gradient	Ind	47.692437	-117.192246	[2]	10-Sep-70	~2018 [5]	unknown	? - 160?	~? - 1858?	unknown	12	unknown		76.2″
SIP-2 (158986)	transitional	Up-gradient	Ind	47.689899	-117.18098	[2]	10-Sep-70	~2018 [5]	unknown	? - 120?	~? - 1898?	unknown	16	unknown		unknown
SIP-3 (158982)	transitional	Up-gradient	Ind	47.684599	-117.19438	[2]	10-Sep-80	~2010 [5]	unknown	? — 11/? 121 127	~1000 1000	unknown	10	unknown		67 10
JIP-4 (158981)	transitional	Op-gradient	ina	47.080031	-117.180709	[2]	22-Apr-71	2019 [5]	UNKNOWN	131 - 137	1000 - 1002	metai	ð	peri		50
	transitional	Cross-gradient	Tost	47 67694	_117 10/	[2]	10-May-77	~2000 [3]	unknown	100 5 - 120 5	~1900 - 1880	metal	Q	nerf		50
IA-155855 IA-155957	transitional	Cross-gradient	Domestic	47.07094	-117.194	[2]	1-Nov-77	~2000 [5]	unknown	100.3 - 120.3 50 - 100	~1950 - 1880	metal	6 6	peri		50 60
Central Pre-Mix	transitional	cross-gradient	Domestic	47.07054	-117.134	[5]	1-1100-77	2000 [5]	unknown	50 - 100	1550 - 1500	metar	0	pen		00
CPM-149175	transitional	Cross-gradient	Ind	47 67701	-117 1888	[3]	11-Διισ-76	~2010 [3]	unknown	100 - 119	~1910 - 1891	metal	8	nerf		55
CPM-150410	transitional	Cross-gradient	unknown	47 67701	-117 1888	[3]	5-Feb-76	~2010 [3]	unknown	2 – 78?	~? - 1922?	unknown	30	perf?		60
CPM-150413	transitional	Cross-gradient	Ind	47 67701	-117 1888	[3]	19-Feb-85	~2000 [3]	unknown	975-119	~1916 - 1894	metal	8	0.05.0.06		53
CPM-150416/150409	transitional	Cross-gradient	Dom	47.67701	-117,1888	[3]	29-Dec-80	~2010 [3]	unknown	154 - 159	~1856 - 1851	metal?	8	perf		47
CPM-150415	transitional	Cross-gradient	Ind	47.67701	-117.1888	[3]	30-Jul-78	~2010 [3]	unknown	68 - 96	~1942 - 1914	metal	12	perf		42
CPM-150417	transitional	Cross-gradient	Ind	47.67701	-117.1888	[3]	31-Jan-94	~2005 (est)	unknown	81 - 111	~1924 - 1894	metal	12	0.100		38
CPM-162427	transitional	Cross-gradient	Ind	47.67701	-117.1888	[3]	7-Apr-99	~2005 (est)	unknown	112 - 127	~1893 - 1878	unknown	8	0.070		80

Well Owner/ Well Name*	River Reach	Position Relative to Kaiser	Well Type*	Well Latitude	Well Longitude	Location Notes	Date Installed	Ground Elevation (ft)	Top of Casing Elevation (ft)	Depth of Well Screen Interval (ft below grade)	Elevation of Well Screen Interval (ft)
Yellow Freight											
YFS-1 (210344)	transitional	Cross-gradient	unknown	47.67875	-117.186	[3]	1-Aug-89	~2005 [5]	unknown	82 - 92	~1923 - 1913
Western Electric											
WE-MW3 (210145)	losing	Upgradient	R	47.68771	-117.1728	[3]	16-Aug-89	~2010 [5]	unknown	80 - 90	~1930 - 1920
WE-MW4 (210146)	losing	Upgradient	R	47.68771	-117.1728	[3]	17-Aug-89	~2010 [5]	unknown	80 - 90	~1930 - 1920
Spokane Aquifer Joint Bo	oard Wellhead	Protection									
SAJB-210410	losing	Upgradient	R1997	47.68586389	-117.1547917	[2]	1997?	~2025 [6]	2027.3 [2]	70 - 100	~1955 - 1925

Table 1a. Summary of background monitoring well evaluation: known (or assumed) active wells (page 2 of 2).

NOTES:

* The well naming convention generally uses a prefix to denote the well owner (e.g., COM and SC for wells owned by Cominco and Spokane County, respectively) and a number or combination of numbers that includes the well log identification code from the Ecology online database and may also include a unique owner ID if available (e.g., MW-1) and/or the alpha-numeric well tag number (e.g., AEK214).

^ Well materials include: SS = stainless steel, PVC = polyvinyl chloride

** Well Type includes: Dom = domestic; Ind = industrial; Mun = municipal supply; R = resource monitoring

ATD = at time of drilling

[1] Location obtained from Kaiser well location map and/or surveyed coordinates provided by Kaiser.

[2] Information provided by Spokane County.

[3] Information obtained from well log

[4] Location obtained from well owner location map: Union Pacific Railroad Company (April 2012), Remedial Investigation/Feasibility Study Report, Aluminum Recycling Trentwood Site, Veradale, WA.

[5] Information obtained from topographic map (see Figure 2)

[6] Casing stickup obtained from well log data.

Yellow highlighted well ID indicates well is located and constructed to support background monitoring of shallow groundwater PCB impacts.

Well Material ^	Well Diam. (in)	Screen Type	Monitored by Spokane County	Depth to GW (ft)
PVC	4	0.020		unknown
PVC	2	0.020		unknown
PVC	2	0.020		unknown
PVC	2	unknown	yes	75

Table 1b.	Summary of background	l monitoring well evaluation:	decommissioned/abandoned wells.
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Well Owner/ Well Name*	River Reach	Position Relative to Kaiser	Well Type*	Well Latitude	Well Longitude	Location Notes	Date Installed	Ground Elevation (ft)	Top of Casing Elevation (ft)	Depth of Well Screen Interval (ft below grade)	Elevation of Well Screen Interval (ft)	Well Material ^	Well Diam. (in)	Screen Type	Date Abandoned	Depth to GW (ft)
General Electric	General Electric															
GE-MW-1 (339012/579542)	gaining	Upgradient	R	47.691540	-117.19920	[3]	24-Jul-02	~2015 [5]	Unknown (flush)	70 – 90	~1945 - 1925	PVC	2	0.020	19-May-05	78
GE-MW-2 (339011/579544)	gaining	Upgradient	R	47.691540	-117.19920	[3]	25-Jul-02	~2015 [5]	Unknown (flush)	70 - 90	~1945 - 1925	PVC	2	0.020	19-May-05	78
GE-MW-3 (339010/579543)	gaining	Upgradient	R	47.691540	-117.19920	[3]	25-Jul-02	~2015 [5]	Unknown (flush)	70 - 90	~1945 - 1925	PVC	2	0.020	19-May-05	78
GE-577459/580793	transitional	Upgraident	R	47.6842	-117.1941	[3]	25-Nov-08	~2010 [5]	Unknown (flush)	67 - 87	~1943 - 1923	PVC	2	0.010	unknown	55
GE-577460/580792	transitional	Upgradient	R	47.6842	-117.1941	[3]	25-Nov-08	~2010 [5]	Unknown (flush)	47 - 67	~1963 - 1943	PVC	2	0.010	unknown	55
GE-577461/580794	transitional	Upgradient	R	47.6842	-117.1941	[3]	25-Nov-08	~2010 [5]	Unknown (flush)	52 - 72	~1958 - 1938	PVC	2	0.010	unknown	55
Sullivan Park – Spokane	Aquifer Joint I	Board														
SP-AEK213 (189641)	gaining	Cross-gradient	R	47.67417222	-117.1978666	[2]	27-Sep-98	~1980 [5]	unknown	25 - 65	~1955 - 1915	PVC	2	0.010	unknown	33
Westinghouse																
WH-MW1 (295966)	losing	Upgradient	R	47.68911	-117.1723	[3]	12-Oct-87	~2018 [3]	unknown	86 - 96	~1932 - 1922	unknown	2	unknown	18-Dec-90	85
WH-MW2 (295965)	losing	Upgradient	R	47.68911	-117.1723	[3]	13-Oct-87	~2015 [3]	unknown	87 - 97	~1928 - 1918	unknown	2?	unknown	18-Dec-90	84
WH-MW3 (295964)	losing	Upgradient	R	47.68911	-117.1723	[3]	16-Aug-89	~2016 [est]	unknown	83 - 93	~1933 - 1923	unknown	2?	unknown	18-Dec-90	84
WH-MW4 (295963)	losing	Upgradient	R	47.68911	-117.1723	[3]	18-Aug-89	~2018 [2]	unknown	85 - 95	~1933 - 1923	unknown	2?	unknown	18-Dec-90	83
Yellow Freight	-														-	
YFS-2 (210345/293313)	transitional	Cross-gradient	unknown	47.67907	-117.1864	[3]	15-Aug-89	~2005 [5]	unknown	71.5 – 81.5	~1934 - 1924	PVC	4	0.020	16-Oct-90	unknown
YFS-3 (210346/293312)	transitional	Cross-gradient	unknown	47.67907	-117.1864	[3]	14-Aug-89	~2005 [5]	unknown	71 - 81	~1934 - 1924	PVC	4	0.020	16-Oct-90	unknown

NOTES:

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* The well naming convention generally uses a prefix to denote the well owner (e.g., COM and SC for wells owned by Cominco and Spokane County, respectively) and a number or combination of numbers that includes the well log identification code from the Ecology online database and may also include a unique owner ID if available (e.g., MW-1) and/or the alpha-numeric well tag number (e.g., AEK214).

^ Well materials include: SS = stainless steel, PVC = polyvinyl chloride

** Well Type includes: Dom = domestic; Ind = industrial; Mun = municipal supply; R = resource monitoring

ATD = at time of drilling

[2] Information provided by Spokane County.

[3] Information obtained from well log

[5] Information obtained from topographic map (see Figure 2)

Attachment A.

Boring Logs & Well Construction Data for Known/Assumed Active Wells and RM-MW-5S and Boring INDBG-SB-1

Kaiser: MW-04 (155289), MW-06 (155281), MW-11 (209496), MW-10 (209471), MW-05 (155285), RM-MW-5S and INDBG-SB-1

Cominco American, Inc.: 150837, 150838 and 292797

Trentwood Irrigation District: TID-2 (159673), TID-3 (293224), TID-4 (159762),

TID-5 (159765) and TID-1/TID-6

East Valley School: 451636

Spokane County: APK309 (451636) and 185311

Union Pacific: MW1 (688497), MW2 (688493) and MW3 (688495)

Hillyard Processing: 159430

Sullivan Park: AEK214 (189642)

Spokane Industrial Park: SIP-1 (158983, also 158987), SIP-2 (158986, also 158985), SIP-3 (158982) and SIP-4 (158981)

Inland Aphalt: 153855 and 155957

Central Pre-Mix: 149175, 150410, 150413, 150416/150409, 150415, 150417 and 162427

Yellow Freight: YFS-1 (210344)

Western Electric: MW3 (210145) and MW4 (210146)

Spokane Aquifer Joint Board: 210410

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Attachment B. Boring Logs & Well Construction Data for Abandoned Wells

General Electric: MW-1 (339012/579542), MW-2 (339011/579544), MW-3 (339010/579543), 577549/793, 577640/580792 and 577461/580794

Sullivan Park: AEK213/189641

Westinghouse: MW1 (295966), MW2 (295965), MW3 (295964) and MW4 (295963)

Yellow Freight: 210345/293313 and 210346/293312

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Attachment C. Inventory of Ecology Well/Boring Data for:

- T25N-R44E Sections 1, 2, 3, 10, 11 and 12
- T25N-R45E Sections 6 and 7
- T26N-R44E Sections 34, 35 and 36
- T26N-R45E Sections 31 and 32

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