

**Ecological PRG Table 1**  
**Gasco OU Ecological Surface Soil COCs**

Gasco and Siltronic GSA(s) Ecological Surface Soil Contaminants of Concern <sup>1</sup>	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	--	--	2
Sulfide	Conv	mg/kg	18496-25-8	--	X	--	--	--	o	--	--	2
Aluminum	Metals	mg/kg	7429-90-5	--	--	--	--	--	--	--	--	3
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	--	--	--	--	--	--	--	--	3
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. COCs listed have at least one exceedance ratio greater than 1 in surface soil within ecological exposure areas of the Gasco OU.

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

3. 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) Ecological Surface Soil Contaminants of Concern	Analyte Group	Units	CAS No.	Gasco OU Ecological PRGs – Bird <sup>1</sup>	Gasco OU Ecological PRGs – Mammal <sup>1</sup>	Gasco OU Ecological PRGs – Invertebrate <sup>1</sup>	Gasco OUs Ecological PRGs – Plant <sup>1</sup>	Portland Basin Background Value <sup>2</sup>	Natural Background Value	Notes	Gasco OU Ecological Soil PRGs <sup>6</sup>	Gasco OU Ecological Soil Hot Spot Level <sup>7</sup>
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 <sup>3</sup>	5	--	--
Antimony	Metals	mg/kg	7440-36-0	--	2.7	78	11	0.381	--	--	2.7	27
Arsenic	Metals	mg/kg	7440-38-2	32	31	6.8	18	6.728	--	--	6.8	68
Cadmium	Metals	mg/kg	7440-43-9	1.6	4	140	32	0.565	--	--	1.6	16
Chromium	Metals	mg/kg	7440-47-3	73	1,600	--	--	63.05	--	--	73	730
Copper	Metals	mg/kg	7440-50-8	43	70	80	70	31.81	--	--	43	430
Iron	Metals	mg/kg	7439-89-6	--	--	36,100*	36,100*	--	36,100 <sup>3</sup>	--	36,100 <sup>8</sup>	360,100
Lead	Metals	mg/kg	7439-92-1	56.22*	170	1,700	120	56.22	--	--	56.22	230
Manganese	Metals	mg/kg	7439-96-5	--	--	--	--	1,383	--	5	--	--
Mercury	Metals	mg/kg	7439-97-6	0.174*	17	0.174*	34	0.174	--	--	0.174	0.5
Nickel	Metals	mg/kg	7440-02-0	81	34.4*	280	38	34.4	--	--	34.4	210
Thallium	Metals	mg/kg	7440-28-0	45	4.962*	--	4.962*	4.962	--	--	4.962	0.5
Vanadium	Metals	mg/kg	7440-62-2	165.7*	610	--	165.7*	165.7	--	--	165.7	950
Zinc	Metals	mg/kg	7440-66-6	124.1*	980	124.1*	160	124.1	--	--	124.1	1,200
1-Methylnaphthalene	PAH	µg/kg	90-12-0	--	--	--	--	--	--	--	--	--
2-Methylnaphthalene	PAH	µg/kg	91-57-6	--	--	--	--	--	--	--	--	--
Acenaphthene	PAH	µg/kg	83-32-9	--	--	--	250	--	--	--	250	2,500
Acenaphthylene	PAH	µg/kg	208-96-8	--	--	--	--	--	--	--	--	--
Anthracene	PAH	µg/kg	120-12-7	--	--	--	6,800	--	--	--	6,800	68,000
Benz(a)anthracene	PAH	µg/kg	56-55-3	--	--	--	18,000	--	--	--	18,000	180,000
Benzo(a)pyrene	PAH	µg/kg	50-32-8	--	--	--	--	--	--	--	--	--
Benzo(b)fluoranthene	PAH	µg/kg	205-99-2	--	--	--	18,000	--	--	--	18,000	180,000
Benzo(g,h,i)perylene	PAH	µg/kg	191-24-2	--	--	--	--	--	--	--	--	--
Benzo(k)fluoranthene	PAH	µg/kg	207-08-9	--	--	--	--	--	--	--	--	--
Chrysene	PAH	µg/kg	218-01-9	--	--	--	--	--	--	--	--	--
Dibenz(a,h)anthracene	PAH	µg/kg	53-70-3	--	--	--	--	--	--	--	--	--
Fluoranthene	PAH	µg/kg	206-44-0	--	--	--	--	--	--	--	--	--
Fluorene	PAH	µg/kg	86-73-7	--	--	--	--	--	--	--	--	--
Indeno(1,2,3-c,d)pyrene	PAH	µg/kg	193-39-5	--	--	--	--	--	--	--	--	--
Naphthalene	PAH	µg/kg	91-20-3	--	--	--	1,000	--	--	--	1,000	10,000
Phenanthrene	PAH	µg/kg	85-01-8	--	--	--	--	--	--	--	--	--
Pyrene	PAH	µg/kg	129-00-0	--	--	--	--	--	--	--	--	--
Total HPAH	PAH	µg/kg	--	900 <sup>9</sup>	5590 <sup>9</sup>	18,000	--	--	--	--	900 <sup>9</sup>	9,000
Total LPAH	PAH	µg/kg	--	67,000	540,000	29,000	--	--	--	--	29,000	290,000
Ethylbenzene	VOC	µg/kg	100-41-4	--	25,800	--	--	--	--	--	25,800	258,000
Total Xylene	VOC	µg/kg	1330-20-7	410,000	1,800	--	100,000	--	--	--	1,800	18,000
TPH (Former Spent Oxide Area RA-1)	TPH	mg/kg	--	--	--	197	--	--	--	10	197	1,970
TPH (Former Lampblack Storage Area RA-2)	TPH	mg/kg	--	--	--	216	--	--	--	10	216	2,160

**Ecological PRG Table 2**

**Gasco OU Ecological Surface Soil PRGs**

Gasco and Siltronic GSA(s) Ecological Surface Soil Contaminants of Concern	Analyte Group	Units	CAS No.	Gasco OU Ecological PRGs – Bird <sup>1</sup>	Gasco OU Ecological PRGs – Mammal <sup>1</sup>	Gasco OU Ecological PRGs – Invertebrate <sup>1</sup>	Gasco OUs Ecological PRGs – Plant <sup>1</sup>	Portland Basin Background Value <sup>2</sup>	Natural Background Value	Notes	Gasco OU Ecological Soil PRGs <sup>6</sup>	Gasco OU Ecological Soil Hot Spot Level <sup>7</sup>
TPH (Former Tar Settling Pond Area RA-3)	TPH	mg/kg	--	--	--	214	--	--	--	10	214	2,140
TPH (Former Koppers Land Disposal Area RA-4)	TPH	mg/kg	--	--	--	205	--	--	--	10	205	2,050
TPH (Former Naphthalene Plant Area RA-5)	TPH	mg/kg	--	--	--	185	--	--	--	10	185	1,850

Notes:

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

--: Not applicable

- The DEQ PRG memorandum indicates that ecological soil PRGs should be selected from the values presented in Table A (soils) included as an attachment to the PRG memorandum (DEQ 2021). 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.
- Regional 90th percentile background concentration, Portland Basin; from Table 3 (DEQ 2013).
- Regional 90th percentile, Clark County, Washington; from Table 1 (Ecology 1994).
- No PRG required by DEQ for this COC (DEQ 2021).
- Metal determined to be at background concentration in soil at Gasco OU. No PRG necessary.
- Ecological Soil PRG selected based on systematic comparative approach used for the IFS (Anchor QEA 2018).
- Ecological soil hot spot level per OAR 340-122-0115 (32) (b) (A) (iii)
- Surface soil data for iron would exceed this PRG if detected concentration exceeds 36,100 mg/kg PRG and soil pH is <5 or >8.
- NW Natural calculated population-based ground-feeding bird and mammal HPAH RBC based on parameters provided by DEQ.
- Site-specific TPH RBCs will be applied consistent with the RI/HERA Addendum (Anchor QEA 2019) and as discussed and approved by DEQ on June 27, 2023.

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

OAR: Oregon Administrative Rule

OU: operable unit

PAH: polycyclic aromatic hydrocarbon

PRG: preliminary remediation goal

RBC: risk based concentration

RI/HERA Addendum: *Remedial Investigation/Human Health and Ecological Risk Assessment Addendum for the Siltronic GSA*

Siltronic: Siltronic Corporation

SLV: screening level value

TPH: total petroleum hydrocarbons

VOC: volatile organic compound

References:

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

Anchor QEA, 2019. *Remedial Investigation/Human Health and Ecological Risk Assessment Addendum for the Siltronic GSA*. November 22, 2019

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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.