

# PT Regression Equations

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**Version 1.3**

## Table of Contents

1.0	Introduction.....	1
2.0	Regression Equations.....	1
3.0	Fixed Limits.....	1
4.0	Consensus Standard Deviation .....	1
5.0	Regression Equations.....	2
C01A	Major Ions in Water.....	2
C01B	Simple Nutrients in Water .....	2
C02A	Metals (Full Range) in Water.....	2
C02B	Metals (High Range) in Water .....	2
C02C	Metals (Total) in Water.....	3
C03	Complex Nutrients in Water .....	3
C04A	Solids in Water .....	3
C04B	BOD in Water .....	3
C04C	Turbidity in Water .....	3
C04D	COD in Water .....	3
C05A	Microbiology in Water.....	3
C06A	OC Pesticides in Water .....	4
C06B	PCBs in Water.....	4
C07	Polycyclic Aromatic Hydrocarbons in Water.....	4
C08	PCBs in Oil.....	4
C09	Metals on Filters .....	4
C11/C12/C13	Toxicology .....	5
C14	Cyanide in Water.....	5
C15	pH in Water.....	5
C16	VOCs in Water.....	5
C17	Metals in Soil.....	5
C18	Polycyclic Aromatic Hydrocarbons in Soil .....	6

<b>C19 Mercury in Water .....</b>	<b>6</b>
<b>C22 Organophosphorus Pesticides in Water.....</b>	<b>6</b>
<b>C24 Aryloxy Acid Pesticides in Water.....</b>	<b>7</b>
<b>C25 Chlorophenols in Water .....</b>	<b>7</b>
<b>C27 Glyphosate in Water.....</b>	<b>7</b>
<b>C29 Aldicarb in Water .....</b>	<b>7</b>
<b>C31A Petroleum Hydrocarbons in Soil.....</b>	<b>7</b>
<b>C31B Petroleum Hydrocarbons in Soil.....</b>	<b>7</b>
<b>C32 Chlorine in Water .....</b>	<b>7</b>
<b>C33 Phenolics in Water .....</b>	<b>7</b>
<b>C34 Oil and Grease in Water.....</b>	<b>7</b>
<b>C35 PCBs in Soil.....</b>	<b>7</b>
<b>C36 VOCs in Soil.....</b>	<b>7</b>
<b>C37 Colour in Water .....</b>	<b>8</b>
<b>C38 VOCs by TCLP .....</b>	<b>8</b>
<b>C39 Inorganics by TCLP.....</b>	<b>8</b>
<b>C40A Petroleum Hydrocarbons in Water .....</b>	<b>9</b>
<b>C40B Petroleum Hydrocarbons in Water .....</b>	<b>9</b>
<b>C41 Hexavalent Chromium in Water.....</b>	<b>9</b>
<b>C42 Sulphide in Water .....</b>	<b>9</b>
<b>C43 Solids in Soil .....</b>	<b>9</b>
<b>C44 Nutrients in Soil.....</b>	<b>9</b>
<b>C45 Anions in Soil.....</b>	<b>9</b>
<b>C46 Acidity in Water .....</b>	<b>9</b>
<b>C47 Haloacetic Acids in Water.....</b>	<b>9</b>
<b>C70 Potency in Cannabis .....</b>	<b>9</b>
<b>C71 Pesticides in Cannabis.....</b>	<b>10</b>
<b>C72 Metals in Hemp.....</b>	<b>10</b>

<b>C73 Residual Solvents in Hemp Seed Oil .....</b>	<b>10</b>
<b>C74 Hexavalent Chromium in Soil .....</b>	<b>11</b>
<b>C75 Particle Size in Soil.....</b>	<b>11</b>
<b>C76 Oil and Grease in Soil.....</b>	<b>11</b>
<b>C77 Pesticides in Soil.....</b>	<b>11</b>
<b>C78 Water Activity/% Moisture in Hemp.....</b>	<b>11</b>
<b>6.0 History of Changes .....</b>	<b>11</b>

## 1.0 Introduction

The acceptance limits for PTC PT are derived from the Standard Deviation for Proficiency Assessment (SDPA). Acceptable criteria for each reported result being the Assigned Value  $\pm 2$  x SDPA. The SDPA for each analyte is derived by one of three processes:

1. **Regression Equations:** Regression of inter-laboratory mean value against inter-laboratory standard deviation from historic PT rounds (1991 to 2012);
2. **Fixed Limits:**(i.e.,  $\pm$  ##%) adopted from external authorities (e.g., TNI) or based on accepted data-quality objectives.
3. **Consensus Standard Deviation:** PT round specific inter-laboratory standard deviation.

## 2.0 Regression Equations

For SDPAs based on regression equations a regression equation is established between sample concentration and inter-laboratory standard deviation for each analyte in the PT program. The steps involved in determining the regression equation for an analyte are as follows:

- compile the consensus means and inter-lab standard deviations used from all historic studies;
- remove data that is below the currently published concentration range;
- plot consensus mean against inter-lab standard deviation and remove any data pairs that are inconsistent with the data set as a whole;
- calculate the slope and intercept of consensus mean against inter-lab standard deviation;
- If the intercept is negative, force the line through zero to prevent unreasonably low standard deviations at lower concentrations.

$$\text{SDPA} = \text{Assigned value} \times \text{slope} + \text{intercept}$$

## 3.0 Fixed Limits

Fixed limits are indicated as  $\pm$  ##% and are derived after consultation with technical experts, regulators, accreditation bodies and other PT schemes. For these, the SDPA is one half the fixed limit percentage. For example, a fixed limit of  $\pm 30\%$  will have a SDPA of  $\frac{1}{2} \times 0.3 = 0.15$ .

## 4.0 Consensus Standard Deviation

Consensus standard deviation is typically used for the SDPA for PT where there are insufficient data to estimate a regression equation and where accepted data-quality objectives are not available. The SDPA is the standard deviation from the PT round following Algorithm A from ISO 13528.

## 5.0 Regression Equations

	Analyte	Conc. Range	Slope	Intercept
<b>C01A Major Ions in Water</b>				
	Alkalinity to pH 4.5	20 - 250 mg/L		± 15%
	Calcium	2 - 200 mg/L		± 15%
	Chloride	5 - 500 mg/L		± 15%
	Conductivity at 25°C	20 - 2000 µS/cm		± 10%
	Fluoride	0.2 - 4.0 mg/L		± 15%
	Hardness as CaCO <sub>3</sub>	10 - 800 mg/L		± 15%
	Inorganic Carbon	10 - 100 mg/L		± 20%
	Magnesium	2 - 50 mg/L		± 15%
	Nitrate	0.20 - 20.0 mg/L		± 15%
	Nitrate plus Nitrite	0.20 - 20.0 mg/L		± 15%
	Potassium	1 - 40 mg/L		± 15%
	Reactive Silica	0.5 - 30 mg/L		± 20%
	Sodium	2 - 150 mg/L		± 15%
	Sulphate	5 - 200 mg/L		± 15%
<b>C01B Simple Nutrients in Water</b>				
	Ammonia	0.5 - 20.0 mg/L		± 20%
	Bromide	1.0 - 10.0 mg/L		± 15%
	Nitrite	0.1 - 1.0 mg/L		± 15%
	Organic Carbon	2.0 - 20.0 mg/L	0.0385	0.226
	Phosphate	0.1 - 3.0 mg/L		± 15%
<b>C02A Metals (Full Range) in Water</b>				
	Aluminium	0.001 - 1.60 mg/L		± 15%
	Antimony	1.0 - 100 µg/L		± 20 %
	Arsenic	1.0 - 100 µg/L		± 20 %
	Barium	0.001 - 1.60 mg/L		± 15%
	Beryllium	0.001 - 0.10 mg/L		± 15%
	Boron	0.001 - 1.60 mg/L		± 15%
	Cadmium	0.001 - 0.10 mg/L		± 15%
	Chromium	0.001 - 1.60 mg/L		± 15%
	Cobalt	0.001 - 1.60 mg/L		± 15%
	Copper	0.001 - 1.60 mg/L		± 15%
	Iron	0.001 - 1.60 mg/L		± 15%
	Lead	0.001 - 1.60 mg/L		± 15%
	Manganese	0.001 - 1.60 mg/L		± 15%
	Molybdenum	0.001 - 1.60 mg/L		± 15%
	Nickel	0.001 - 1.60 mg/L		± 15%
	Selenium	1.0 - 100 µg/L		± 20 %
	Silver	0.001 - 0.100 mg/L		± 15%
	Strontium	0.001 - 1.60 mg/L		± 15%
	Thallium	0.001 - 0.100 mg/L		± 20 %
	Tin	0.001 - 0.100 mg/L		± 20 %
	Titanium	0.001 - 1.60 mg/L		± 15%
	Uranium	0.001 - 0.1 mg/L		± 15%
	Vanadium	0.001 - 1.60 mg/L		± 15%
	Zinc	0.001 - 1.60 mg/L		± 15%
<b>C02B Metals (High Range) in Water</b>				
	Aluminium	0.25 - 1.60 mg/L		± 15%
	Barium	0.25 - 1.60 mg/L		± 15%
	Boron	0.25 - 1.60 mg/L		± 15%

Analyte	Conc. Range	Slope	Intercept
Chromium	0.25 - 1.60 mg/L		± 15%
Cobalt	0.25 - 1.60 mg/L		± 15%
Copper	0.25 - 1.60 mg/L		± 15%
Iron	0.25 - 1.60 mg/L		± 15%
Lead	0.25 - 1.60 mg/L		± 15%
Manganese	0.25 - 1.60 mg/L		± 15%
Molybdenum	0.25 - 1.60 mg/L		± 15%
Nickel	0.25 - 1.60 mg/L		± 15%
Strontium	0.25 - 1.60 mg/L		± 15%
Thallium	0.25 - 1.60 mg/L		± 20 %
Titanium	0.25 - 1.60 mg/L		± 15%
Vanadium	0.25 - 1.60 mg/L		± 15%
Zinc	0.25 - 1.60 mg/L		± 15%
<b>C02C Metals (Total) in Water</b>			
Aluminium	0.25 - 1.60 mg/L		± 15%
Antimony	1.0 - 100 µg/L		± 20 %
Arsenic	1.0 - 100 µg/L		± 20 %
Barium	0.25 - 1.60 mg/L		± 15%
Beryllium	0.001 - 0.10 mg/L		± 15%
Boron	0.25 - 1.60 mg/L		± 15%
Cadmium	0.001 - 0.10 mg/L		± 15%
Chromium	0.25 - 1.60 mg/L		± 15%
Cobalt	0.25 - 1.60 mg/L		± 15%
Copper	0.25 - 1.60 mg/L		± 15%
Iron	0.25 - 1.60 mg/L		± 15%
Lead	0.25 - 1.60 mg/L		± 15%
Manganese	0.25 - 1.60 mg/L		± 15%
Molybdenum	0.25 - 1.60 mg/L		± 15%
Nickel	0.25 - 1.60 mg/L		± 15%
Selenium	1.0 - 100 µg/L		± 20 %
Silver	0.001 - 0.100 mg/L		± 15%
Strontium	0.25 - 1.60 mg/L		± 15%
Thallium	0.25 - 1.60 mg/L		± 20 %
Tin	0.001 - 0.10 mg/L		± 20 %
Titanium	0.25 - 1.60 mg/L		± 15%
Uranium	0.001 - 0.1 mg/L		± 15%
Vanadium	0.25 - 1.60 mg/L		± 15%
Zinc	0.25 - 1.60 mg/L		± 15%
<b>C03 Complex Nutrients in Water</b>			
Total Kjeldahl Nitrogen	2.0 - 20 mg/L		± 25%
Total Phosphorus	0.10 - 4.0 mg/L		± 20%
<b>C04A Solids in Water</b>			
Total Dissolved Solids	100 - 1000 mg/L	0	22.5
Total Suspended Solids	10 - 200 mg/L		± 20%
Volatile Suspended Solids	5 - 150 mg/L		± 25%
<b>C04B BOD in Water</b>			
BOD	25 - 200 mg/L		± 35%
CBOD	25 - 200 mg/L		± 35%
<b>C04C Turbidity in Water</b>			
Turbidity	0.5 - 50 NTU	0.0887	0
<b>C04D COD in Water</b>			
COD	30 - 500 mg/L	0.0308	3.15
<b>C05A Microbiology in Water</b>			

Analyte	Conc. Range	Slope	Intercept
<i>Escherichia coli</i> ( <i>E. coli</i> )	200 - 1000 CFU/mL	0.16	1.45
Faecal (Thermotolerant) Coliforms	200 - 1000 CFU/mL	0.252	0.219
Heterotrophic Plate Count	200 - 1000 CFU/mL	0.14	7.62
Total Coliforms	200 - 1000 CFU/mL	0.144	2.24
<b>C06A OC Pesticides in Water</b>			
a - Chlordane	0.05 - 5.0 µg/L	0.1899	0
alpha-BHC	0.05 - 3.0 µg/L	0.246	0.0056
Aldrin	0.05 - 5.0 µg/L	0.2222	0.0286
Dieldrin	0.05 - 5.0 µg/L	0.203	0.0151
Endosulfan I	0.05 - 3.0 µg/L	0.2416	0.0155
Endosulfan II	0.05 - 3.0 µg/L	0.2028	0.0457
Endrin	0.05 - 3.0 µg/L	0.216	0.0354
g - Chlordane	0.05 - 5.0 µg/L	0.1713	0.0022
Heptachlor	0.05 - 5.0 µg/L	0.329	0
Heptachlor Epoxide	0.05 - 3.0 µg/L	0.164	0.0471
Lindane (gamma-BHC)	0.05 - 3.0 µg/L	0.234	0
Mirex	0.05 - 3.0 µg/L	0.2447	0.0294
o,p' - DDT	0.05 - 3.0 µg/L	0.2043	0.031
p,p' - DDT	0.05 - 3.0 µg/L	0.243	0.0216
p,p' Methoxychlor	0.05 - 3.0 µg/L	0.2084	0.0499
<b>C06B PCBs in Water</b>			
Aroclor 1242	1.0 - 20.0 µg/L	0.2863	0.0336
Aroclor 1248	1.0 - 20.0 µg/L	0.2863	0.0336
Aroclor 1254	1.0 - 20.0 µg/L	0.2863	0.0336
Aroclor 1260	1.0 - 20.0 µg/L	0.2863	0.0336
Total PCB	1.0 - 20.0 µg/L	0.2863	0.0336
<b>C07 Polycyclic Aromatic Hydrocarbons in Water</b>			
Acenaphthene	0.4 - 12 µg/L	0.1445	0.0613
Acenaphthylene	0.4 - 12 µg/L	0.167	0.0323
Anthracene	0.4 - 12 µg/L	0.179	0.0714
Benzo(a)anthracene	0.4 - 12 µg/L	0.218	0.0402
Benzo(a)pyrene	0.4 - 12 µg/L	0.2336	0.069
Benzo(b)fluoranthene	0.4 - 12 µg/L	0.237	0.0382
Benzo(b+j)fluoranthene	0.4 - 12 µg/L	Consensus	
Benzo(g,h,i)perylene	0.4 - 12 µg/L	0.247	0.065
Benzo(k)fluoranthene	0.4 - 12 µg/L	0.239	0.0204
Chrysene	0.4 - 12 µg/L	0.1974	0.0417
Dibenzo(a,h)anthracene	0.4 - 12 µg/L	0.238	0.1203
Fluoranthene	0.4 - 12 µg/L	0.164	0.051
Fluorene	0.4 - 12 µg/L	0.158	0.0472
Indeno(1,2,3-cd)pyrene	0.4 - 12 µg/L	0.257	0.0523
Naphthalene	0.4 - 12 µg/L	0.177	0.0326
Phenanthrene	0.4 - 12 µg/L	0.1757	0.0368
Pyrene	0.4 - 12 µg/L	0.159	0.0655
<b>C08 PCBs in Oil</b>			
Aroclor 1242	5.0 - 150.0 µg/g	0.177	0.653
Aroclor 1248	5.0 - 150.0 µg/g	0.177	0.653
Aroclor 1254	5.0 - 150.0 µg/g	0.177	0.653
Aroclor 1260	5.0 - 150.0 µg/g	0.177	0.653
Total PCB	5.0 - 150.0 µg/g	0.177	0.653
<b>C09 Metals on Filters</b>			
Cadmium	4.0 - 30 µg/HVF	0.0777	0.425
Copper	4.0 - 60 µg/HVF	0.101	0.21



Analyte	Conc. Range	Slope	Intercept
Lead	4.0 – 80 µg/HVF	0.108	0.137
Zinc	4.0 – 60 µg/HVF	0.153	0.138
<b>C11/C12/C13 Toxicology</b>			
Trout 96 Hour LC50	2 – 10 mL/L	0.117	0.04
Daphnia 48 Hour LC50	2 – 40 mL/L	0.141	0
Microtox™ 15 Minute IC50	4 – 10 mL/L	0.2	0
<b>C14 Cyanide in Water</b>			
Cyanide – Strong Acid Dissociable	0.2 – 5.0 mg/L		± 30%
<b>C15 pH in Water</b>			
pH	3 – 10 pH units	0	0.1
<b>C16 VOCs in Water</b>			
1,1,1-Trichloroethane	6.0 – 200 µg/L		± 30%
1,1,2,2-Tetrachloroethane	6.0 – 200 µg/L		± 35%
1,1,2-Trichloroethane	6.0 – 200 µg/L		± 30%
1,1-Dichloroethane	6.0 – 200 µg/L		± 30%
1,1-Dichloroethylene	6.0 – 200 µg/L		± 40%
1,2-Dichlorobenzene	6.0 – 200 µg/L		± 30%
1,2-Ddichloroethane	6.0 – 200 µg/L		± 30%
1,2-Dichloropropane	6.0 – 200 µg/L		± 30%
1,3-Dichlorobenzene	6.0 – 200 µg/L		± 30%
1,4-Dichlorobenzene	6.0 – 200 µg/L		± 30%
Acetone (2-Propanone)	6.0 – 200 µg/L	0.233	2.05
Benzene	2.0 – 200 µg/L		± 30%
Bromodichloromethane	20 – 200 µg/L		± 30%
Bromoform	20 – 200 µg/L		± 30%
Carbon Tetrachloride	6.0 – 200 µg/L		± 30%
Chlorobenzene	6.0 – 200 µg/L		± 30%
Chlorodibromomethane	20 – 200 µg/L		± 30%
Chloroform	20 – 200 µg/L		± 30%
cis-1,2-Dichloroethylene	6.0 – 200 µg/L		± 30%
cis-1,3-Dichloropropene	6.0 – 200 µg/L		± 30%
Dichloromethane	6.0 – 200 µg/L		± 35%
Ethylbenzene	2.0 – 200 µg/L		± 30%
Ethylene Dibromide	6.0 – 200 µg/L		± 30%
m/p-xylene	6.0 – 200 µg/L		± 30%
Methyl t-butyl ether (MTBE)	6.0 – 200 µg/L		± 40%
Methyl Ethyl Ketone	6.0 – 200 µg/L		± 45%
Methyl isobutyl Ketone (MIBK)	6.0 – 200 µg/L		± 30%
o-xylene	6.0 – 200 µg/L		± 30%
Styrene	6.0 – 200 µg/L		± 30%
Tetrachloroethylene	6.0 – 200 µg/L		± 30%
Toluene	6.0 – 200 µg/L		± 30%
trans-1,2-Dichloroethylene	6.0 – 200 µg/L		± 30%
trans-1,3-Dichloropropene	6.0 – 200 µg/L		± 30%
Trichloroethylene	6.0 – 200 µg/L		± 35%
Trichlorofluoromethane	6.0 – 200 µg/L		± 40%
Vinyl Chloride	6.0 – 200 µg/L		± 45%
<b>C17 Metals in Soil</b>			
Aluminium	1000 – 100000 µg/g	0.131	400
Antimony	0.4 – 4.0 µg/g	0.573	0
Arsenic	5.0 – 35 µg/g	0.111	0.62
Barium	50 – 500 µg/g	0.0692	2.09
Beryllium	1.0 – 3.0 µg/g	0.132	0.045

Analyte	Conc. Range	Slope	Intercept
Boron	20 – 200 µg/g	0.105	0.807
Cadmium	0.2 – 6.0 µg/g	0.0866	0.153
Chromium	50 – 150 µg/g	0.0761	1.53
Cobalt	10 – 20 µg/g	0.0978	0
Copper	30 – 600 µg/g	0.0836	0
Iron	1000 – 50000 µg/g	0.0913	0
Lead	5 – 400 µg/g	0.0746	1.68
Manganese	100 – 2000 µg/g	0.0733	0
Mercury	50 – 2000 ng/g	0.255	0
Nickel	25 – 1000 µg/g	0.103	0
Strontium	100 – 500 µg/g	0.0871	0.459
Tin	10 – 100 µg/g	0.24	0.613
Titanium	500 – 5000 µg/g	0.253	14.2
Uranium	1 – 5 µg/g	0.0872	0.0649
Vanadium	25 – 200 µg/g	0.141	0.155
Zinc	40 – 1600 µg/g	0.08	0.283
<b>C18 Polycyclic Aromatic Hydrocarbons in Soil</b>			
Acenaphthene	0.2 – 50 µg/g	0.209	0.0161
Acenaphthylene	0.2 – 50 µg/g	0.445	0
Anthracene	0.2 – 50 µg/g	0.321	0
Benzo(a)anthracene	0.2 – 50 µg/g	0.241	0
Benzo(a)pyrene	0.2 – 50 µg/g	0.232	0.0058
Benzo(b)fluoranthene	0.2 – 50 µg/g	0.28	0.0836
Benzo(b+j)fluoranthene	0.2 – 50 µg/g	Consensus	
Benzo(g,h,i)perylene	0.2 – 50 µg/g	0.243	0.039
Benzo(k)fluoranthene	0.2 – 50 µg/g	0.372	0
Chrysene	0.2 – 50 µg/g	0.221	0.056
Dibenzo(a,h)anthracene	0.2 – 50 µg/g	0.303	0.0102
Fluoranthene	0.2 – 50 µg/g	0.206	0.0165
Fluorene	0.2 – 50 µg/g	0.25	0.112
Indeno(1,2,3-cd)pyrene	0.2 – 50 µg/g	0.223	0.107
Naphthalene	0.2 – 50 µg/g	0.373	0
Phenanthrene	0.2 – 50 µg/g	0.209	0
Pyrene	0.2 – 50 µg/g	0.2	0.0423
<b>C19 Mercury in Water</b>			
Mercury	0.1 – 5.0 µg/L	± 30%	
<b>C22 Organophosphorus Pesticides in Water</b>			
Atrazine	2 – 5 µg/L	0.204	0
Azinphos-methyl	10 – 40 µg/L	0.250	0.356
Bendiocarb	1 – 40 µg/L	0.223	0.598
Carbaryl	0.2 – 90 µg/L	0.301	0.073
Carbofuran	0.2 – 90 µg/L	0.309	0
Chlorpyrifos (ethyl)	2 – 10 µg/L	0.188	0.147
Cyanazine	2 – 10 µg/L	0.275	0.164
Diazinon	0.5 – 20 µg/L	0.254	0
Dimethoate	2 – 20 µg/L	0.302	0.227
Diuron	20 – 50 µg/L	0.238	0.583
Malathion	2 – 10 µg/L	0.197	0.26
Metolachlor	2 – 10 µg/L	0.179	0.191
Metribuzin	2 – 10 µg/L	0.216	0.263
Parathion (ethyl)	0.5 – 20 µg/L	0.2347	0.0776
Phorate	0.5 – 5 µg/L	0.274	0
Simazine	1 – 10 µg/L	0.25	0.0079

Analyte	Conc. Range	Slope	Intercept
Terbufos	0.5 – 5 µg/L	0.279	0.0389
Trifluralin	1 – 10 µg/L	0.26	0.0121
<b>C24 Aryloxy Acid Pesticides in Water</b>			
2,4,5-Trichlorophenoxyacetic Acid	0.1 – 10 µg/L	0.244	0.0761
2,4-Dichlorophenoxyacetic Acid	0.1 – 10 µg/L	0.264	0.0979
Bromoxynil	1 – 5 µg/L	0.23	0.0704
Dicamba	1 – 10 µg/L	0.29	0.0108
Diclofop-methyl (as free acid)	0.5 – 5 µg/L	0.363	0
Dinoseb	1 – 10 µg/L	0.339	0.0979
Picloram	0.1 – 10 µg/L	0.482	0.0957
<b>C25 Chlorophenols in Water</b>			
2,3,4,6-Tetrachlorophenol	2 – 20 µg/L	0.207	0.387
2,4,6-Trichlorophenol	2 – 20 µg/L	0.24	0
2,4-Dichlorophenol	2 – 20 µg/L	0.237	0.278
Pentachlorophenol	2 – 20 µg/L	0.206	0.406
<b>C27 Glyphosate in Water</b>			
Glyphosate	25 – 80 µg/L	0.138	1.85
<b>C29 Aldicarb in Water</b>			
Aldicarb	1 – 9 µg/L	0.174	0.326
<b>C31A Petroleum Hydrocarbons in Soil</b>			
Benzene	0.1 – 10 mg/kg		± 35%
Ethylbenzene	10 – 200 mg/kg		± 35%
F1: (C6-C10)	30 – 3500 mg/kg	0.213	38.9
m/p- Xylene	100 – 500 mg/kg		± 40%
o-Xylene	100 – 500 mg/kg		± 35%
Toluene	10 – 200 mg/kg		± 35%
VH (C6-C10)	30 – 3500 mg/kg	0.213	38.9
<b>C31B Petroleum Hydrocarbons in Soil</b>			
F2: C10-C16	150 – 6500 mg/kg	0.220	40.3
F3: C16-C34	250 – 12500 mg/kg	0.227	26
F4: C34-C50	1000 – 12500 mg/kg	0.3	35
F4: Gravimetric	1000 – 12500 mg/kg	0.187	570
<b>C32 Chlorine in Water</b>			
Free Chlorine	0.5 – 3.0 mg/L	0.0661	0.00248
Total Chlorine	0.5 – 3.0 mg/L	0.0576	0.0193
<b>C33 Phenolics in Water</b>			
Total Phenolics	0.005 – 0.5 mg/L	0.0678	0.0035
<b>C34 Oil and Grease in Water</b>			
Mineral (non-polar) Oil and Grease	10 – 500 mg/L	0.185	7.15
Total Oil and Grease	10 – 500 mg/L	0.185	7.15
<b>C35 PCBs in Soil</b>			
Aroclor 1242	5 – 500 µg/g	0.339	0
Aroclor 1248	5 – 500 µg/g	0.339	0
Aroclor 1254	5 – 500 µg/g	0.339	0
Aroclor 1260	5 – 500 µg/g	0.339	0
Total PCB	5 – 500 µg/g	0.339	0
<b>C36 VOCs in Soil</b>			
1,1,1-Trichloroethane	6 – 200 µg/g		± 45%
1,1,2,2-Tetrachloroethane	6 – 200 µg/g		± 35%
1,1,2-Trichloroethane	6 – 200 µg/g		± 35%
1,1-Dichloroethane	6 – 200 µg/g		± 40%
1,1-Dichloroethylene	6 – 200 µg/g		± 40%
1,2-Dichlorobenzene	6 – 200 µg/g		± 35%

Analyte	Conc. Range	Slope	Intercept
1,2-Dichloroethane	6 - 200 µg/g		± 35%
1,2-Dichloropropane	6 - 200 µg/g		± 35%
1,3-Dichlorobenzene	6 - 200 µg/g		± 35%
1,4-Dichlorobenzene	6 - 200 µg/g		± 35%
Acetone(2-Propanone)	6 - 200 µg/g	0.204	1.21
Benzene	2- 200 µg/g		± 35%
Bromodichloromethane	20 - 500 µg/g		± 35%
Bromoform	20 - 500 µg/g		± 35%
Carbon Tetrachloride	6 - 200 µg/g		± 35%
Chlorobenzene	6 - 200 µg/g		± 35%
Chlorodibromomethane	20 - 200 µg/g		± 35%
Chloroform	20 - 200 µg/g		± 35%
cis-1,2-Dichloroethylene	6 - 200 µg/g		± 35%
cis-1,3-Dichloropropene	6 - 200 µg/g		± 35%
Dichloromethane	6 - 200 µg/g		± 40%
Ethylbenzene	2 - 200 µg/g		± 35%
Ethylene Dibromide	6 - 200 µg/g		± 35%
m/p-xylene	6 - 200 µg/g		± 40%
Methyl Ethyl Ketone	6 - 200 µg/g		± 55%
Methyl isobutyl Ketone (MIBK)	6 - 200 µg/g		± 45%
Methyl t-butyl ether (MTBE)	6 - 200 µg/g		± 40%
o-xylene	6 - 200 µg/g		± 35%
Styrene	6 - 200 µg/g		± 35%
Tetrachloroethylene	6 - 200 µg/g		± 45%
Toluene	6 - 200 µg/g		± 35%
trans-1,2-Dichloroethylene	6 - 200 µg/g		± 35%
trans-1,3-Dichloropropene	6 - 200 µg/g		± 35%
Trichloroethylene	6 - 200 µg/g		± 40%
Trichlorofluoromethane	6 - 200 µg/g		± 50%
<b>C37 Colour in Water</b>			
True Colour	2 - 50 TCU	0.081	0.933
<b>C38 VOCs by TCLP</b>			
1,2-Dichlorobenzene	0.025 - 5 mg/L		Consensus
1,2-Dichloroethane	0.025 - 5 mg/L		Consensus
1,4-Dichlorobenzene	0.025 - 5 mg/L		Consensus
Benzene	0.025 - 5 mg/L		Consensus
Carbon tetrachloride	0.025 - 5 mg/L		Consensus
Chlorobenzene	0.025 - 5 mg/L		Consensus
Chloroform	0.025 - 5 mg/L		Consensus
Dichloromethane	0.025 - 5 mg/L		Consensus
Methyl Ethyl Ketone	1.0 - 5 mg/L		Consensus
Tetrachloroethylene	0.025 - 5 mg/L		Consensus
Trichloroethylene	0.025 - 5 mg/L		Consensus
<b>C39 Inorganics by TCLP</b>			
Arsenic	0.10 - 5.0 mg/L		Consensus
Barium	0.10 - 2.0 mg/L		Consensus
Boron	0.50 - 10.0 mg/L		Consensus
Cadmium	0.0010 - 0.050 mg/L		Consensus
Chromium	0.010 - 0.50 mg/L		Consensus
Cyanide (Weak Acid Dissociable)	0.1 - 5 mg/L		Consensus
Fluoride	10 - 100 mg/L		Consensus
Lead	0.010 - 0.50 mg/L		Consensus
Mercury	0.0001 - 0.050 mg/L		Consensus

Analyte	Conc. Range	Slope	Intercept
Nitrate-N	2 - 50 mg/L		Consensus
Nitrate and Nitrite as N	2 - 70 mg/L		Consensus
Selenium	0.050 - 1.0 mg/L		Consensus
Silver	0.0010 - 0.050 mg/L		Consensus
Uranium	0.050 - 1.0 mg/L		Consensus
<b>C40A Petroleum Hydrocarbons in Water</b>			
Benzene	1 - 100 µg/L		± 30%
Ethylbenzene	1 - 200 µg/L		± 30%
F1: C6-C10	20 - 1000 µg/L		± 30%
m/p-Xylene	1 - 200 µg/L		± 30%
o-Xylene	1 - 200 µg/L		± 30%
Toluene	1 - 200 µg/L		± 30%
VH (C6-C10)	20 - 1000 µg/L		± 30%
<b>C40B Petroleum Hydrocarbons in Water</b>			
F2: C10-C16	200 - 50000 µg/L		± 30%
F3: C16-C34	200 - 50000 µg/L		± 30%
F4: C34-C50	200 - 50000 µg/L		± 30%
<b>C41 Hexavalent Chromium in Water</b>			
Hexavalent Chromium	50 - 500 µg/L		± 20%
<b>C42 Sulphide in Water</b>			
Sulphide	1 - 10 mg/L	0.121	0.282
<b>C43 Solids in Soil</b>			
Fixed Solids	80 - 100%		Consensus
Percent Moisture	1 - 30%		Consensus
Total Solids	70 - 100%		Consensus
Volatile Solids	1 - 20%		Consensus
<b>C44 Nutrients in Soil</b>			
Ammonia - N	300 - 3000 µg/g		Consensus
Kjeldahl Nitrogen	400 - 4000 µg/g		Consensus
Organic Carbon	1000 - 15000 µg/g		Consensus
Phosphorus	300 - 3000 µg/g		Consensus
<b>C45 Anions in Soil</b>			
Bromide	10 - 100 µg/g		Consensus
Chloride	200 - 1000 µg/g		Consensus
Fluoride	25 - 500 µg/g		Consensus
Nitrate-N	25 - 500 µg/g		Consensus
% Saturation			Consensus
Phosphate-P	25 - 500 µg/g		Consensus
Sulphate	25 - 2000 µg/g		Consensus
<b>C46 Acidity in Water</b>			
Acidity	50 - 2000 mg/L		± 10%
<b>C47 Haloacetic Acids in Water</b>			
Bromochloroacetic acid	5 - 50 µg /L		± 40%
Dibromoacetic acid	5 - 50 µg /L		± 40%
Dichloroacetic acid	5 - 50 µg /L		± 40%
Monobromoacetic acid	5 - 50 µg /L		± 40%
Monochloroacetic acid	5 - 50 µg /L		± 40%
Trichloroacetic acid	5 - 50 µg /L		± 40%
<b>C70 Potency in Cannabis</b>			
Cannabidiol (CBD)	0.1 - 25%		Consensus
Cannabidiolic Acid (CBDA)	0.1 - 25%		Consensus
Tetrahydrocannabinol (THC)	0.1 - 25%		Consensus
Tetrahydrocannabinolic Acid (THCA)	0.1 - 25%		Consensus

	Analyte	Conc. Range	Slope	Intercept
<b>C71 Pesticides in Cannabis</b>				
	Acephate	0.1 - 1 µg/g		Consensus
	Aldicarb	5.0 - 20 µg/g		Consensus
	Azoxystrobin	0.1 - 1 µg/g		Consensus
	Bifenazate	0.1 - 1 µg/g		Consensus
	Boscalid	0.1 - 1 µg/g		Consensus
	Carbaryl	0.25 - 5 µg/g		Consensus
	Carbofuran	0.1 - 1 µg/g		Consensus
	Diazinon	0.1 - 1 µg/g		Consensus
	Dichlorvos (DDVP)	0.5 - 10 µg/g		Consensus
	Dimethoate	0.1 - 1 µg/g		Consensus
	Ethoprophos	0.1 - 1 µg/g		Consensus
	Etoxazole	0.1 - 1 µg/g		Consensus
	Fipronil	0.3 - 1.2 µg/g		Consensus
	Fludioxonil	0.1 - 1 µg/g		Consensus
	Imidacloprid	0.1 - 1 µg/g		Consensus
	Malathion	0.1 - 1 µg/g		Consensus
	Metalaxyl	0.1 - 1 µg/g		Consensus
	Methiocarb	0.1 - 1 µg/g		Consensus
	Methomyl	0.25 - 1 µg/g		Consensus
	Myclobutanil	0.1 - 1 µg/g		Consensus
	Oxamyl	15 - 60 µg/g		Consensus
	Paclobutrazol	0.1 - 1 µg/g		Consensus
	Propoxur (Baygon)	0.1 - 1 µg/g		Consensus
	Spiromesifen	15 - 60 µg/g		Consensus
	Spirotetramat	0.1 - 1 µg/g		Consensus
	Thiamethoxam	0.1 - 1 µg/g		Consensus
	Trifloxystrobin	0.1 - 1 µg/g		Consensus
<b>C72 Metals in Hemp</b>				
	Arsenic	0.1 - 10 µg/g		Consensus
	Cadmium	0.1 - 50 µg/g		Consensus
	Chromium	0.1 - 10 µg/g		Consensus
	Mercury	0.05 - 2 µg/g		Consensus
	Lead	0.1 - 10 µg/g		Consensus
<b>C73 Residual Solvents in Hemp Seed Oil</b>				
	1-Butanol (n-Butanol)	500 - 7000 µg/g		Consensus
	1-Pentanol	500 - 7000 µg/g		Consensus
	1-Propanol (Propanol)	500 - 7000 µg/g		Consensus
	2-Butanol	500 - 7000 µg/g		Consensus
	2-Butanone (Methyl ethyl ketone, MEK)	500 - 7000 µg/g		Consensus
	2-Propanol (Isopropyl alcohol)	500 - 7000 µg/g		Consensus
	3-Methyl-1-butanol	500 - 7000 µg/g		Consensus
	Acetone (2-Propanone)	500 - 7000 µg/g		Consensus
	Anisole	500 - 7000 µg/g		Consensus
	Butane	500 - 7000 µg/g		Consensus
	Butyl acetate	500 - 7000 µg/g		Consensus
	Dimethyl sulfoxide	500 - 7000 µg/g		Consensus
	Ethanol	500 - 7000 µg/g		Consensus
	Ethyl acetate	500 - 7000 µg/g		Consensus
	Ethyl ether	500 - 7000 µg/g		Consensus
	Heptane	500 - 7000 µg/g		Consensus
	Isobutanol (2-Methyl-1-propanol)	500 - 7000 µg/g		Consensus
	Isobutyl acetate	500 - 7000 µg/g		Consensus

Analyte	Conc. Range	Slope	Intercept
Isopropyl acetate	500 - 7000 µg/g		Consensus
Methyl acetate	500 - 7000 µg/g		Consensus
Pentane	500 - 7000 µg/g		Consensus
Propane	500 - 7000 µg/g		Consensus
Propyl acetate	500 - 7000 µg/g		Consensus
Triethylamine	500 - 7000 µg/g		Consensus
<b>C74 Hexavalent Chromium in Soil</b>			
Hexavalent Chromium	40 - 300 µg/g	0.1547	8.546
<b>C75 Particle Size in Soil</b>			
Percent Sand			Consensus
Percent Silt			Consensus
Percent Clay			Consensus
<b>C76 Oil and Grease in Soil</b>			
Total Oil and Grease	300 - 3000 µg/g	0.1567	88.04
<b>C77 Pesticides in Soil</b>			
p,p'-DDT	50 - 500 µg/g	0.2243	2.65
Aldrin	50 - 500 µg/g	0.2024	1.85
Alpha-BHC	50 - 500 µg/g	0.2004	3.18
Alpha-Chlordane	50 - 500 µg/g	0.1876	0.6823
Beta-BHC	50 - 500 µg/g	0.1788	9.406
Dieldrin	50 - 500 µg/g	0.1672	4.0365
Endosulfan I	50 - 500 µg/g	0.1824	5.0749
Endosulfan II	50 - 500 µg/g	0.2026	3.2251
Endrin	50 - 500 µg/g	0.1435	7.1706
Lindane	50 - 500 µg/g	0.1955	6.0037
Gamma-Chlordane	50 - 500 µg/g	0.1666	2.0584
Heptachlor	50 - 500 µg/g	0.1911	2.5619
Heptachlor Epoxide	50 - 500 µg/g	0.1786	2.4451
Methoxychlor	50 - 500 µg/g	0.2696	6.089
<b>C78 Water Activity/% Moisture in Hemp</b>			
Percent Moisture	1 - 60 %		Consensus
Water Activity	0.1 - 10 wa		Consensus

## 6.0 History of Changes

Date	Rev. No.	Sections	Changes
12/18/2019	1.0		Initial publication
01/13/2021	1.1	General 4.0	Added clarification of SDPA and fixed limits. Added section for Consensus standard deviation.
01/04/2023	1.2	4.0	C02B Removed duplicate Aluminum C40A Removed "New"
03/06/2023	1.3		Updated concentration ranges, slopes and Intercept to match the contract and F07 Data Examination rev 1.2.