

Grad, Andrea E.

From: Kenny, Ann [AKEN461@ECY.WA.GOV]
Sent: Saturday, October 13, 2001 11:41 AM
To: Grad, Andrea E.
Subject: FW: SeaTac

Hellwig
EXHIBIT NO. *102*
1-8-02
M. Green



Clean Fill Criteria
for 401 Ce...



seatec.xls



Three-Phase
Model.xls



Hazardous
Substances.doc

Dear Ms. Grad:

I am forwarding this e-mail in response to your PDA request of October 3, 2001.

Please call me if you have any questions.

Ann Kenny
425-649-4310

> -----Original Message-----

> From: Fitzpatrick, Kevin
> Sent: Wednesday, October 03, 2001 12:25 PM
> To: Kenny, Ann
> Subject: FW: SeaTac

> Ann: This is the most recent document I have in my records related to
> Andrea Grad's request dated October 3, 2001. Kevin

> -----Original Message-----

> From: Yee, Chung K.
> Sent: Friday, September 21, 2001 11:23 AM
> To: Marchioro, Joan (ATG)
> Cc: Thompson, Craig E.; Fitzpatrick, Kevin
> Subject: FW: SeaTac

> I found the spreadsheets. This should be the last e-mail I sent to the
> NWRO detailing the fill language.

> -----Original Message-----

> From: Yee, Chung K.
> Sent: Tuesday, June 26, 2001 4:58 PM
> To: Thompson, Craig E.
> Cc: Fitzpatrick, Kevin
> Subject: SeaTac

DELIBERATIVE DOCUMENT CURRENTLY EXEMPT FROM PUBLIC

> DISCLOSURE

> Attached please find:

> 1. Draft Fill Criteria requirements for the 401 Water Quality
> Certification for the SeaTac Third Runway Embankment project.

> <<Clean Fill Criteria for 401 Certification.doc>>

> 2. Spreadsheet deriving the surface water quality criteria needed for
> the three-phase model calculations for soil cleanup levels for the
> protection of surface water.

> <<seatec.xls>>

>
> 3. Spreadsheet deriving the ground water cleanup levels, the
> three-phase model calculations for soil cleanup levels for the protection
> of ground water, and the three-phase model calculations for soil cleanup
> levels for the protection of surface water.

>
> <<Three-Phase Model.xls>>

>
> 4. A summary table showing the various soil cleanup levels, natural
> background concentrations, and PQLs.

>
> <<Hazardous Substances.doc>>

>
> The fill criteria requirements have been developed using the Amended MTCA.
> I have included relevant sections of the regulation into the development
> of the fill criteria. Specifically, I have developed fill criteria based
> on the Method A Soil Cleanup Levels (Table 740-1); derived soil cleanup
> levels using the three-phase model in WAC 173-340-747 first for the
> protection of ground water and second for the protection of surface water;
> reviewed soil concentrations presented in Table 749-2 (ecological
> standards), reviewed natural background soil metals concentrations; and
> reviewed PQL values for the metals under consideration. The listing of
> metals being proposed for the fill criteria is based on 40 CFR Part 122
> Appendix D Table III (Other Toxics Pollutants). These are required
> monitoring parameters for the NPDES program.

>
> The bases for the fill criteria are:

- >
> 1. Use Method A (Table 740-1) values if available.
> 2. If not, use the lower value of Method B, protection of either ground
> water or surface water. If Method B value is less than PQL, use PQL. If
> Method B is less than natural background, use natural background.
> 3. For the first six feet, use ecological value if it is less than
> Method B value.

>
> I have also included a ground water and surface water monitoring
> requirement in accordance with the amended MTCA. I did not incorporate any
> Institutional Control requirements since the airport access is controlled.

>
> I did not change the soil sampling schedule as proposed by the NWRO/WQP
> since I consider the TCP's guidance for petroleum-contaminated soil may
> not be applicable to this project (cost issue).

>
> Please review and comment and if possible, forward to the TCP Policy group
> for review and comment. Thanks.

Draft

E6. Borrow Sites

The use of imported fill for the proposed Third Runway embankment may result in impacts to wetlands or other waters of the state. To ensure compliance with measures designed to minimize potential impacts, the Port of Seattle shall submit borrow site clean fill certification documentation described in the following sections to the Department of Ecology for review and approval prior to fill placement.

E7. Fill Source/Documentation/Fill Criteria

The Port of Seattle shall adhere to the following conditions to ensure that the fill placed for the proposed Third Runway embankment does not contain toxic materials in toxic amounts.

E7a. Fill Sources

Fill materials for the proposed Third Runway embankment shall be limited to the following three sources:

- State-certified borrow pits
- Contractor-certified construction sites
- Port of Seattle-owned properties.

E7b. Documentation

No later than two (2) business days prior to the acceptance of fill materials for the proposed Third Runway embankment, the Port of Seattle shall submit to the Department of Ecology's Northwest Regional Office Water Quality Program for review and approval clean fill certification documentation for the proposed fill source. The documentation shall contain an environmental assessment of the fill source and shall verify the proposed fill source complies with the fill criteria. The environmental assessment shall be conducted by an environmental professional in general conformance with the American Society for Testing and Materials Standard (ASTM) E 1527-00 Standard Practice for Environmental Site Assessments: Phase I Environmental Site Assessment Process, and E 1903-97 Standard Guide for Environmental Site Assessments: Phase II Environmental Site Assessment Process. At minimum, the document shall contain the followings:

1. **Fill Source Description:** Provide a description/location of the fill source, general characteristics of the fill source and vicinity, current use, and a site plan identifying the extent of the excavation, project schedule and the estimated quantity of fill to be transported to the proposed Third Runway embankment.

2. Records Review: Obtain and review environmental records of the proposed fill source site and adjoining properties. In addition to the standard federal and local environmental record sources, the following Department of Ecology environmental databases shall be reviewed:

- Confirmed & Suspected Contaminated Site Report
- No Further Action Site List
- Underground Storage Tank List
- Leaking Underground Storage Tank List
- Site Register.

Records review shall also contain historical use information of the fill source and surrounding area to help identify the likelihood of environmental contamination.

3. Site Reconnaissance: Conduct a site visit to identify current site use and site conditions to help identify the likelihood of environmental contamination and/or the potential migration of hazardous substances onto the site from adjoining properties.
4. Fill Source Sampling: Collect and analyze fill materials for the potential contaminant(s) identified in the Phase I Environmental Site Assessment. At a minimum, fill materials from each fill source shall be analyzed for the following hazardous substances.

- Total Antimony
- Total Arsenic
- Total Beryllium
- Total Cadmium
- Total Chromium¹
- Total Copper
- Total Lead
- Total Mercury
- Total Nickel
- Total Selenium
- Total Silver
- Total Thallium
- Total Zinc
- NWTPH-HCID

¹ Chromium (VI) shall be analyzed if the results of the Phase I Environmental Site Assessment show a likelihood of Chromium (VI) contamination.

For fill sources characterization, the following table presents the minimum sampling schedule for fill sources with no likelihood of environmental contamination.

Cubic Yards	Minimum Number
-------------	----------------

of Soil	of Samples
<1,000	2
1,000 – 10,000	3
10,000 – 50,000	4
50,000 – 100,000	5
>100,000	6

Samples shall be collected at locations that are representative of the fill destined for the proposed Third Roadway embankment.

For fill sources with suspected contamination or with complex conditions, please consult with the Department of Ecology Northwest Regional Office, Water Quality Program, for the appropriate sampling requirements.

E7b. Fill Criteria

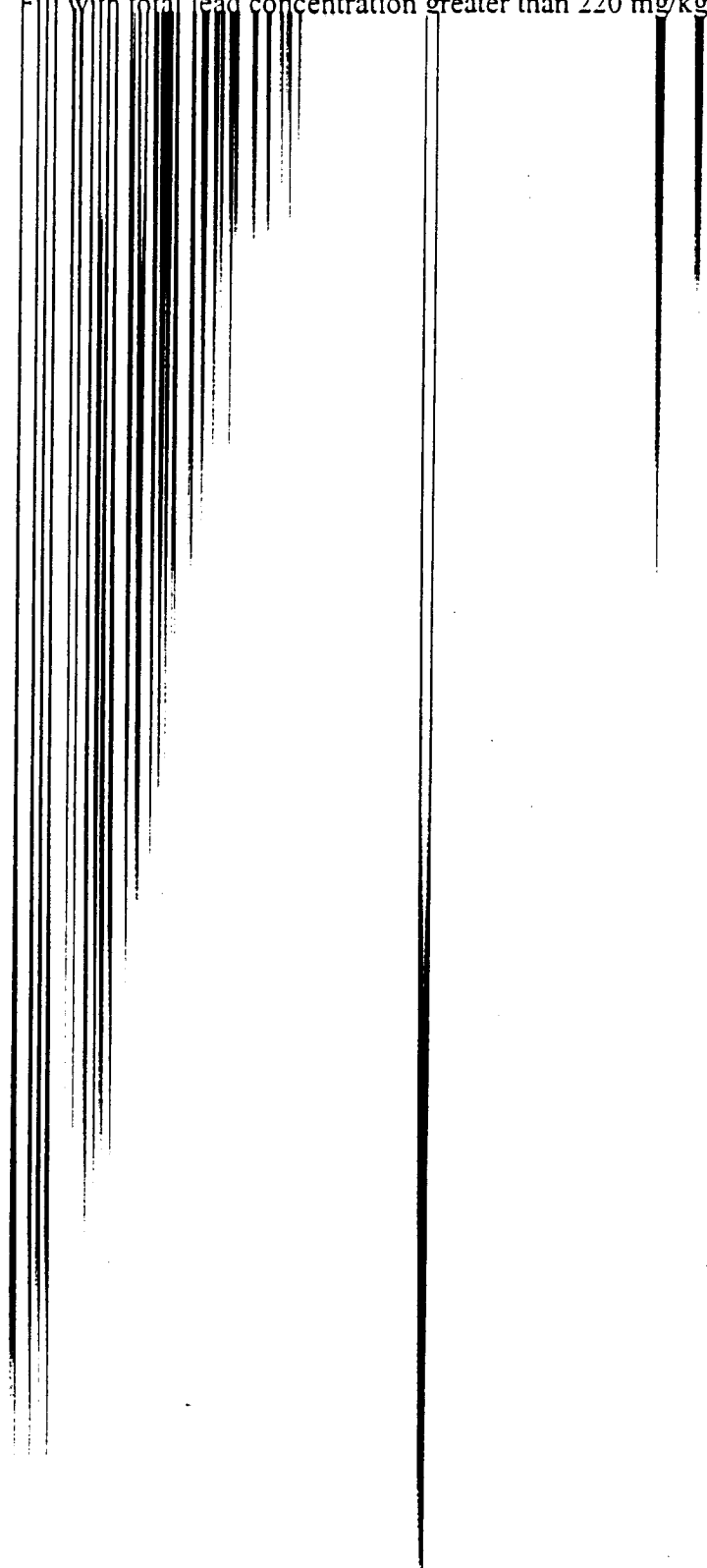
The results of the Phase II sampling and testing shall be compared to the fill criteria to determine the suitability of the fill source for the proposed Third Roadway Embankment. Presented in the following table is the fill criteria established for hazardous substances contained in Section E7b.4.

Hazardous Substances	Fill Criteria mg/kg ²
Antimony	16
Arsenic	20
Beryllium	0.6
Cadmium	2
Chromium ³	42/2000
Copper	36
Lead ⁴	220/250
Mercury	2
Nickel ⁵	100/110
Selenium	5
Silver	5
Thallium	2
Zinc	85
Gasoline	30
Diesel ⁶	460/2000
Heavy Oils	2000

² mg/kg ≡ milligrams per kilogram

3 Fill with total chromium concentration greater than 42 mg/kg and less than 2000 mg/kg may be placed to within six feet of the ground surface. No fill with total chromium concentration greater than 42 mg/kg may be placed on the first six feet of the embankment. No fill with chromium (VI) concentration greater than 19 mg/kg may be placed in the embankment.

4 Fill with total lead concentration greater than 220 mg/kg and less than 250 mg/kg



- 3 Fill with total chromium concentration greater than 42 mg/kg and less than 2000 mg/kg may be placed to within six feet of the ground surface. No fill with total chromium concentration greater than 42 mg/kg may be placed on the first six feet of the embankment. No fill with chromium (VI) concentration greater than 19 mg/kg may be placed in the embankment.
- 4 Fill with total lead concentration greater than 220 mg/kg and less than 250 mg/kg may be placed to within six feet of the ground surface. No fill with total lead concentration greater than 220 mg/kg may be placed on the first six feet of the embankment.
- 5 Fill with total nickel concentration greater than 100 mg/kg and less than 110 mg/kg may be placed to within six feet of the ground surface. No fill with total nickel concentration greater than 100 mg/kg may be placed on the first six feet of the embankment.
- 6 Fill with diesel range organics concentration greater than 460 mg/kg and less than 2000 mg/kg may be placed to within six feet of the ground surface. No fill with diesel range organics concentration greater than 460 mg/kg may be placed on the first six feet of the embankment.

For hazardous substances other than those identified in the above fill criteria table that have been identified in the Phase II Environmental Site Assessment, please consult with the Department of Ecology Northwest Regional Office, Water Quality Program, for the applicable fill criteria.

E8. As-Built Documentation

The Port of Seattle shall provide to the Department of Ecology for review quarterly summaries of:

- Fill sources placed for the previous quarter
- Quantities of fill materials from these fill sources
- Locations and elevations of fill source materials placed within the embankment.

The Department of Ecology may require additional fill conditions and/or corrective actions upon Ecology's review of the as-built documents.

E9. Post Construction Monitoring

In order to minimize the potential for migration of hazardous substances, the Department of Ecology expects the Port of Seattle to take appropriate measures to minimize precipitation and subsequent runoff coming into contact with the fill material. Furthermore, the department expects that runoff and seepage from the fill area shall be monitored for compliance with applicable Washington State surface water criteria.

Ground water down-gradient from the fill area shall be monitored for compliance with applicable ground water criteria.

Within 180 days after the issuance of the 401 Water Quality Certification for the Master Plan Update Improvements for the Seattle-Tacoma International Airport, the Port of Seattle shall submit to the Department of Ecology for review and approval a surface water and ground water monitoring plan. The monitoring plan shall be designed to detect impacts of the fill embankment to the receiving water and to the ground water during fill placement and post fill placement. In the event monitoring detected adverse impacts to the receiving water/ground water, the Department of Ecology may revise the fill criteria and may also institute corrective actions to address these impacts.

WAC 173-340-747 Deriving soil concentrations for ground water protection

SeaTac Third Runway Embankment Project

Equation 747-1 Based on the protection of ground water

Hazardous Substance	Cs mg/kg	Cw ug/liter	UCF mg/ug	DF	Kd liter/kg	Ow mL water/ mL soil	Oa mL air/ mL soil	Hcc	Pb kg/liter
Antimony (2)	5.79	6.4	0.001	20	45	0.3	0.13	0	1.5
Arsenic (1)	2.92	5	0.001	20	29	0.3	0.13	0	1.5
Beryllium (2)	0.01	0.02	0.001	20	17	0.3	0.13	0	1.5
Cadmium (1)	0.69	5	0.001	20	6.7	0.3	0.13	0	1.5
Chromium +3 (2)	2000.40	100	0.001	20	1000	0.3	0.13	0	1.5
Chromium +6 (1)	18.43	48	0.001	20	19	0.3	0.13	0	1.5
Copper (1)	262.85	592	0.001	20	22	0.3	0.13	0	1.5
Lead (1)			0.001	20	10000	0.3	0.13	0	1.5
Mercury (1)	2.09	2	0.001	20	52	0.3	0.13	0.47	1.5
Nickel (1)	417.28	320	0.001	20	65	0.3	0.13	0	1.5
Selenium (1)	8.32	80	0.001	20	5	0.3	0.13	0	1.5
Silver (2)	21.12	80	0.001	20	13	0.3	0.13	0	1.5
Thallium (2)	2.28	1.6	0.001	20	71	0.3	0.13	0	1.5
Zinc (1)	5971.20	4800	0.001	20	62	0.3	0.13	0	1.5

Kd from: (1) MTCA Table 747-3; (2) Soil Screening Guidance: Technical Background Document, 9355.4-17A, May 1996, Table 46.

Equation 747-1 Based on the protection of surface water

Hazardous Substance	Cs mg/kg	Cw ug/liter	UCF mg/ug	DF	Kd liter/kg	Ow mL water/ mL soil	Oa mL air/ mL soil	Hcc	Pb kg/liter
Antimony (2)	1446.40	1600	0.001	20	45	0.3	0.13	0	1.5
Arsenic (1)	110.96	190	0.001	20	29	0.3	0.13	0	1.5

Beryllium (2)	1.82	5.3	0.001	20	17	0.3	0.13	0	0	1.5
Cadmium (1)	0.09	0.62	0.001	20	6.7	0.3	0.13	0	0	1.5
Chromium +3 (2)	2018.40	100.9	0.001	20	1000	0.3	0.13	0	0	1.5
Chromium +6 (1)	3.84	10	0.001	20	19	0.3	0.13	0	0	1.5
Copper (1)	2.79	6.28	0.001	20	22	0.3	0.13	0	0	1.5
Lead (1)	234.00	1.17	0.001	20	10000	0.3	0.13	0	0	1.5
Mercury (1)	0.01	0.012	0.001	20	52	0.3	0.13	0.47	0	1.5
Nickel (1)	114.03	87.45	0.001	20	65	0.3	0.13	0	0	1.5
Selenium (1)	0.52	5	0.001	20	5	0.3	0.13	0	0	1.5
Silver (2)	0.28	1.05	0.001	20	13	0.3	0.13	0	0	1.5
Thallium (2)	56.96	40	0.001	20	71	0.3	0.13	0	0	1.5
Zinc (1)	72.26	58.09	0.001	20	62	0.3	0.13	0	0	1.5

Kd from: (1) MTCA Table 747-3; (2) Soil Screening Guidance: Technical Background Document, 9355.4-17A, May 1996, Table 46.
Surface water quality values derived from WQP spreadsheet using a hardness value of 50 mg/liter.

WAC 173-340-720(4)(b)(A) Standard Method B potable ground water cleanup levels - Noncarcinogens
Equation 720-1 (Ground water cleanup level for noncarcinogens)

Hazardous Substance	GWCL ug/liter	RfD mg/kg/day	ABW kg	UCF ug/mg	HQ	AT years	DWIR liter/day	INH	DWF	ED years
Antimony (1)	6.4	0.0004	16	1000	1	6	1	1	1	6
Arsenic (1)	4.8	0.0003	16	1000	1	6	1	1	1	6
Beryllium (1)	32	0.002	16	1000	1	6	1	1	1	6
Cadmium (1)	8	0.0005	16	1000	1	6	1	1	1	6
Chromium +3 (1)	24000	1.5	16	1000	1	6	1	1	1	6
Chromium +6 (1)	48	0.003	16	1000	1	6	1	1	1	6
Copper (2)	592	0.037	16	1000	1	6	1	1	1	6
Lead			16	1000	1	6	1	1	1	6
Mercury (2)	4.8	0.0003	16	1000	1	6	1	1	1	6
Nickel (2)	320	0.02	16	1000	1	6	1	1	1	6
Selenium (1)	80	0.005	16	1000	1	6	1	1	1	6
Silver (1)	80	0.005	16	1000	1	6	1	1	1	6
Thallium (2)	1.6	0.0001	16	1000	1	6	1	1	1	6
Zinc (1)	4800	0.3	16	1000	1	6	1	1	1	6

AR 017844

RfD from: (1) U.S.EPA IRIS Substance file; (2) MTCA Cleanup Levels and Risk Calculations (CLARC II) Update, February 1996

Equation 720-2 (Ground water cleanup level for carcinogens)

Hazardous Substance	GWCL ug/liter	RISK	ABW kg	AT years	UCF ug/mg	CPF kg-day/mg	DWIR liters/day	ED years	INH	DWF
Antimony										
Arsenic	0.06	0.000001	70	75	1000	1.5	2	30	1	1
Beryllium	0.02	0.000001	70	75	1000	4.3	2	30	1	1
Cadmium										
Chromium +3										
Chromium +6										
Copper										
Lead										
Mercury										
Nickel										
Selenium										
Silver										
Thallium										
Zinc										

CPF from MTCA Cleanup Levels and Risk Calculations (CLARC II) Update, February 1996

WAC 173-340-747 Deriving soil concentrations for ground water protection

SeaTac Third Runway Embankment Project

Equation 747-1 Based on the protection of ground water

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Cadmium (1)	0.69	5	0.001	20	6.7	0.3	0.13	0	1.5
Chromium +3 (2)	2000.40	100	0.001	20	1000	0.3	0.13	0	1.5
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Copper (1)	262.85	592	0.001	20	22	0.3	0.13	0	1.5
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Nickel (1)	417.28	320	0.001	20	65	0.3	0.13	0	1.5
Selenium (1)	8.32	80	0.001	20	5	0.3	0.13	0	1.5
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Thallium (2)	2.28	1.6	0.001	20	71	0.3	0.13	0	1.5
Zinc (1)	5971.20	4800	0.001	20	62	0.3	0.13	0	1.5

Kd from: (1) MTCA Table 747-3; (2) Soil Screening Guidance: Technical Background Document, 9355.4-17A, May 1996, Table 46.

Equation 747-1 Based on the protection of surface water

Hazardous Substance	Cs mg/kg	Cw ug/liter	UCF mg/ug	DF	Kd liter/kg	Ow mL water/ mL soil	Oa mL air/ mL soil	Hcc	Pb kg/liter
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Arsenic (1)	110.96	190	0.001	20	29	0.3	0.13	0	1.5

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Chromium +3 (2)	2018.40	100.9	0.001	20	1000	0.3	0.13	0	1.5
Chromium +6 (1)	3.84	10	0.001	20	19	0.3	0.13	0	1.5
Copper (1)	2.79	6.28	0.001	20	22	0.3	0.13	0	1.5
Lead (1)	234.00	1.17	0.001	20	10000	0.3	0.13	0	1.5
Mercury (1)	0.01	0.012	0.001	20	52	0.3	0.13	0.47	1.5
Nickel (1)	114.03	87.45	0.001	20	65	0.3	0.13	0	1.5
Selenium (1)	0.52	5	0.001	20	5	0.3	0.13	0	1.5
Silver (2)	0.28	1.05	0.001	20	13	0.3	0.13	0	1.5
Thallium (2)	56.96	40	0.001	20	71	0.3	0.13	0	1.5
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Kd from: (1) MTCA Table 747-3; (2) Soil Screening Guidance: Technical Background Document, 9355.4-17A, May 1996, Table 46.
Surface water quality values derived from WQP spreadsheet using a hardness value of 50 mg/liter.

**WAC 173-340-720(4)(b)(A) Standard Method B potable ground water cleanup levels - Noncarcinogens
Equation 720-1 (Ground water cleanup level for noncarcinogens)**

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Antimony (1)	6.4	0.0004	16	1000	1	6	1	1	1	6
Arsenic (1)	4.8	0.0003	16	1000	1	6	1	1	1	6
Beryllium (1)	32	0.002	16	1000	1	6	1	1	1	6
Cadmium (1)	8	0.0005	16	1000	1	6	1	1	1	6
Chromium +3 (1)	24000	1.5	16	1000	1	6	1	1	1	6
Chromium +6 (1)	48	0.003	16	1000	1	6	1	1	1	6
Copper (2)	592	0.037	16	1000	1	6	1	1	1	6
Lead			16	1000	1	6	1	1	1	6
Mercury (2)	4.8	0.0003	16	1000	1	6	1	1	1	6
Nickel (2)	320	0.02	16	1000	1	6	1	1	1	6
Selenium (1)	80	0.005	16	1000	1	6	1	1	1	6
Silver (1)	80	0.005	16	1000	1	6	1	1	1	6
Thallium (2)	1.6	0.0001	16	1000	1	6	1	1	1	6
Zinc (1)	4800	0.3	16	1000	1	6	1	1	1	6

RfD from: (1) U.S.EPA IRIS Substance file; (2) MTCA Cleanup Levels and Risk Calculations (CLARC II) Update, February 1996

Equation 720-2 (Ground water cleanup level for carcinogens)

Hazardous Substance	GWCL ug/liter	RISK	ABW kg	AT years	UCF ug/mg	CPF kg-day/mg	DWIR liters/day	ED years	INH	DWF
Antimony										
Arsenic	0.06	0.000001	70	75	1000	1.5	2	30	1	1
Beryllium	0.02	0.000001	70	75	1000	4.3	2	30	1	1
Cadmium										
Chromium +3										
Chromium +6										
Copper										
Lead										
Mercury										
Nickel										
Selenium										
Silver										
Thallium										
Zinc										

CPF from MTCA Cleanup Levels and Risk Calculations (CLARC II) Update, February 1996

**SeaTac Third Runway Embankment Project
Summary of Hazardous Substance Levels**

Hazardous Substances	Method A Soil Cleanup Levels (Table 740-1) (mg/kg)	Method B Soil Cleanup Levels Ground Water Protection (mg/kg)	Method B Soil Cleanup Levels Surface Water Protection (mg/kg)	Terrestrial Ecological Evaluation Soil Concentration (Table 749-2) (mg/kg)	Natural Background Soil Metals Concentrations in Puget Sound ¹ (mg/kg)	PQL ¹ (mg/kg)
Antimony	none	6	1450	none	none	16
Arsenic	20			95 (As ³⁺)	7	
Beryllium	none	0.01	2	25	0.6	0.15
Cadmium	2			25	1	
Chromium				42	48	
Chromium ⁶	19					
Chromium ³	2000					
Copper	none	260	3	100	36	3
Lead	250			220	24	
Mercury	2			9	0.07	
Nickel	none	420	110	100	48	7.5
Selenium	none	8	0.5	0.8	none	5
Silver	none	20	0.3	none	none	5
Thallium	none	2	60	none	none	
Zinc	none	6000	70	270	85	1
Total Petroleum Hydrocarbons						
Gasoline	30			200		
Diesel	2000			460		
Heavy Oils	2000					

¹ Source: "Natural Background Soil Metals Concentrations in Washington State", Publication #94-115, Washington State Department of Ecology
² Source: Implementation Memo No. 3, PQLs as Cleanup Standards, by Steve Robb, Washington State Department of Ecology, November 24, 1993.