

1 March 2013

Technical Memorandum

To: Ms. Amy Blain, City of Longview
From: Janet Snedecor and Dan Sander
Subject: Monitoring Well Analytes and Department of Health Test Panels
K/J 0997003*01

A review of the previous City of Longview (City) deep monitoring wells test results and analytes was completed to provide recommendations for the City's ongoing deep monitoring well sampling events. It was decided to utilize the recently established Washington State Department of Health (DOH) Test Panels for future monitoring. These test panels were established based on U.S. Environmental Protection Agency (EPA) approved test methods and are commonly used among DOH certified drinking water laboratories. Each test panel will provide results for various analytes as shown on the attached Table 1- DOH Test Panels and Analytes of Special Interest. These panels also reflect analytes for which there are known health effects, or that are being currently studied for potential health effects. In addition to the DOH test panels, Table 1 includes additional test analytes which have been selected based on either citizen concerns or their value in determining potential changes in aquifer water quality.

The following table provides anticipated costs based on information provided by Chris Leaf of ALS Environmental (ALS) in Kelso, Washington. This analytical laboratory has performed, or subcontracted, the previous monitoring well analysis.

Recommendation: Continue to monitor deep wells DW 1, 2, 5, 6, 7, and 9.

Schedule: It is recommended the City implement annual and semi-annual testing for 2013 and 2014 based on the schedule indicated in Table 2 below. Following completion of the October 2014 analysis, the results of the tests should be evaluated along with the pre-MFRWTP results, and consideration be given to eliminating some additional test panels, or changing them to an annual schedule.

Costs: Based on the suggested testing frequency and panels, it is estimated the City's annual deep monitoring well test cost will be approximately \$25,132 for all six deep monitoring wells. ALS offers a 10 percent multiple samples discount; the laboratory must receive more than three samples simultaneously in order to receive the discount. Table 2 summarizes the estimated costs both annually per well, as well as combined.

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Table 2: Annual and Semi-Annual Testing Schedule and Costs

Test Panel	Semi-Annual (May & October)	Annual (October)	Annual Per Well Costs
Fumigant	\$80		\$160
Endo		\$165	165
Glyph		\$180	180
Herb1	\$165		\$330
Insect1	\$180		\$360
IOC	\$260		\$520
PCB and Pest1	\$295		\$590
Phth	Yes, included in 525.2 (PCB /Pest1)		
Quat	\$172		\$344
Rads (add Gross Beta)	\$200		\$400
VOC1	\$100		\$200
Coliform Bacteriological Analysis	\$25		\$50
Special Interest	\$380		\$760
Special Interest (Chlorinated phenolics)		\$595	595
Subtotal Per Well	\$1,857	\$940	\$4,654
ALS Discount multiple samples (10%)			\$465
Total Per Well			\$4,189
Estimated Annual Costs			
Based on six (6) wells tested	\$22,284	\$5,640	\$27,924
ALS discount (10%)	\$2,228	\$564	\$2,792
Total Costs	\$20,056	\$5,076	\$25,132

Enclosure (1):

Table 1- DOH Test Panels and Analytes of Special Interest

**DOH Test Panels and Analytes of Special Interest
Mint Farm Regional Wellfield Monitoring Well Sampling Program**

February 2013

Table 1: DOH Test Panels and Analytes of Special Interest

Test Panel	Method	DOH #	Analyte
TOTAL COLIFORM			TC (E. coli / Fecal if TC+)
FUMIGANT TEST PANEL	EPA Methods 504.1, or 551.1)	0102	EDB (Ethylene Dibromide)
		0103	DBCP (Dibromochloropropane)
		0079	1,2,3 Trichloropropane
ENDO TEST PANEL	EPA Method 548.1)	0151	Endothall
GLYPH TEST PANEL	EPA Method 547 or SM 6651	0152	Glyphosate
HERB1 TEST PANEL	EPA Methods 555, 515.1, 515.2, 515.3, 515.4, 524.3 or ASTM D5317-93)	0037	2,4 - D
		0038	2,4,5- TP (Silvex)
		0134	Pentachlorophenol
		0137	Dalapon
		0139	Dinoseb
		0140	Picloram
		0225	DCPA (Acid Metabolites)
		0222	Total DCPA
		0138	Dicamba
		0135	2,4 DB
		0223	Acifluorfen
		0224	Chloramben
		0226	3,5 - Dichlorobenzoic Acid
INSECT1 TEST PANEL	Carbamate Insecticides by EPA Methods 531.1, 531.2, or SM 6610)	0146	Carbofuran
		0148	Oxamyl (Vydate)
		0142	Aldicarb
		0145	Carbaryl
		0147	Methomyl

**DOH Test Panels and Analytes of Special Interest
Mint Farm Regional Wellfield Monitoring Well Sampling Program**

February 2013

Test Panel	Method	DOH #	Analyte
IOC TEST PANEL	Complete Inorganics	0004	Arsenic
		0005	Barium
		0006	Cadmium
		0007	Chromium
		0011	Mercury
		0012	Selenium
		0110	Beryllium
		0112	Antimony
		0113	Thallium
		0116	Cyanide
		0019	Fluoride
		0114	Nitrite-N
		0020	Nitrate-N
		0161	Total Nitrate/Nitrite
		0008	Iron
		0010	Manganese
		0013	Silver
		0021	Chloride
		0022	Sulfate
		0024	Zinc
		0014	Sodium
		0015	Hardness
		0016	Conductivity
0017	Turbidity		
0018	Color		
0026	TDS-Total Dissolved Solids		
		0111	Nickel
		0009	Lead
		0023	Copper
PCB TEST PANEL (PCB as Decachlorobiphenyl)	EPA Method 508A	0401	PCB (as Decachlorobiphenyl)
PEST1 TEST PANEL (General Pesticides)	EPA Methods 525.2, 551.1, 505, 508, 508.1, et al.)	0033	Endrin
		0034	Lindane (BHC - gamma)
		0035	Methoxychlor
		0036	Toxaphene
		0117	Alachlor

**DOH Test Panels and Analytes of Special Interest
Mint Farm Regional Wellfield Monitoring Well Sampling Program**

February 2013

Test Panel	Method	DOH #	Analyte
		0119	Atrazine
		0120	Benzo (a) pyrene
		0122	Chlordane (total)
		0124	Di (2-ethylhexyl) adipate
		0125	Di (2-ethylhexyl) phthalate
		0126	Heptachlor
		0127	Heptachlor epoxide
		0128	Hexachlorobenzene
		0129	Hexachlorocyclopentadiene
		0133	Simazine
		0134	Pentachlorophenol
		121	Butachlor
		0123	Dieldrin
		0130	Metolachlor
		0131	Metribuzin
		0132	Propachlor
		0254	Fluorene
		0153	PCB (as total arochlors)
		0173	Arochlor 1221
		0174	Arochlor 1232
		0175	Arochlor 1242
		0176	Arochlor 1248
		0177	Arochlor 1254
		0178	Arochlor 1260
		0179	Bromacil
		0180	Arochlor 1016
PHTH TEST PANEL (Phthalates)	EPA Method 506)	0124	Di (2-ethylhexyl) Adipate
		0125	Di(2-ethylhexyl) Phthalate
		0258	Benzyl Butyl Phthalate
		0259	Di-N-Butyl Phthalate
		0260	Diethyl Phthalate
		0261	Dimethyl Phthalate
QUAT TEST PANEL (Diquat and Paraquat)	EPA Method 549.2)	0150	Diquat
RADIONUCLIDES TEST PANEL	Beta Emitters		
		165	Gross alpha
		166	Radium 228

**DOH Test Panels and Analytes of Special Interest
Mint Farm Regional Wellfield Monitoring Well Sampling Program**

February 2013

Test Panel	Method	DOH #	Analyte
		39	Radium 226 (<i>only if gross alpha activity plus radium 228 activity is greater than 5.0 pCi/L</i>)
		105	Uranium** (mass) (<i>if gross alpha activity is greater than 15.0 pCi/L</i>)
		105	Uranium** (activity)
		40	Radium 226 + 228 (<i>Depending on the foregoing data</i>)
		40	Gross alpha*** + radium 228
		41	Gross alpha minus uranium and Radon
VOC1 TEST PANEL (Volatile Organic Compounds)	EPA Methods 524.2, 524.3 or 502.2)	0045	VINYL CHLORIDE
		0046	1,1 DICHLOROETHYLENE
		0047	1,1,1 TRICHLOROETHANE
		0048	CARBON TETRACHLORIDE
		0049	BENZENE
		0050	1,2 DICHLOROETHANE
		0051	TRICHLOROETHYLENE
		0052	Para-DICHLOROBENZENE
		0056	METHYLENE CHLORIDE (DICHLOROMETHANE)
		0057	TRANS- 1,2 DICHLOROETHYLENE
		0060	CIS- 1,2 DICHLOROETHYLENE
		0063	1,2 DICHLOROPROPANE
		0066	TOLUENE
		0067	1,1,2 TRICHLOROETHANE
		0068	TETRACHLOROETHYLENE
		0071	MONOCHLOROBENZENE
		0073	ETHYLBENZENE
		0074	M/P XYLENES (MCL FOR TOTAL)
		0075	O- XYLENE (MCL FOR TOTAL)
		0076	STYRENE
		0084	Ortho- DICHLOROBENZENE
		0095	1,2,4 TRICHLOROBENZENE
		0160	TOTAL XYLENES
		0079	1,2,3 TRICHLOROPROPANE
		0027	CHLOROFORM [<i>screening</i>]
		0053	CHLOROMETHANE
		0054	BROMOMETHANE
		0058	1,1 DICHLOROETHANE
		0078	BROMOBENZENE
		0081	O- CHLOROTOLUENE
		0085	FLUOROTRICHLOROMETHANE

**DOH Test Panels and Analytes of Special Interest
Mint Farm Regional Wellfield Monitoring Well Sampling Program**

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Test Panel	Method	DOH #	Analyte
		0086	BROMOCHLOROMETHANE
		0089	1,3,5 TRIMETHYLBENZENE
		0091	1,2,4 TRIMETHYLBENZENE
		0092	SEC-BUTYLBENZENE
		0096	NAPHTHALENE
		0102	EDB (Ethylene Dibromide) [screening]
		0103	DBCP [screening]
		0104	Dichlorodifluoromethane
MINT FARM SPECIAL INTEREST	SM4500-P-F		Orthophosphate
	EPA 200.7		Silica (different method used see below)
	EPA 200.7		Aluminum
	SM2320B		Alkalinity
	EPA 200.7		Magnesium
	EPA 200.7		Calcium
	EPA 350.1		Ammonia
	EPA 200.7		Potassium
	EPA 314		Perchlorate
	EPA 300		Bromide
	EPA 1630		Methyl mercury
	EPA 1653		Chlorinated phenolics
	Field		pH
			Hydrogen Sulfide