

Comparison of Screening Level Values (SLVs) used in the draft Interim Feasibility Study Report (IFS, Anchor QEA 2018) to:

- the 2020 DEQ Interim Management Directive for “Conducting Ecological Risk Assessments” (Eco IMD) SLVs from Tables 1a (Soil) Table 1b (Water - direct contact) and Table 2 (Aquatic Life)
- Portland Harbor ROD Table 17, ESD (2020)
- Portland Harbor ROD Table 16

Last updated: 12/15/2021

This workbook contains three tabs comparing screening levels used in the IFS for the Gasco Site.	
Wildlife Soil and Water Ingestion RBCs	Soil and water RBCs are calculated assuming wildlife exposure only occurs to that media. Wildlife are exposure to several media, such as soil, sediment and water, and therefore a multimedia exposure calculation that calculates a cumulative hazard index (HI) value for each wildlife receptor should be used in RBC implementation. Alternatively, an RBC protective of multi-media exposure can be calculated. Most RBCs identified in the GASCO risk assessments are for individual media, except for the cyanide wildlife water exposure RBC. This RBC was calculated as the acceptable concentration in water protective of the cumulative risk from exposure to both water and riverbank soil / sediment to terrestrial receptors. This site-specific value is therefore not comparable to other wildlife ingestion RBCs that consider only water ingestion. See the footnote for cyanide in sheet “B-Wildlife Water Ingestion”.
A-Soils	IFS screening levels (SLs) are compared to Table 1a from the new Eco IMD. Values are presented receptor specific (RBC_type).
B-Wildlife_Water_Ingestion	IFS screening levels (SLs) are compared to Table 1b from the new Eco IMD and Table 17. Values are presented receptor specific (RBC_type). Note derivation of site-specific RBCs are not comparable to Eco IMD RBCs. Note: Cyanide water RBC is a site-specific acceptable concentration in water assuming that each receptor receives its potential dose from both water and soil ingestion. The RBC is the lowest of four species evaluated, including the robin, shrew, mink, and hawk. The lowest RBC of 22 ug/L was derived was for the robin. Acceptable Water Concentration,mg/L = $TRV \text{ mg/kg BW/day} / \times BW[(\text{Water Ingestion Rate} \times \text{BW}) + (\text{Soil Ingestion Rate} \times \text{Kd} \times \text{BW})]$ where: BW = body weight of the receptor (kg [kilogram]) Kd = soil-to-water partition coefficient (L/kg [liters per kilogram]) TRV = Toxicity Reference Value or acceptable dose for the receptor (mg/kg BW/day [milligrams per kilogram of body weight per day]) Soil Ingestion Rate = incidental soil ingestion rate for each species (kg/kg BW/day [kilograms per kilogram of body weight per day]) Water Ingestion Rate = water ingestion rate for each species (L/kg BW/day [liters per kilogram of body weight per day])
C-Aquatic Life	IFS screening levels (SLs) are compared to Table 2 from the new Eco IMD and Table 17.
Additional Notes:	- Chemical groups identified as data gaps for the Siltronic GSA (pest/herb, PCBs, dioxins/furans) are not included - PAHs: Where an individual PAH did not have an RBC, or where the individual PAH RBC was lower than the total LPAH or HPAH RBC, the total LPAH or HPAH value was used (e.g. Naphthalene for Invertebrates). - Manganese and TPH values for Aquatic Life represent DEQ permit values and not a risk based concentrations.

Column Descriptions

Sheet: A-Soils	
chemical_group	Chemical group of contaminant, e.g. metal, VOC, SVOC, PAH, etc.
chemical_name	Chemical name of contaminant.
CASRN	CAS Registry Number, includes some text fields for sums, such as Total_DDX
Media	Media, includes soil or water
RBC_type	Type of RBC, includes major receptor (Bird, Mammal, Invertebrate, Plant)
RBC_unit	Units for the RBC or SLV
IFS_SLV	The value for the final ecological screening level in surface soils in the IFS.
RBC_NR_Table1a	The value of the 2020 Eco-risk IMD Table 1a risk-based concentration (RBC).

Sheet: B-Wildlife Water Ingestion	
chemical_group	Chemical group of contaminant, e.g. metal, VOC, SVOC, PAH, etc.
chemical_name	Chemical name of contaminant.
CASRN	CAS Registry Number, includes some text fields for sums, such as Total_DDX
RBC_unit	Units for the RBC or SLV
IFS_SLV	The value of the IFS screening level (SLV).
RBC_NR_Table1b	The value of the 2020 Eco-risk IMD Table 1b risk-based concentration (RBC).
RBC_type_Table1b	The receptor for the 2020 Eco-risk IMD Table 1b. Values include Bird, or Mammal.
Table17_value	The value of the Portland Harbor Table 17.
Table16_YN	Whether or not the chemical is on Portland Harbor ROD Table 16. Options include "Yes", "No"

Sheet: C-Aquatic Life

chemical_group	Chemical group of contaminant, e.g. metal, VOC, SVOC, PAH, etc.
chemical_name	Chemical name of contaminant.
CASRN	CAS Registry Number, includes some text fields for sums, such as Total_DDX
RBC_unit	Units for the RBC or SLV
IFS_SLV	The value of the IFS screening level (SLV).
RBC_NR_Table2_AqLf	The value of the 2020 Eco-risk IMD Table 2 risk-based concentration (RBC).
Tbl2_Aq_Wdlf	Detailed information on which receptor SLV refers to for the Eco-IMD value.
Table17_value	The value of the Portland Harbor Table 17.
Table16_YN	Whether or not the chemical is on Portland Harbor ROD Table 16. Options include "Yes", "No"

chemical_group	chemical_name	CASRN	Media	RBC_type	RBC_unit	IFS_SLV	RBC_NR_Table1a ¹
CONV	SULFIDE	18496-25-8	soil	Birds	mg/kg		
CONV	SULFIDE	18496-25-8	soil	Inverts	mg/kg		
CONV	SULFIDE	18496-25-8	soil	Mammals	mg/kg	0.0179	
CONV	SULFIDE	18496-25-8	soil	Plants	mg/kg		
CONV	CYANIDE	57-12-5	soil	Birds	mg/kg		0.98
CONV	CYANIDE	57-12-5	soil	Inverts	mg/kg		
CONV	CYANIDE	57-12-5	soil	Mammals	mg/kg	6.65	1700
CONV	CYANIDE	57-12-5	soil	Plants	mg/kg		
MET	ALUMINUM (TOXIC IF SOIL PH <5.5)	7429-90-5	soil	Birds	mg/kg	2250	TOXIC IF SOIL PH <5.5
MET	ALUMINUM (TOXIC IF SOIL PH <5.5)	7429-90-5	soil	Inverts	mg/kg	600	TOXIC IF SOIL PH <5.5
MET	ALUMINUM (TOXIC IF SOIL PH <5.5)	7429-90-5	soil	Mammals	mg/kg	535	TOXIC IF SOIL PH <5.5
MET	ALUMINUM (TOXIC IF SOIL PH <5.5)	7429-90-5	soil	Plants	mg/kg	50	TOXIC IF SOIL PH <5.5
MET	IRON (TOXIC IF SOIL PH <5 OR > 8)	7439-89-6	soil	Birds	mg/kg		TOXIC IF SOIL PH <5 OR > 8
MET	IRON (TOXIC IF SOIL PH <5 OR > 8)	7439-89-6	soil	Inverts	mg/kg	200	TOXIC IF SOIL PH <5 OR > 8
MET	IRON (TOXIC IF SOIL PH <5 OR > 8)	7439-89-6	soil	Mammals	mg/kg		TOXIC IF SOIL PH <5 OR > 8
MET	IRON (TOXIC IF SOIL PH <5 OR > 8)	7439-89-6	soil	Plants	mg/kg	10	TOXIC IF SOIL PH <5 OR > 8
MET	LEAD	7439-92-1	soil	Birds	mg/kg	55	23
MET	LEAD	7439-92-1	soil	Inverts	mg/kg	1700	1700
MET	LEAD	7439-92-1	soil	Mammals	mg/kg	280	170
MET	LEAD	7439-92-1	soil	Plants	mg/kg	120	120
MET	MANGANESE	7439-96-5	soil	Birds	mg/kg	21500	2700
MET	MANGANESE	7439-96-5	soil	Inverts	mg/kg	450	450
MET	MANGANESE	7439-96-5	soil	Mammals	mg/kg	20000	5400
MET	MANGANESE	7439-96-5	soil	Plants	mg/kg	220	220
MET	MERCURY	7439-97-6	soil	Birds	mg/kg	7.5	0.13
MET	MERCURY	7439-97-6	soil	Inverts	mg/kg	0.1	0.05
MET	MERCURY	7439-97-6	soil	Mammals	mg/kg	365	17
MET	MERCURY	7439-97-6	soil	Plants	mg/kg	0.3	34
MET	NICKEL	7440-02-0	soil	Birds	mg/kg	1050	81
MET	NICKEL	7440-02-0	soil	Inverts	mg/kg	280	280
MET	NICKEL	7440-02-0	soil	Mammals	mg/kg	650	21
MET	NICKEL	7440-02-0	soil	Plants	mg/kg	38	38
MET	THALLIUM	7440-28-0	soil	Birds	mg/kg		45
MET	THALLIUM	7440-28-0	soil	Inverts	mg/kg		
MET	THALLIUM	7440-28-0	soil	Mammals	mg/kg	5	4.2
MET	THALLIUM	7440-28-0	soil	Plants	mg/kg	1	0.05
MET	TITANIUM	7440-32-6	soil	Birds	mg/kg		
MET	TITANIUM	7440-32-6	soil	Inverts	mg/kg	1000	
MET	TITANIUM	7440-32-6	soil	Mammals	mg/kg	360	770
MET	TITANIUM	7440-32-6	soil	Plants	mg/kg		
MET	ANTIMONY	7440-36-0	soil	Birds	mg/kg		
MET	ANTIMONY	7440-36-0	soil	Inverts	mg/kg	78	78
MET	ANTIMONY	7440-36-0	soil	Mammals	mg/kg	1.35	2.7
MET	ANTIMONY	7440-36-0	soil	Plants	mg/kg	5	11
MET	ARSENIC	7440-38-2	soil	Birds	mg/kg	215	32
MET	ARSENIC	7440-38-2	soil	Inverts	mg/kg	60	6.8
MET	ARSENIC	7440-38-2	soil	Mammals	mg/kg	230	31
MET	ARSENIC	7440-38-2	soil	Plants	mg/kg	18	18
MET	CADMIUM	7440-43-9	soil	Birds	mg/kg	3.85	1.6
MET	CADMIUM	7440-43-9	soil	Inverts	mg/kg	140	140
MET	CADMIUM	7440-43-9	soil	Mammals	mg/kg	1.8	4
MET	CADMIUM	7440-43-9	soil	Plants	mg/kg	32	32
MET	CHROMIUM	7440-47-3	soil	Birds	mg/kg	130	73
MET	CHROMIUM	7440-47-3	soil	Inverts	mg/kg	0.4	
MET	CHROMIUM	7440-47-3	soil	Mammals	mg/kg	170	1600
MET	CHROMIUM	7440-47-3	soil	Plants	mg/kg		
MET	COBALT	7440-48-4	soil	Birds	mg/kg	600	170
MET	COBALT	7440-48-4	soil	Inverts	mg/kg	1000	
MET	COBALT	7440-48-4	soil	Mammals	mg/kg	1150	640
MET	COBALT	7440-48-4	soil	Plants	mg/kg	13	13
MET	COPPER	7440-50-8	soil	Birds	mg/kg	140	43
MET	COPPER	7440-50-8	soil	Inverts	mg/kg	80	80
MET	COPPER	7440-50-8	soil	Mammals	mg/kg	245	70
MET	COPPER	7440-50-8	soil	Plants	mg/kg	70	70
MET	VANADIUM	7440-62-2	soil	Birds	mg/kg	39	9.5
MET	VANADIUM	7440-62-2	soil	Inverts	mg/kg		
MET	VANADIUM	7440-62-2	soil	Mammals	mg/kg	1400	610
MET	VANADIUM	7440-62-2	soil	Plants	mg/kg	2	60
MET	ZINC	7440-66-6	soil	Birds	mg/kg	230	120
MET	ZINC	7440-66-6	soil	Inverts	mg/kg	120	120
MET	ZINC	7440-66-6	soil	Mammals	mg/kg	395	980
MET	ZINC	7440-66-6	soil	Plants	mg/kg	160	160
PAH	ANTHRACENE	120-12-7	soil	Birds	mg/kg		67
PAH	ANTHRACENE	120-12-7	soil	Inverts	mg/kg	29	29
PAH	ANTHRACENE	120-12-7	soil	Mammals	mg/kg	500	540
PAH	ANTHRACENE	120-12-7	soil	Plants	mg/kg		6.8
PAH	PYRENE	129-00-0	soil	Birds	mg/kg		0.55
PAH	PYRENE	129-00-0	soil	Inverts	mg/kg	18	10
PAH	PYRENE	129-00-0	soil	Mammals	mg/kg	5.5	5.9
PAH	PYRENE	129-00-0	soil	Plants	mg/kg		
PAH	BENZO(G,H,I)PERYLENE	191-24-2	soil	Birds	mg/kg		0.55
PAH	BENZO(G,H,I)PERYLENE	191-24-2	soil	Inverts	mg/kg	18	18
PAH	BENZO(G,H,I)PERYLENE	191-24-2	soil	Mammals	mg/kg	5.5	5.9
PAH	BENZO(G,H,I)PERYLENE	191-24-2	soil	Plants	mg/kg		
PAH	INDENO(1,2,3-C,D)PYRENE	193-39-5	soil	Birds	mg/kg		0.55
PAH	INDENO(1,2,3-C,D)PYRENE	193-39-5	soil	Inverts	mg/kg	18	18
PAH	INDENO(1,2,3-C,D)PYRENE	193-39-5	soil	Mammals	mg/kg	5.5	5.9
PAH	INDENO(1,2,3-C,D)PYRENE	193-39-5	soil	Plants	mg/kg		
PAH	BENZO(B)FLUORANTHENE	205-99-2	soil	Birds	mg/kg		0.55
PAH	BENZO(B)FLUORANTHENE	205-99-2	soil	Inverts	mg/kg	18	18
PAH	BENZO(B)FLUORANTHENE	205-99-2	soil	Mammals	mg/kg	5.5	5.9
PAH	BENZO(B)FLUORANTHENE	205-99-2	soil	Plants	mg/kg		18
PAH	FLUORANTHENE	206-44-0	soil	Birds	mg/kg		0.55
PAH	FLUORANTHENE	206-44-0	soil	Inverts	mg/kg	18	10
PAH	FLUORANTHENE	206-44-0	soil	Mammals	mg/kg	5.5	5.9
PAH	FLUORANTHENE	206-44-0	soil	Plants	mg/kg		
PAH	BENZO(K)FLUORANTHENE	207-08-9	soil	Birds	mg/kg		0.55
PAH	BENZO(K)FLUORANTHENE	207-08-9	soil	Inverts	mg/kg	18	18
PAH	BENZO(K)FLUORANTHENE	207-08-9	soil	Mammals	mg/kg	5.5	5.9
PAH	BENZO(K)FLUORANTHENE	207-08-9	soil	Plants	mg/kg		
PAH	ACENAPHTHYLENE	208-96-8	soil	Birds	mg/kg		67
PAH	ACENAPHTHYLENE	208-96-8	soil	Inverts	mg/kg	29	29
PAH	ACENAPHTHYLENE	208-96-8	soil	Mammals	mg/kg	500	540
PAH	ACENAPHTHYLENE	208-96-8	soil	Plants	mg/kg		
PAH	CHRYSENE	218-01-9	soil	Birds	mg/kg		0.55
PAH	CHRYSENE	218-01-9	soil	Inverts	mg/kg	18	18
PAH	CHRYSENE	218-01-9	soil	Mammals	mg/kg	5.5	5.9
PAH	CHRYSENE	218-01-9	soil	Plants	mg/kg		
PAH	BENZO(A)PYRENE	50-32-8	soil	Birds	mg/kg		0.55
PAH	BENZO(A)PYRENE	50-32-8	soil	Inverts	mg/kg	18	18
PAH	BENZO(A)PYRENE	50-32-8	soil	Mammals	mg/kg	5.5	5.9
PAH	BENZO(A)PYRENE	50-32-8	soil	Plants	mg/kg		
PAH	DIBENZO(A,H)ANTHRACENE	53-70-3	soil	Birds	mg/kg		0.55
PAH	DIBENZO(A,H)ANTHRACENE	53-70-3	soil	Inverts	mg/kg	18	18
PAH	DIBENZO(A,H)ANTHRACENE	53-70-3	soil	Mammals	mg/kg	5.5	5.9
PAH	DIBENZO(A,H)ANTHRACENE	53-70-3	soil	Plants	mg/kg		
PAH	BENZO(A)ANTHRACENE	56-55-3	soil	Birds	mg/kg		0.55

Iron not on Table 1a of IMD

Benzo(k)flouranthene not on Table 1a of IMD

PAH	BENZO(A)ANTHRACENE	56-55-3	soil	Inverts	mg/kg	18	18
PAH	BENZO(A)ANTHRACENE	56-55-3	soil	Mammals	mg/kg	5.5	5.9
PAH	BENZO(A)ANTHRACENE	56-55-3	soil	Plants	mg/kg		18
PAH	ACENAPHTHENE	83-32-9	soil	Birds	mg/kg		67
PAH	ACENAPHTHENE	83-32-9	soil	Inverts	mg/kg	29	29
PAH	ACENAPHTHENE	83-32-9	soil	Mammals	mg/kg	500	540
PAH	ACENAPHTHENE	83-32-9	soil	Plants	mg/kg	20	0.25
PAH	PHENANTHRENE	85-01-8	soil	Birds	mg/kg		67
PAH	PHENANTHRENE	85-01-8	soil	Inverts	mg/kg	29	5.5
PAH	PHENANTHRENE	85-01-8	soil	Mammals	mg/kg	500	110
PAH	PHENANTHRENE	85-01-8	soil	Plants	mg/kg		
PAH	FLUORENE	86-73-7	soil	Birds	mg/kg		67
PAH	FLUORENE	86-73-7	soil	Inverts	mg/kg	29	3.7
PAH	FLUORENE	86-73-7	soil	Mammals	mg/kg	500	510
PAH	FLUORENE	86-73-7	soil	Plants	mg/kg		
PAH	1-METHYLNAPHTHALENE	90-12-0	soil	Birds	mg/kg		67
PAH	1-METHYLNAPHTHALENE	90-12-0	soil	Inverts	mg/kg	29	29
PAH	1-METHYLNAPHTHALENE	90-12-0	soil	Mammals	mg/kg	500	540
PAH	1-METHYLNAPHTHALENE	90-12-0	soil	Plants	mg/kg		
PAH	NAPHTHALENE	91-20-3	soil	Birds	mg/kg		34
PAH	NAPHTHALENE	91-20-3	soil	Inverts	mg/kg	29	29
PAH	NAPHTHALENE	91-20-3	soil	Mammals	mg/kg	500	27
PAH	NAPHTHALENE	91-20-3	soil	Plants	mg/kg	10	1
PAH	2-METHYLNAPHTHALENE	91-57-6	soil	Birds	mg/kg		67
PAH	2-METHYLNAPHTHALENE	91-57-6	soil	Inverts	mg/kg	29	29
PAH	2-METHYLNAPHTHALENE	91-57-6	soil	Mammals	mg/kg	500	160
PAH	2-METHYLNAPHTHALENE	91-57-6	soil	Plants	mg/kg		
PAH	TOTAL HPAH (GASCO 9 OF 17) (U=1/2 TOTALED, QUALIFIED)	Total_HPAH	soil	Birds	mg/kg		0.55
PAH	TOTAL HPAH (GASCO 9 OF 17) (U=1/2 TOTALED, QUALIFIED)	Total_HPAH	soil	Inverts	mg/kg	18	18
PAH	TOTAL HPAH (GASCO 9 OF 17) (U=1/2 TOTALED, QUALIFIED)	Total_HPAH	soil	Mammals	mg/kg	5.5	5.9
PAH	TOTAL HPAH (GASCO 9 OF 17) (U=1/2 TOTALED, QUALIFIED)	Total_HPAH	soil	Plants	mg/kg		
PAH	TOTAL LPAH (GASCO 8 OF 17) (U=1/2 TOTALED, QUALIFIED)	Total_LPAH	soil	Birds	mg/kg		67
PAH	TOTAL LPAH (GASCO 8 OF 17) (U=1/2 TOTALED, QUALIFIED)	Total_LPAH	soil	Inverts	mg/kg	29	29
PAH	TOTAL LPAH (GASCO 8 OF 17) (U=1/2 TOTALED, QUALIFIED)	Total_LPAH	soil	Mammals	mg/kg	500	540
PAH	TOTAL LPAH (GASCO 8 OF 17) (U=1/2 TOTALED, QUALIFIED)	Total_LPAH	soil	Plants	mg/kg		
VOC	ETHYLBENZENE	100-41-4	soil	Birds	mg/kg		
VOC	ETHYLBENZENE	100-41-4	soil	Inverts	mg/kg		
VOC	ETHYLBENZENE	100-41-4	soil	Mammals	mg/kg	25.8	
VOC	ETHYLBENZENE	100-41-4	soil	Plants	mg/kg		
VOC	TOTAL XYLENE (U=1/2 TOTALED, QUALIFIED)	1330-20-7	soil	Birds	mg/kg		410
VOC	TOTAL XYLENE (U=1/2 TOTALED, QUALIFIED)	1330-20-7	soil	Inverts	mg/kg		
VOC	TOTAL XYLENE (U=1/2 TOTALED, QUALIFIED)	1330-20-7	soil	Mammals	mg/kg	600	1.8
VOC	TOTAL XYLENE (U=1/2 TOTALED, QUALIFIED)	1330-20-7	soil	Plants	mg/kg	100	100

Notes:

1 : RBCs identified in Table 1 of the DEQ PRG Memorandum (DEQ 20201) that are referenced as being sourced from the 2020 DEQ Ecological Risk IMD (DEQ 2020)

	RBC Inconsistent with DEQ IMD Table 1a (Ecological RBCs for soil)
	RBC Consistent with DEQ IMD Table 1a (Ecological RBCs for soil)

References:

DEQ (Oregon Department of Environmental Quality), 2020. *Conducting Ecological Risk Assessments IMD*. September 14, 2020.
 DEQ, 2021. *Contaminants of Concern, Risk-Based Criteria, and Preliminary Remediation Goals; Former Gasco Manufacturing Gas Plant Operable Unit*. December 16, 2021.

Ecological PRG Table 1
Gasco OU Ecological Surface Soil COCs

Gasco and Siltronic GSA(s) Chemicals of Concern	Analyte Group	Units	CAS No.	Gasco GSAs Ecological COCs – Bird	Gasco GSAs Ecological COCs – Mammal	Gasco GSAs Ecological COCs – Invertebrate	Gasco GSAs Ecological COCs – Plant	Siltronic GSA Ecological COCs – Bird	Siltronic GSA Ecological COCs – Mammal	Siltronic GSA Ecological COCs – Invertebrate	Siltronic GSA Ecological COCs – Plant	Notes
Cyanide, total	Conv	mg/kg	57-12-5	--	X	--	--	--	X	--	--	1
Sulfide	Conv	mg/kg	18496-25-8	--	X	--	--	--	o	--	--	1
Aluminum	Metals	mg/kg	7429-90-5	--	--	--	--	--	--	--	--	2
Antimony	Metals	mg/kg	7440-36-0	--	X	o	X	--	X	o	o	
Arsenic	Metals	mg/kg	7440-38-2	o	o	o	X	o	o	o	o	
Cadmium	Metals	mg/kg	7440-43-9	o	X	o	o	o	X	o	o	
Chromium	Metals	mg/kg	7440-47-3	o	o	X	--	o	o	X	--	
Copper	Metals	mg/kg	7440-50-8	o	o	X	X	o	o	o	o	
Iron	Metals	mg/kg	7439-89-6	--	--	X	X	--	--	X	X	
Lead	Metals	mg/kg	7439-92-1	X	o	o	X	X	o	o	X	
Manganese	Metals	mg/kg	7439-96-5	--	--	--	--	--	--	--	--	2
Mercury	Metals	mg/kg	7439-97-6	o	o	X	X	o	o	X	o	
Nickel	Metals	mg/kg	7440-02-0	o	o	X	X	o	o	o	o	
Thallium	Metals	mg/kg	7440-28-0	--	X	--	X	--	NT	--	NT	
Vanadium	Metals	mg/kg	7440-62-2	o	o	--	o	X	o	--	X	
Zinc	Metals	mg/kg	7440-66-6	X	o	o	X	X	X	X	X	
1-Methylnaphthalene	PAH	µg/kg	90-12-0	--	X	X	--	--	o	o	--	
2-Methylnaphthalene	PAH	µg/kg	91-57-6	--	X	X	--	--	o	o	--	
Acenaphthene	PAH	µg/kg	83-32-9	--	o	X	X	--	o	o	o	
Acenaphthylene	PAH	µg/kg	208-96-8	--	o	X	--	--	o	o	--	
Anthracene	PAH	µg/kg	120-12-7	--	X	X	--	--	o	o	--	
Benz(a)anthracene	PAH	µg/kg	56-55-3	--	X	X	--	--	o	o	--	
Benzo(a)pyrene	PAH	µg/kg	50-32-8	--	X	X	--	--	o	o	--	
Benzo(b)fluoranthene	PAH	µg/kg	205-99-2	--	X	X	--	--	o	o	--	
Benzo(g,h,i)perylene	PAH	µg/kg	191-24-2	--	X	X	--	--	o	o	--	
Benzo(k)fluoranthene	PAH	µg/kg	207-08-9	--	X	X	--	--	o	o	--	
Chrysene	PAH	µg/kg	218-01-9	--	X	X	--	--	o	o	--	
Dibenz(a,h)anthracene	PAH	µg/kg	53-70-3	--	X	X	--	--	o	o	--	
Fluoranthene	PAH	µg/kg	206-44-0	--	X	X	--	--	o	o	--	
Fluorene	PAH	µg/kg	86-73-7	--	o	X	--	--	o	o	--	
Indeno(1,2,3-c,d)pyrene	PAH	µg/kg	193-39-5	--	X	X	--	--	o	o	--	
Naphthalene	PAH	µg/kg	91-20-3	--	X	X	X	--	o	o	o	
Phenanthrene	PAH	µg/kg	85-01-8	--	X	X	--	--	o	o	--	
Pyrene	PAH	µg/kg	129-00-0	--	X	X	--	--	o	o	--	
Total HPAH	PAH	µg/kg	--	--	X	X	--	--	X	X	--	
Total LPAH	PAH	µg/kg	--	--	X	X	--	--	o	o	--	
Ethylbenzene	VOC	µg/kg	100-41-4	--	X	--	--	--	o	--	--	
Total Xylene	VOC	µg/kg	1330-20-7	--	o	--	X	--	o	--	o	
Gasoline-range hydrocarbons	TPH	mg/kg	8006-61-9	--	o	X	--	--	o	o	--	
Diesel-range hydrocarbons	TPH	mg/kg	68334-30-5	--	X	X	--	--	o	o	--	

Ecological PRG Table 1

Gasco OU Ecological Surface Soil COCs

Notes:

--: Not applicable

o: Contaminant analyzed in surface soil and determined to not be a COC.

X: Ecological COC for surface soil

1. No PRG required by DEQ for this COC (DEQ 2021).

2. Metal determined to be at background concentration in soil at Gasco OU.

µg/kg: microgram per kilogram

CAS: Chemical Abstracts Service

COC: contaminant of concern

CONV: conventional

DEQ: Oregon Department of Environmental Quality

GSA: geographic subarea

HPAH: high-molecular-weight polycyclic aromatic hydrocarbon

LPAH: low-molecular-weight polycyclic aromatic hydrocarbon

mg/kg: milligram per kilogram

NT: not tested

OU: operable unit

PAH: polycyclic aromatic hydrocarbon

PRG: preliminary remediation goal

Siltronic: Siltronic Corporation

TPH: total petroleum hydrocarbons

VOC: volatile organic compound

Reference:

DEQ (Oregon Department of Environmental Quality), 2021. *Contaminants of Concern, Risk-Based Criteria, and Preliminary Remediation Goals; Former Gasco Manufacturing Gas Plant Operable Unit*. December 16, 2021.

Ecological PRG Table 2

Gasco OU Ecological Surface Soil PRGs

Gasco and Siltronic GSA(s) Chemicals of Concern	Analyte Group	Units	CAS No.	Gasco OU Ecological PRGs – Bird ¹	Gasco OU Ecological PRGs – Mammal ¹	Gasco OU Ecological PRGs – Invertebrate ¹	Gasco OUs Ecological PRGs – Plant ¹	Portland Basin Background Value ²	Natural Background Value	Notes
Cyanide, total	Conv	mg/kg	57-12-5	--	--	--	--	--	--	4
Sulfide	Conv	mg/kg	18496-25-8	--	--	--	--	--	--	4
Aluminum	Metals	mg/kg	7429-90-5	--	--	--	--	--	52,300 ³	5
Antimony	Metals	mg/kg	7440-36-0	--	2.7	78	11	0.56	--	
Arsenic	Metals	mg/kg	7440-38-2	32	31	8.8*	18	8.8	--	
Cadmium	Metals	mg/kg	7440-43-9	1.6	4	140	32	0.63	--	
Chromium	Metals	mg/kg	7440-47-3	73	1,600	76*	--	76	--	
Copper	Metals	mg/kg	7440-50-8	43	70	80	70	34	--	
Iron	Metals	mg/kg	7439-89-6	--	--	36,100*	36100*	--	36,100 ³	
Lead	Metals	mg/kg	7439-92-1	79*	170	1,700	120	79	--	
Manganese	Metals	mg/kg	7439-96-5	--	--	--	--	1,800	--	5
Mercury	Metals	mg/kg	7439-97-6	0.23*	17	0.23*	34	0.23	--	
Nickel	Metals	mg/kg	7440-02-0	81	47*	280	47*	47	--	
Thallium	Metals	mg/kg	7440-28-0	45	5.2*	--	5.2*	5.2	--	
Vanadium	Metals	mg/kg	7440-62-2	180*	610	--	180*	180	--	
Zinc	Metals	mg/kg	7440-66-6	180*	980	180*	180*	180	--	
1-Methylnaphthalene	PAH	µg/kg	90-12-0	--	500,000	29,000	--	--	--	
2-Methylnaphthalene	PAH	µg/kg	91-57-6	--	160,000	29,000	--	--	--	
Acenaphthene	PAH	µg/kg	83-32-9	--	1,300,000	29,000	250	--	--	
Acenaphthylene	PAH	µg/kg	208-96-8	--	1,200,000	29,000	--	--	--	
Anthracene	PAH	µg/kg	120-12-7	--	2,100,000	29,000	6,800	--	--	
Benz(a)anthracene	PAH	µg/kg	56-55-3	7,300	34,000	18,000	18,000	--	--	
Benzo(a)pyrene	PAH	µg/kg	50-32-8	--	190,000	18,000	--	--	--	
Benzo(b)fluoranthene	PAH	µg/kg	205-99-2	--	440,000	18,000	18,000	--	--	
Benzo(g,h,i)perylene	PAH	µg/kg	191-24-2	--	250,000	18,000	--	--	--	
Benzo(k)fluoranthene	PAH	µg/kg	207-08-9	--	5,500	18,000	--	--	--	
Chrysene	PAH	µg/kg	218-01-9	--	31,000	18,000	--	--	--	
Dibenz(a,h)anthracene	PAH	µg/kg	53-70-3	--	140,000	18,000	--	--	--	
Fluoranthene	PAH	µg/kg	206-44-0	--	220,000	10,000	--	--	--	
Fluorene	PAH	µg/kg	86-73-7	--	510,000	3,700	--	--	--	
Indeno(1,2,3-c,d)pyrene	PAH	µg/kg	193-39-5	--	710,000	18,000	--	--	--	
Naphthalene	PAH	µg/kg	91-20-3	34,000	27,000	29,000	1,000	--	--	
Phenanthrene	PAH	µg/kg	85-01-8	--	110,000	5,500	--	--	--	
Pyrene	PAH	µg/kg	129-00-0	330,000	230,000	10,000	--	--	--	
Total HPAH	PAH	µg/kg	--	550	5,900	18,000	--	--	--	
Total LPAH	PAH	µg/kg	--	67,000	540,000	29,000	--	--	--	
Ethylbenzene	VOC	µg/kg	100-41-4	--	25,800	--	--	--	--	
Total Xylene	VOC	µg/kg	1330-20-7	410,000	1,800	--	100,000	--	--	
Gasoline-range hydrocarbons	TPH	mg/kg	8006-61-9	5,000	5,000	120	120	--	--	
Diesel/heavy oil-range hydrocarbons	TPH	mg/kg	68334-30-5	6,000	6,000	260	260	--	--	
TPH	TPH	mg/kg	--	--	--	180	--	--	--	--

Ecological PRG Table 2

Gasco OU Ecological Surface Soil PRGs

Notes:

*: RBC below background levels and the PRG is based on background level.

--: Not applicable

: Proposed ecological soil PRGs consistent with hierarchy of sources identified in DEQ's PRG memorandum (DEQ 2021).

: NW Natural has technical concerns with this PRG, and further discussions with DEQ is requested before identifying this value as an ecological soil PRG.

1. The DEQ PRG memorandum indicates that ecological soil PRGs should be selected from the values presented in Table 1 (soils) included as an attachment to the PRG memorandum. Hierarchy of sources for Ecological Soil PRGs are to apply values from DEQ's RBCs from DEQ's 2020 Eco-risk IMD Table 1a (DEQ 2020) and use of IFS SLVs (Anchor QEA 2018) for COCs without RBCs. Table 1 of the DEQ PRG memorandum references values from the DEQ's 2020 Eco-risk IMD Table 1a that are not consistent with Table 1a. The PRGs included in this table are based on the RBCs as presented in Table 1a of DEQ 2020.

2. Regional 95% UPL default background concentration, Portland Basin; from Table 4 (DEQ 2013).

3. Regional 90th percentile, Clark County, Washington; from Table 1 (Ecology 1994).

4. No PRG required by DEQ for this COC (DEQ 2021).

5. Metal determined to be at background concentration in soil at Gasco OU.

µg/kg: microgram per kilogram

CAS: Chemical Abstracts Service

COC: contaminant of concern

CONV: conventional

DEQ: Oregon Department of Environmental Quality

GSA: geographic subarea

HPAH: high-molecular-weight polycyclic aromatic hydrocarbon

IFS: *Interim Feasibility Study*

IMD: internal management directive

LPAH: low-molecular-weight polycyclic aromatic hydrocarbon

mg/kg: milligram per kilogram

OU: operable unit

PAH: polycyclic aromatic hydrocarbon

PRG: preliminary remediation goal

RBC: risk based concentration

Siltronic: Siltronic Corporation

SLV: screening level value

TPH: total petroleum hydrocarbons

UPL: upper prediction limit

VOC: volatile organic compound

References:

Anchor QEA (Anchor QEA, LLC), 2018. *Interim Feasibility Study*. Gasco OU. Prepared for NW Natural. November 21, 2018.

DEQ (Oregon Department of Environmental Quality), 2013. *Development of Oregon Background Metals Concentrations in Soil*. Technical Report. Land Quality Division, Cleanup Program. March 2013.

DEQ, 2020. *Conducting Ecological Risk Assessments IMD*. September 14, 2020.

DEQ, 2021. *Contaminants of Concern, Risk-Based Criteria, and Preliminary Remediation Goals; Former Gasco Manufacturing Gas Plant Operable Unit*. December 16, 2021.

Ecology (Washington State Department of Ecology), 1994. *Natural Background Soil Metal Concentrations in Washington State*. Publication No. 94-115. October 1994.