

## WASHINGTON STATE WASTE DESIGNATION

Designating hazardous waste under the federal rules is relatively straight forward. However, designating waste under the Dangerous Waste rules in Washington State is more complicated. The rules regarding designating dangerous waste in Washington State are found in WAC 173-303-100 (Dangerous Waste Criteria). The purpose WAC 173-303-100 is to describe the methods and criteria for determining if a solid waste is a state-only dangerous waste. The dangerous waste criteria consist of:

- Toxic dangerous wastes.
- Persistent dangerous wastes.

A generator must determine if a solid waste meets the toxicity criteria under WAC 173-303-100 by following either the instructions for book designation, when knowledge of the waste is sufficient or by testing the waste using the biological testing methods adopted under WAC 173-303-110(3).

Ecology requires generators to manage their dangerous waste under the most stringent management standards that apply. Even if waste have been designated dangerous (hazardous) under the listed waste rules or characteristics waste rules it still must be further designated under the dangerous waste criteria. This is necessary because it may change how the waste must be managed. A generator may produce less than 220 pounds of a listed or characteristic waste each month and be considered small quantity generator. However, if that waste designates as an extremely hazardous waste under the State's designation methods then if the amount is greater than 2.2 pounds the generator's status would be changed to a large quantity generator. The book designation or bioassay designation may be required if Ecology has reason to believe that a generator's knowledge or test results regarding a waste is not sufficient for determining whether or not it should be designated and/or has been designated properly.

### Book Designation Procedure

A generator may determine if a waste meets the state-only DW or EHW toxicity criteria by following the book designation instructions in WAC 173-303-100(5)(b). This procedure requires generators to determine the toxic category for each known constituent using available toxicity data. The examples of "available toxicity data" given by Ecology include the Registry for Toxic Effects of Chemical Substances (RTECS), Hazardous Substances Data Bank (HSDB), and Ecotoxicology database (ECOTOX).

The Ecotoxicology database (ECOTOX) database is an extensive database that provides toxicity data from peer reviewed journals that is managed by the EPA. This data base allows you to search for specific types of toxicity endpoints and test organisms as well as journal publication dates. It can take some practice to navigate, but it is a free resource that can be found at: <https://cfpub.epa.gov/ecotox/>.

The Hazardous Substances Data Bank (HSDB) is another data base that provides toxicology data from peer reviewed sources on a number of different chemicals. This data base is managed by NIH and is also free to access. It does not allow you to narrow your search by endpoint, species, or publication data. Additionally, the reports generated from a search should be carefully read to ensure the data provided is for the form of the chemical the users is searching for. This data base can be accessed at: <https://toxnet.nlm.nih.gov/newtoxnet/hsdb.htm>.

The Registry for Toxic Effects of Chemical Substances (RTECS) was a free database maintained by NIOSH; however, in 2001 it switched to a private company and is only available for a fee or subscription. The company Symyx Technologies now operates this database and access to it can be gained by contacting Symyx Technologies at: <http://accelrys.com>.

There are only four applicable test endpoints that the state uses to evaluate the toxicity of solid waste. These are a fish LC50, oral rat LD50, inhalation rat LC50, and dermal rabbit LD50. If there are data available for more than one test endpoint (that is, fish, oral rat, inhalation rat, or dermal rabbit), the value with the highest toxicity must be used. Similarly, if toxicity data do not agree on the same toxic category within the same test endpoint, the value with the highest toxicity must be used. Finally, if toxicity data for a constituent cannot be found in reasonably available sources (for example, RTECS, HSDB or ECOTOX), the toxic category for that constituent does not need to be determined.

Toxic Category Table [WAC 173-303-100(5)(b)(I)]

Toxic Category	Fish LC50(mg/L) <sup>b</sup>	Oral Rat LD50(mg/kg)	Inhalation Rat LC 50(mg/L) <sup>c</sup>	Dermal Rabbit LD50(mg/kg)
X	<0.01	<0.5	<0.02	< 2
A	0.01 - <0.1	0.5 - <5	0.02 - <0.2	2 - <20
B	0.1 - <1	5 - <50	0.2 - <2	20 - <200
C	1 - <10	50 - <500	2 - <20	200 - <2000
D	10 - 100	500 - 5000	20 - 200	2000 - 20,000

<sup>a</sup> These four test endpoints are defined in WAC 173-303-040.

<sup>b</sup> Fish LC50 data must be derived from an exposure period greater than or equal to 24 hours. A hierarchy of species LC50 data should be used that includes (in decreasing order of preference) salmonids, fathead minnows, and other fish species.

<sup>c</sup> Inhalation Rat LC50 data must be derived from an exposure period greater than or equal to one hour.

If a generator's solid waste contains one or more potentially toxic constituent they must determine the equivalent concentration of all these constituents in their waste. That is, you must add up each portion of the toxicity contributed by each constituent in the waste to calculate the waste's equivalent concentration (EC). To do this, use the following formula:

$$\text{Equivalent Concentration (EC)(\%)} = \frac{\frac{\sum X\%}{1} + \frac{\sum A\%}{10} + \frac{\sum B\%}{100} + \frac{\sum C\%}{1000} + \frac{\sum D\%}{10,000}}$$

Where  $\sum(X,A,B,C, \text{ OR } D)\%$  is the sum of all the concentration percentages for a particular toxic category.

*Example. A generator's waste contains: Silicon (D Category) – 10.0%; Potassium permanganate (B Category) – 3%; Aluminum (B Category) – 0.85%; Copper (A Category) – 0.05%; Nickel (A Category) – 0.05%; Solids (nontoxic) – 86.05%.*

Chemical	Fish LC <sub>50</sub> (mg/L)	Oral Rat LD <sub>50</sub> (mg/kg <sub>bw</sub> )	Inhalation Rat LC <sub>50</sub> (mg/L)	Dermal Rabbit LD <sub>50</sub> (mg/ kg <sub>bw</sub> )
Silicon		3,160		
Copper	0.02			
Potassium permanganate	0.88	750.00		
Aluminum	0.12			
Nickel	0.05			

The equivalent concentration (E.C.) would be:

$$\begin{aligned} \text{E.C. (\%)} &= \frac{0\%}{1} + \frac{(0.05\%+0.05\%)}{10} + \frac{(3\%+0.85\%)}{100} + \frac{0\%}{1000} + \frac{10.0\%}{10,000} \\ &= 0\% + 0.010\% + 0.0385\% + 0\% + 0.001\% \\ &= 0.0495\% \end{aligned}$$

so the equivalent concentration equals 0.0495 %.

A person whose waste contains toxic constituents must determine its designation according to the value of the equivalent concentration. If the equivalent concentration is less than 0.001 %, the waste is not a toxic dangerous waste and can be considered solid waste. However, if the equivalent concentration is between 0.001 % and 1.0 %, the waste designates as **DW** and is assigned the dangerous waste number WT02. If the equivalent concentration is equal to or less than 0.01 %, the DW may also be a special waste; or if the equivalent concentration is equal to or greater than 1.0 %, the waste will designate as **EHW** and is assigned the dangerous waste number WT01.

*Example Continued. The equivalent concentration of 0.0495 % (from Example 1. above) is greater than 0.001 % and less than 1.0 %. The waste is DW and the dangerous waste code WT02 must be assigned.*

Table 3. Ecology Generic Dangerous Waste Codes

Dangerous Waste Criteria and Designation	Ecology Waste Code	Toxicity Equivalent Concentration	Total Concentration
Toxic Dangerous Wastes			
EHW	WT01	>1.0%	NA
DW	WT02	0.001% - <1.0%	NA
Persistent Dangerous Wastes			
Organic Compounds			
EHW	WP01	NA	>1.0%
DW	WP02	NA	0.01% to 1.0%
Polycyclic Aromatic Hydrocarbons (PAHs)			
EHW	WP03	NA	>1.0%

EHW – Extremely Hazardous Waste

DW – Dangerous Waste

NA – Not Applicable

### Persistence Criteria

For the purposes of this section, persistent constituents are chemical compounds which are either halogenated organic compounds (HOCs) or polycyclic aromatic hydrocarbons (PAHs), as defined under WAC 173-303-040. Except as provided in WAC 173-303-070(4) or (5), a person may determine the identity and concentration of persistent constituents by either applying knowledge of the waste or by testing the waste according to WAC 173-303-110(3)(c) Chemical Testing Methods for Designating Dangerous Waste Publication #97-407.

Except as provided in WAC 173-303-070(4), if a generator knows only some of the persistent constituents in the waste or only some of the constituent concentrations, and if the waste is undesignated for those known constituents or concentrations, then the waste has not been designated for persistence. The generator must determine whether their waste contains persistent constituents or not.

When a waste contains one or more HOCs for which the concentrations are known, the total halogenated organic compound concentration must be determined by summing the concentration percentages for all of the HOCs for which the concentration is known.

*Example . A waste contains 2-chlorotoluene (0.05 %), methylene bromide (0.05 %), and 1,1,1 - trichloroethylene (0. 15%). The total halogenated organic compound concentration would be:*

$$\text{Total HOC Concentration (\%)} = 0.05 \% + 0.05 \% + 0.15 \% = 0.25\%$$

This waste would not designate as a state-only dangerous waste for toxicity, and (unless it has a flashpoint of 140° F or less) would not designate as a listed or characteristic waste. However, this waste will designate and a state-only dangerous waste for persistence.

#### Persistent Dangerous Waste Table

If your waste contains...	At a total concentration level of...	Then your waste's designation, and waste # are...
Halogenated Organic Compounds (HOC)	0.01% to 1.0% greater than 1.0%	DW, WP02 EHW, WP01

Waste designation for persistence can be tricky, in that, a waste that contains a mixture of or a single halogenated organic chemical may not designate as a dangerous waste or will only designate as a WT02 waste. When the percentage of HOCs in the waste is calculated it may designate as a WP02 or a WP01. If the waste designates as a WP01 then it must be managed as an extremely hazardous waste.

Polycyclic aromatic hydrocarbons (PAH) are another group of persistent organic chemicals that are singled out by Ecology for a persistence waste code. Wastes containing PAHs, as defined in WAC 173-303-040, must have the total PAH concentration determined. This is done by summing the concentration percentages of each of the polycyclic aromatic hydrocarbons in the waste.

*Example. A waste contains: Chrysene (0.08 %) and 3,4 - benzo(a)pyrene (1.22 %). The total PAH concentration is:*

$$\text{Total PAH Concentration (\%)} = 0.08 \% + 1.22 \% = 1.30 \%$$

#### Persistent Dangerous Waste Table

If your waste contains...	At a total concentration level of...	Then your waste's designation, and waste # are...
Polycyclic Aromatic Hydrocarbons (PAH)	greater than 1.0%	EHW*, WP03

\*No DW concentration level for PAH.

According to the table above that waste would designate as WP03, and would be considered an extremely hazardous waste (EHW). The state does not have a persistence dangerous waste designation code specific to PAHs that comprise less than 1.0% of a dangerous waste; however the waste may still designate as a WT02 for toxicity.

Up until the end of 2014 there was a simpler way to determine if your waste contains a state-only (WT01, WT02, or a persistent WP01, WP02, or WP03). Ecology created the Dangerous Waste Designation Tool for businesses to use in determining if their waste is a federal or state-only regulated dangerous waste. Prior to the end of 2014 Ecology provided a list of chemicals and various toxicity data that could be used to designate state-only dangerous waste. While the Dangerous Waste Designation Tool is still available from Ecology, only data for federally listed wastes are provided. The generator is now required to enter the chemical and corresponding toxicity data for a material to determine if it is considered a state-only dangerous waste.

The Dangerous Waste Designation Tool can be downloaded from [http://www.ecy.wa.gov/programs/hwtr/manage\\_waste/des\\_intro.html](http://www.ecy.wa.gov/programs/hwtr/manage_waste/des_intro.html)

If you would like a copy of the earlier version of the Dangerous Waste Designation Tool with the toxicity data please contact Coulee Environmental Safety Training at [info@wasteandsafety.com](mailto:info@wasteandsafety.com).

Steps for state-only waste designation using the book method:

1. Identify the relevant LC50s and LD50s for the potentially hazardous chemicals in your waste using
  - Hazardous Substances Data Bank (HSDB), and
  - Ecotoxicology Database (ECOTOX).
2. Identify the Toxic Category each chemical falls into.
3. Determine the Equivalent Concentration (EC) by summing up the percentage of each chemical in each Toxic Category and divide by the appropriate leveling value.
4. Compare the EC to the total concentration values that require a waste to be given a WT01 or WT02 waste code.
5. Determine if your waste contains an HOC and its percentage of the waste.
6. Sum the percentage of each HOC the waste contains and compare to the total concentration values that require a waste to be given a WP01 or WP02 waste code.
7. Determine if your waste contains a PAH and its percentage of the waste.
8. Sum the percentage of each PAH the waste contains and compare to the total concentration values that require a waste to be given a WP01 waste code.

This covers the basics of designating Washington State dangerous waste using the book designation method. The next presentation will discuss designating Washington State dangerous waste using the bioassay designation method. If you are in need of waste management training Coulee Environmental Safety Training has upcoming Waste Management for Washington State (Annual RCRA) trainings in the next few months. We are offering the one day refresher class October 18 and November 15 in Moses Lake. This class is for people who work at large and medium quantity generator facilities who have experience managing dangerous waste but need to maintain their annual training. This class is also good for small quantity generators who want to stay current on the regulations and how they may affect their operation. The class runs from 8:00 - 4:00 and costs \$395.

We are offering the full three day Waste Management for Washington State (Annual RCRA) training December 5-7 in Moses Lake. This class is for people working for large and medium quantity generators who are new to dangerous waste management and would like an in depth training on both the federal and state waste management regulations. The classes run from 8:30-4:00 and costs \$995. If you are interested in finding out more about these trainings please go to <https://wasteandsafety.com/training-schedule> or email Angela, [angela.stenhouse@wasteandsafety.com](mailto:angela.stenhouse@wasteandsafety.com)