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02-RCA-0151

FEB 5 2002

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EDMC

Mr. Michael A. Wilson, Program Manager
State of Washington
Department of Ecology
1315 West Fourth Avenue
Kennewick, Washington 99336

Dear Mr. Wilson:

**PROPOSED VERIFICATION CONSTITUENTS AND DELISTING VALUES FOR
TREATED WASTEWATER AT THE EFFLUENT TREATMENT FACILITY**

Attached for your review and concurrence is the subject proposed verification constituents and delisting values to be included in the administrative record for 200 Area Effluent Treatment Facility Delisting Modification. This proposal represents a reasonable approach to verification sampling based on sound principles discussed over the past nine months with representatives of Ecology and the U.S. Environmental Protection Agency.

The verification constituents and delisting values are proposed for the Effluent Treatment Facility treated wastewater discharged to the State Approved Land Disposal Site. The attachment also includes the methodology used to select the constituents and proposes delisting values for each constituent. Should you have any questions or comments, please call A. C. McKarns, of my staff, on (509) 376-8981.

Sincerely,

Joel Hebdon, Director
Regulatory Compliance and Analysis Division

Attachment

cc w/attach:
D. Bartus, EPA
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Environmental Portal, A3-01

FH-0200182
CONTRACT NO. DE-AC06-96RL13200

ATTACHMENT 1

Methodology for Selecting Verification Constituents and Delisting Values
for ETF Treated Wastewater

Consisting of 10 pages
including cover page

Methodology for Selecting Verification Constituents and Delisting Values

The process of selecting proposed verification constituents are similar to that used in the existing delisting exclusion where constituents that are representative of a treatability group were selected as verification parameters. One difference in the selection process is, except for the inorganic constituents, one constituent is selected and proposed to represent a treatability group. Since the initial delisting was an up-front delisting, multiple constituents were selected for a few treatability groups. The initial delisting focused exclusively on listed wastewaters with a designation of F001 to F005, or F039 derived from F001 to F005, and the verification parameters include multiple constituents in several treatability groups. Since this delisting modification expands the number of waste codes being delisted, the proposed verification constituents need to represent all the treatability groups and one representative constituent is selected for each treatability group.

The constituents and the delisting levels for monitoring are determined in a three-phase approach. First, the health-based levels (HBLs) for each constituent are calculated based on toxicological data. The HBLs are calculated using current toxicological data from IRIS, HEAST, and NCEA. The target risk factor of 1/100,000 is used with the oral slope factor to calculate a HBL for carcinogens. The target hazard quotient factor of 1/10 is used with the reference dose for oral exposure to calculate a HBL for non-carcinogens. When an oral slope factor and a reference dose for oral exposure are both available, the minimum resulting HBL is used. The groundwater ingestion pathway was the only pathway considered consistent with the initial delisting exclusion, found in 40 CFR 261, Appendix IX.

There are a number of constituents where toxicological data is inconclusive or lacking. Since all the constituents are placed in treatability groups, constituents having toxicological data available are considered to represent the treatability group.

Second, a constituent is selected from a treatability group to represent the entire group by using the described methodology. This methodology uses HBLs (the lower the HBL the higher the constituent toxicity), the EE/O which is a measure of the UV/OX treatment efficiency for a constituent (the higher the EE/O the more difficult it is to destroy a constituent), and the practical quantitation level (PQL). Constituents are ranked by the HBL (HBLs within a factor of 10 are considered identical for this selection process) and then ranked by the EE/O. Each treatability group is evaluated individually. The constituents having the lowest HBL and the highest EE/O are the first candidates considered for selection. Then the PQL is considered and if the PQL is higher than the delisting level (HBL times the DAF), then another constituent is evaluated.

Then third, the delisting levels are proposed based on the HBL times the DAF of 6. In a few cases, the delisting level is based on the PQL, MCL, or a TSCA level.

The following are exceptions to the above methodology:

- Group 2. Diethylstilbestrol, also called estrogen, was not selected due to analytical measurement difficulties and this constituent is highly unlikely to be in wastewater treated at the ETF.
- Group 9a. 1-Butanol was chosen over Propargyl alcohol because it is expected to be more prevalent in wastewaters treated at ETF.
- Group 10a. All constituents containing hydrazine were eliminated from selection because of their reactivity under strong oxidizing conditions present in the ultraviolet oxidation system at the ETF.
- Group 10e. N-Nitrosodimethylamine was chosen and due to analytical measurement difficulties, the delisting level is the PQL.
- Group 12. The delisting level for PCBs is based on the TSCA limit of 0.0005 mg/L. This level is where treated remediation waste is authorized for unrestricted use.
- Group 17. 17a. The aldehyde group, in general, is reactive in water that makes these constituents unlikely to be in wastewaters treated at the ETF. Also, the reactivity of aldehydes cause analytical problems where they are difficult to analyze in the laboratory. The aldehyde group will be represented by treatability group 13, the group that is most difficult to destroy.
- Group 19. Acetone was chosen over Acetophenone because acetone is expected to be a more prevalent contaminant in wastewaters treated at the ETF.
- Group 22, 21. The delisting level for arsenic is based on the PQL rather than the HBL. The delisting level for lead is based on the maximum contamination level (MCL) for drinking water rather than a level based on toxicity.
- Group 25. this group includes group 25a and 25b. Tributyl phosphate was chosen from this group as it is expected to be more prevalent in wastewaters treated at the ETF.

The proposed list of verification constituents and delisting levels, Table 1, is intended to replace the existing verification constituents for delisting the ETF treated wastewater found in 40 CFR 261, Appendix IX.

Table 1 Proposed Delisting Constituents and Delisting Levels

Treatability Group	Proposed Delisting Constituents	CAS #	HBL (mg/L)	EE/O	Current Delisting Parameter	Justification	Proposed Delisting Level (mg/L)
1	Cresol [Cresylic acid]	1319-77-3	2E-01 ⁽¹⁾	10	c	Representing group, has relatively low HBL and highest EE/O of group, target compound in SW-846 method, PQL less than delisting level.	1.2E-00
2	2,4,6-Trichlorophenol	88-06-2	6E-02	10		Representing group, has a low HBL and is a hard to destroy compound, target compound in SW-846 method, PQL less than delisting level	3.6E-01
3, 15, 15a	Benzene	71-43-2	1E-02	3	c	Representing group, the compound with the lowest HBL, target compound in SW-846 method, PQL less than delisting level.	6.0E-02
4	Chrysene	218-01-9	9E-02	10		Representing group, has a relatively low HBL and is one of the hard to destroy compounds, target compound in SW-846 method, PQL less than delisting level. Chrysene was chosen because the other constituents with lower HBLs have analytical measurement difficulties.	5.6E-01
5, 5a, 16	Hexachlorobenzene	118-74-1	4E-04	10		Representing group, has a relatively low HBL and is one of the hard to destroy compounds, target compound in SW-846 method, PQL less than delisting level. Hexachlorobenzene was chosen over because Heptachlorodibenzofuran and Heptachlorodibenzo-p-dioxins have analytical measurement difficulties.	2.E-03

Table 1 Proposed Delisting Constituents and Delisting Levels

Treatability Group	Proposed Delisting Constituents	CAS #	HBL (mg/L)	EE/O	Current Delisting Parameter	Justification	Proposed Delisting Level (mg/L)
6b, 14	Hexachlorocyclopentadiene	77-47-4	3E-02	10		Representing group, has a low HBL and is a hard to destroy compound, target compound in SW-846 method, PQL less than delisting level. <i>Hexachlorocyclopentadiene</i> was chosen over 1,4-Dichloro-2-butene, and Hexachlorobutadiene because of analytical measurement difficulties, and over 1,1-Dichloroethylene and Vinyl chloride because of a higher EE/O.	1.8E-01
7a	Dichloroisopropyl ether [Bis(2-Chloroisopropyl) ether]	108-60-1	10E-03	15		Representing group 7a and 7b, has a relatively low HBL and the EE/O is highest of group, target compound in SW-846 method, PQL less than delisting level. Dichloroisopropyl ether was chosen over Bis(2-Chloroethyl) ether and Dichloromethyl ether because of a higher EE/O.	6.0E-02
8	Di-n-octylphthalate	117-84-0	8E-02	15	c	Representing group, has a relatively low HBL and the EE/O is highest of group, target compound in SW-846 method, PQL less than delisting level	4.8E-01
9a	1-Butanol	71-36-3	4E-01	10	c	Representing group, the compound with the lowest HBL, target compound in SW-846 method, PQL less than delisting level.	2.4E-00

Table 1 Proposed Delisting Constituents and Delisting Levels

Treatability Group	Proposed Delisting Constituents	CAS #	HBL (mg/L)	EE/O	Current Delisting Parameter	Justification	Proposed Delisting Level (mg/L)
9	Isophorone	78-59-1	7E-01	30		Representing group, has a relatively low HBL and the EE/O is highest of group, target compound in SW-846 method, PQL less than delisting level. Isophorone was chosen because the other constituents with lower HBLs have analytical measurement difficulties and it had the highest EE/O.	4.2E-00
10a	Diphenylamine	122-39-4	9E-02	15		Representing group, has a relatively low HBL and the EE/O is close to highest of group, target compound in SW-846 method, PQL less than delisting level. Diphenylamine was chosen because other constituents with lower HBLs have analytical measurement difficulties.	5.6E-01
10b	p-Chloroaniline	106-47-8	2E-02	10		Representing group, has a relatively low HBL and the EE/O is highest of group, target compound in SW-846 method, PQL less than delisting level. p-Chloroaniline was chosen over 4,4'-Methylenebis(2-chloroaniline) and o-Nitroaniline because of analytical measurement difficulties.	1.2E-01
10c	Acetonitrile	75-05-8	recinded, Previous HBL is 0.2 mg/L	10		Representing group, has a relatively low HBL and the EE/O is close to highest of group, target compound in SW-846 method, PQL less than delisting level, the 1994 established HBL is used. Acetonitrile was chosen because it has, by far, the highest EE/O.	1.2E-00

Table 1 Proposed Delisting Constituents and Delisting Levels

Treatability Group	Proposed Delisting Constituents	CAS #	HBL (mg/L)	EE/O	Current Delisting Parameter	Justification	Proposed Delisting Level (mg/L)
10d	Carbazole	86-74-8	3E-02	30		Representing group, has a relatively low HBL and it is one of the more difficult compounds to destroy, target compound in SW-846 method PQL less than delisting level. Carbazole was chosen because other constituents with lower HBLs have analytical measurement difficulties.	1.8E-01
10e	N-Nitrosodimethylamine	62-75-9	1E-05	10		Representing group, target compound in SW-846 method, due to analytical measurement difficulties the PQL is used as the delisting level.	2.0E-02
10f	Pyridine	110-86-1	4E-03	4		Representing group, the compound with a low HBL, target compound in SW-846 method, PQL less than delisting level. Pyridine was chosen because the other constituent with a lower HBL has analytical measurement difficulties.	2.4E-02
11	Lindane [gamma-BHC]	58-89-9	5E-04	40		Representing group, has a low HBL and is one of the more difficult compounds to destroy, target compound in SW-846 method, PQL less than delisting level. Lindane was chosen because of those with lower HBLs it has the highest EE/O.	3.0E-03
12	Aroclor 1016, 1221, 1232, 1242, 1248, 1254, 1260	PCBs	3E-04	15		Representing group, target compound in SW-846 method, delisting level based on TSCA value, PQL less than delisting level	5.0E-04

Table 1 Proposed Delisting Constituents and Delisting Levels

Treatability Group	Proposed Delisting Constituents	CAS #	HBL (mg/L)	EE/O	Current Delisting Parameter	Justification	Proposed Delisting Level (mg/L)
13, 6a	Carbon tetrachloride	56-23-5	3E-03	200	c	Representing group, has relatively low HBL and is the compound with the highest EE/O, target compound in SW-846 method, PQL less than delisting level. Carbon tetrachloride was chosen because the other constituent with a lower HBL has analytical measurement difficulties and it has by far the highest EE/O.	1.8E-02
18a	Tetrahydrofuran	109-99-9	9E-02	4		Representing group 18 and 18a, a compound with relatively low HBL, target compound in SW-846 method, PQL less than delisting level. Tetrahydrofuran was chosen because the other constituent with a lower HBL has analytical measurement difficulties.	5.6E-01
19	Acetone	67-64-1	4E-01	10	c	Representing group, has a relatively low HBL and is one of the harder to destroy compounds, target compound in SW-846 method, PQL less than delisting level.	2.4E-00
20	Carbon disulfide	75-15-0	4E-01	5		Representing group, the compound with the lowest HBL, target compound in SW-846 method, PQL less than delisting level.	2.3E-00
21, 22	Barium	7440-39-3	3E-01		c	HBL * DAF is delisting level, PQL is less than delisting level	1.6E-00
21, 22	Beryllium	7440-41-7	8E-03		c	HBL * DAF is delisting level, PQL is less than delisting level	4.5E-02
21, 22	Nickel	7440-02-0	8E-02		c	HBL * DAF is delisting level, PQL is less than delisting level	4.5E-01

Table 1 Proposed Delisting Constituents and Delisting Levels

Treatability Group	Proposed Delisting Constituents	CAS #	HBL (mg/L)	EE/O	Current Delisting Parameter	Justification	Proposed Delisting Level (mg/L)
21, 22	Silver	7440-22-4	2E-02		c	HBL * DAF is delisting level, PQL is less than delisting level	1.1E-01
21, 22	Vanadium	7440-62-2	3E-02		c	HBL * DAF is delisting level, PQL is less than delisting level	1.6E-01
21, 22	Zinc	7440-66-6	1E-00		c	HBL * DAF is delisting level, PQL is less than delisting level	6.8E-00
22, 21	Arsenic	7440-38-2	5E-04		c	HBL below PQL, PQL of 0.015 mg/L used as delisting level	1.5E-02
22, 21	Cadmium	7440-43-9	2E-03		c	HBL * DAF is delisting level, PQL is less than delisting level	1.1E-02
22, 21	Chromium	7440-47-3	1E-02		c	HBL * DAF is delisting level, PQL is less than delisting level	6.8E-02
22, 21	Lead	7439-92-1	1.5E-02		c	No HBL, used MCL of 0.015 mg/L and DAF = 6, (MCL * DAF)	9.0E-02
22, 21	Mercury	7439-97-6	1E-03		c	HBL * DAF is delisting level, PQL is less than delisting level	6.8E-03
22, 21	Selenium	7782-49-2	2E-02		c	HBL * DAF is delisting level, PQL is less than delisting level	1.1E-01
23	Fluoride	16984-48-8	2E-01		c	HBL * DAF is delisting level, PQL is less than delisting level	1.2E-00
24	Ammonia	7664-41-7	1E-00 ⁽²⁾		c	HBL * DAF is delisting level, PQL is less than delisting level	6.0E-00
24	Cyanides	57-12-5	8E-02		c	HBL * DAF is delisting level, PQL is less than delisting level	4.8E-01

Table 1 Proposed Delisting Constituents and Delisting Levels

Treatability Group	Proposed Delisting Constituents	CAS #	HBL (mg/L)	EE/O	Current Delisting Parameter	Justification	Proposed Delisting Level (mg/L)
25a	Tributyl phosphate	126-73-8	2E-02 ⁽³⁾	5	c	Representing group 25a and 25b, the compound with a low HBL, target compound in EPA method, PQL less than delisting level. No updated HBL. Previous delisting level is used except it is adjusted for a DAF of 6 instead of 10.	1.2E-01

(1) The HBL for Cresol is assumed to be that for o-Cresol and m-Cresol.

(2) The HBL for Ammonia is assumed the same as used in the initial Delisting Petition.

(3) The HBL for Tributyl phosphate is assumed the same as used in the initial Delisting Petition.