

3745-30-03

Residual wasteWaste characterization for disposal in a residual landfill facility.

(A) ~~In order to~~To determine and confirm ~~the whether it is appropriate residual waste landfill~~ class for disposal of wastes specified in rule 3745-30-01 of the Administrative Code ~~to~~ dispose a particular IMW waste stream in a residual landfill, ~~residual waste~~the owner or operator shall ~~be sampled~~sample the IMW in accordance with paragraph (C) of this rule; ~~and an~~An extract ~~from the IMW~~ shall be obtained and tested in accordance with paragraphs (D) and (E) of this rule for ~~all of the following parameters unless an alternative list is used in accordance with paragraph (B) of this rule:~~

- (1) For ~~residual wastes~~IMW generated by fuel burning operations as specified in paragraph ~~(B)(1)(I)(1)(a)~~ of rule 3745-30-01 of the Administrative Code, parameter numbers one through eight, ten through fifteen, and forty of appendix ~~A~~B to ~~this rule 3745-30-04 of the Administrative Code.~~
- (2) For ~~residual wastes~~IMW generated by foundry operations as specified in paragraph ~~(B)(2)(I)(1)(b)~~ of rule 3745-30-01 of the Administrative Code, parameter numbers one through eighteen, twenty-two through twenty-four, thirty-two, thirty-five, thirty-six, and forty of appendix ~~A~~B to ~~this rule 3745-30-04 of the Administrative Code.~~
- (3) For ~~residual wastes~~IMW generated by pulp and papermaking operations as specified in paragraph ~~(B)(3)(I)(1)(c)~~ of rule 3745-30-01 of the Administrative Code, parameter numbers one through forty of appendix ~~A~~B to ~~this rule 3745-30-04 of the Administrative Code.~~
- (4) For ~~residual wastes~~IMW generated by steelmaking operations as specified in paragraph ~~(B)(4)(I)(1)(d)~~ of rule 3745-30-01 of the Administrative Code, parameter numbers one through seventeen and forty of appendix ~~A~~B to ~~this rule 3745-30-04 of the Administrative Code.~~
- (5) For ~~residual wastes~~IMW generated from gypsum processing plant operations as specified in paragraph ~~(B)(5)(I)(1)(e)~~ of rule 3745-30-01 of the Administrative Code, parameter numbers one through seventeen and forty of appendix ~~A~~B to ~~this rule 3745-30-04 of the Administrative Code.~~
- (6) For ~~residual wastes~~IMW generated from lime processing operations as specified in paragraph ~~(B)(6)(I)(1)(f)~~ of rule 3745-30-01 of the Administrative Code, parameter numbers one through six, eight, ten through fifteen, and forty of appendix ~~A~~B to ~~this rule 3745-30-04 of the Administrative Code.~~
- (7) For ~~residual wastes~~IMW generated from portland cement operations as specified in paragraph ~~(B)(7)(I)(1)(g)~~ of rule 3745-30-01 of the Administrative Code,

parameter numbers one through seventeen and forty of appendix ~~AB~~ to this rule 3745-30-04 of the Administrative Code.

- (8) For IMW specified in paragraph (I)(1)(h) of rule 3745-30-01 of the Administrative Code, applicable parameters approved by the director based on process or material knowledge or previously acquired waste characterization.
- (B) As an ~~alternate~~alternative to a parameter list prescribed in paragraph (A) of this rule, the owner or operator may use another parameter list ~~may be used~~ to characterize a ~~residual waste~~the IMW in accordance with the following:
- (1) ~~For the purpose of determining the appropriate residual solid waste landfill class, parameters~~Parameters may be added or removed from the parameters listed in paragraph (A) of this rule if ~~approved~~authorized by ~~the director~~Ohio EPA.
 - (2) ~~For the purpose of determining the appropriate residual solid waste landfill class, the director, based on process or material knowledge or previously acquired waste characterization data,~~Ohio EPA may require the addition of a ~~parameter(s)~~parameter to the parameter list prescribed in paragraph (A) of this rule based on process or material knowledge or previously acquired waste characterization data.
 - (3) If a parameter is added to the list prescribed in paragraph (A) of this rule, the maximum allowable concentration shall be set as thirty times the maximum contaminant level established in Chapters 3745-81 and 3745-82 of the Administrative Code. If a maximum contaminant level does not exist for that parameter, the maximum allowable concentration shall be set as thirty times the United States environmental protection agency regional screening level for resident tap water with a target hazard quotient of 1.0.
 - ~~(3)~~(4) ~~For the purpose of confirming the residual solid waste is appropriate for the landfill class, compounds~~A compound may be removed from the ~~parameters listed~~parameter list prescribed in paragraph (A) of this rule when performing the waste characterization required by paragraph (G) of this rule if the waste characterization conducted in accordance with paragraphs (C) to (F) of this rule demonstrates that the parameter is either not present in the waste; or present at such low concentrations that the applicable maximum allowable concentration for the proposed residual ~~waste landfill class~~ will not be exceeded.
- (C) All samples of a ~~residual waste~~IMW shall be composite samples of that ~~residual~~ waste as described in ~~section 9.1.1.4.1. of USEPA's "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods, third edition" (SW-846), as amended through January 3, 2008,~~"Guidance on Choosing a Sampling Design for Environmental Data

Collection" (EPA/240/R-02/005) and the sampler owner or operator shall employ all reasonable measures, such as sampling different sources of the residual waste IMW at different times; or conducting random sampling of a representative pile of the residual waste generated by the same production processes using the same raw materials at different times, to ensure that representative composite samples are obtained. ~~Wastes may be mixed or treated prior to collecting composite samples as long as one of the following criteria are met:~~

(1) At the discretion of the applicant, owner, or operator, wastes may be mixed or treated prior to collecting composite samples as long as one of the following criteria are met:

~~(1)(a)~~ (a) The individual wastes are mixed prior to discharge in the normal production process of the generator or the individual wastes are generated by substantially similar industrial processes and raw materials.

~~(2)(b)~~ (b) The mixing of individual wastes results in a waste in which leaching characteristics are reduced relative to one or more of the individual wastes due to attenuation factors other than dilution, such as precipitation, adsorption, or ion exchange and the applicant, owner, or operator demonstrates all of the following to Ohio EPA:

~~(a)(i)~~ (i) ~~It is demonstrated to the satisfaction of the director that~~ That a reduction in leaching characteristics occurs in one or more parameters due to such a factor. ~~The~~ At a minimum, the demonstration shall be submitted to Ohio EPA for approval and it shall include, at a minimum, all of the following:

~~(i)(a)~~ (a) The concentration, determined in accordance with the waste characterization specified in paragraph (E) of this rule, of each parameter that undergoes a reduction in concentration due to such a factor and of each parameter with a concentration greater than fifty per cent of the maximum concentration for the proposed landfill class, for the following:

~~(a)(i)~~ (i) Each individual waste in the mixture.

~~(b)(ii)~~ (ii) The resultant mixture.

~~(ii)(b)~~ (b) A listing and the ratio, by weight and volume, of the individual wastes ~~which~~ that comprise the mixture.

~~(iii)(c)~~ Calculations using the concentration and weight data required by paragraphs ~~(C)(2)(a)(i)(a), (C)(2)(a)(i)(b)~~ (C)(1)(b)(i)(a), (C)(1)(b)(i)(b), and (C)(2)(a)(ii)(C)(1)(c) of this rule, which demonstrate quantitatively that the reduction in leaching characteristics is not due solely to dilution.

~~(iv)(d)~~ An identification and explanation of the chemical ~~reaction(s)~~ reactions, including chemical equations, which causes the attenuation.

~~(b)(ii)~~ The individual wastes are mixed in the same ratios and in the same manner in which they will be mixed prior to disposal during the normal operation of the residual ~~waste~~ landfill.

~~(3)(c)~~ A ~~residual waste~~ IMW may be treated by aeration to reduce the concentration of phenol prior to the waste characterization performed in accordance with paragraph (D) of this rule provided that an aeration process is performed in the same manner and for the same duration on all similar ~~residual waste~~ IMW prior to disposal in the residual ~~waste~~ landfill.

(2) If the director determines that mixing of individual wastes when co-disposed in the residual landfill facility may result in increased concentrations of parameters, wastes shall be mixed prior to collecting composite samples.

(D) ~~The toxicity characteristic leaching procedure (TCLP) (USEPA method 1311) shall be used to~~ To obtain all extracts for the purpose of characterizing a ~~residual waste~~ IMW proposed for disposal in a residual ~~waste~~ landfill. ~~For a leaching solution to obtain the extract, the applicant, or permittee may owner, or operator shall use either the acid solution specified in the TCLP or the water solution specified in the ASTM water leaching method (ASTM D 3987-85) the specifications of the United States Environmental Protection Agency's "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods (SW-846), method 1311, method 1312, method 1313, method 1314, or method 1315. The acid and water solutions may each be used for specific parameters as appropriate to utilize characterization knowledge from other testing, such as hazardous waste determination. The solution chosen for a parameter in the initial characterization of a residual waste~~ IMW shall be used for that parameter in all subsequent characterizations of that residual waste. ~~For the purpose of obtaining an extract which will be analyzed for any of the volatile organic compounds listed in appendix A to rule 3745-30-04 of the Administrative Code, a zero headspace extraction (ZHE) apparatus, as specified in the TCLP, shall be used. Laboratory analytical methods for determining the concentration of the parameters required by paragraph (A) of this rule in an extract shall use all of~~ be in accordance with the following:

- (1) Methods specified in ~~USEPA's~~United States Environmental Protection Agency's "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods, ~~third edition~~" (SW-846), ~~as amended through January 3, 2008~~, for the analysis of ~~volatile organic compounds and inorganic parameters.~~
- (2) ~~Methods specified in "methods for chemical analysis of water and wastes" (EPA 600/4-79-020)~~ASTM D5907 or SM 2540C for the analysis of total dissolved solids.
- (3) ~~Methods specified in either of the documents listed in paragraphs (D)(1) and (D)(2) of this rule for the analysis of arsenic, barium, cadmium, chromium, lead, mercury, selenium, silver, chloride, fluoride, iron, manganese, sodium, sulfate, cyanide, and phenols.~~
- (E) ~~To determine the appropriate residual waste landfill class for disposal of wastes, the~~The concentration of all parameters required to be analyzed by paragraph (A) of this rule shall be determined using a minimum number of seven samples. Based on a high degree of variability in the concentration of a parameter at or near the maximum allowable concentration for ~~a particular landfill class~~disposal in a residual landfill, the sampler, applicant, ~~permittee~~owner or operator, or ~~the director~~Ohio EPA may determine that ~~more~~additional samples are ~~required~~necessary to characterize the IMW. The maximum allowable concentration is established in appendix B to this rule and, if appropriate, by paragraph (B) of this rule. The ~~residual~~ waste classification shall be performed ~~in accordance with one~~to determine either of the following:
- (1) ~~All~~The concentrations of all parameters required for analysis by paragraph (A) of this rule are less than seventy ~~percent~~per cent of the maximum allowable concentrations for ~~the class~~disposal in a residual landfill.
- (2) The upper limit of the eighty ~~percent~~per cent confidence interval of the mean of the concentration of each parameter required for analysis by paragraph (A) of this rule is below the maximum allowable concentration for ~~the class~~disposal in a residual landfill. The statistical procedure for determining the eighty per cent confidence intervals shall be in accordance with appendix A to this rule or with an alternative statistical procedure deemed acceptable by ~~the director~~Ohio EPA.
- (F) ~~For purposes of determining the appropriate residual waste landfill class, actual leachate~~Leachate from previously disposed ~~residual waste which~~IMW that is representative of long-term field leachate of the ~~residual wastes~~IMW proposed for future disposal may be substituted for the extract specified in paragraph (D) of this rule upon ~~the~~written concurrence of the director ~~from Ohio EPA. The director~~Ohio EPA.

EPA may allow ~~alternative~~alternate statistical procedures to those specified in paragraph (E) of this rule when ~~actual~~ leachate is used.

(G) ~~To confirm the residual waste is appropriate for the landfill class as established by rule 3745-30-04 of the Administrative Code, after~~Upon the effective date of a permit to install for a residual ~~waste~~ landfill, the ~~permittee~~owner or operator shall characterize each ~~residual~~ waste in accordance with the following:

- (1) ~~Within~~Not later than twelve months ~~of~~after the effective date of the permit, establish a confirmation sampling date by collecting one sample of each ~~residual~~ waste and characterizing it in accordance with paragraphs (A) to (D) of this rule. Based on a concentration of a parameter ~~which that~~ exceeds ~~the upper limit of the confidence interval calculated for that parameter in accordance with~~limit determined by paragraph (E)(1) or (E)(2) of this rule, the sampler, applicant, ~~permittee~~owner or operator, or ~~the director~~Ohio EPA may determine that ~~more~~additional samples are ~~required~~necessary to characterize the IMW.
- (2) Annually, ~~within~~not later than forty-five days ~~of~~after the confirmation sampling date established in accordance with paragraph (G)(1) of this rule, or according to a more frequent schedule ~~authorized as established by the director~~Ohio EPA based on variability noted in previous sampling events ~~and/or~~ other factors affecting the predictability of waste characteristics, collect one (or more) ~~sample(s)~~samples of each ~~residual~~ waste and characterize it in accordance with paragraphs (A) to (D) of this rule.
- (3) ~~All~~Submit all characterization data ~~shall be submitted to Ohio EPA within~~not later than seventy-five days ~~of~~after sampling and include a general process flow diagram ~~which that~~ displays the processes, points of generation, and types of wastes generated.
- (4) If ~~a test results indicate~~result indicates that the maximum allowable concentration for ~~the previously established landfill class~~disposal in the residual landfill is exceeded, submit two test results from additional samples ~~must be submitted within~~not later than seventy-five ~~additional~~ days after receipt of the test results. Testing may be limited to the parameter in ~~exceedence~~exceedance and any parameters with a concentration greater than fifty per cent of the maximum allowable concentration. Test results from two samples are ~~required~~needed to reject the original ~~exceedence~~exceedance. If the original ~~exceedence~~exceedance is not rejected, the ~~permittee~~owner or operator ~~may either~~shall cease disposal of the waste in the residual landfill facility. The owner or operator may submit to Ohio EPA a new waste characterization in accordance with paragraphs (A) to (E) of this rule, ~~within seventy-five days~~, or submit a permit to install application for modification to future phases of

the residual ~~waste~~-landfill to comply with the ~~appropriate landfill class~~liner system prescribed in rule 3745-30-07 of the Administrative Code due to a change in the type of waste received. If the ~~permittee~~owner or operator submits a new waste characterization, the director shall evaluate the characterization for the applicable maximum allowable concentration for disposal in a residual waste landfill classification and may require that the ~~permittee~~owner or operator submit a permit to install application to modify the landfill to comply with ~~a new class as appropriate~~the liner system prescribed in rule 3745-30-07 of the Administrative Code. The director shall not apply the siting criteria specified in rule 3745-30-06 of the Administrative Code to such a permit to install application, but may require additional environmentally protective measures.

- (5) Whenever the production process or raw materials used in the production process change significantly ~~and/or~~or new wastes are proposed for disposal in the residual ~~waste~~-landfill, characterize the waste in accordance with paragraphs (A) to (E) of this rule. For the ~~purpose~~purposes of this rule, ~~to "a significant change significantly"~~means that the change would be reasonably expected to ~~alter the appropriate~~cause the IMW to fail to meet the criteria for disposal in a residual waste landfill, classification as required~~established~~ in rule ~~3745-30-04~~3745-30-03 of the Administrative Code.

[Comment: The confirmation sampling date established pursuant to paragraph (G)(1) of this rule is the same date to be applied to a new waste proposed for disposal~~residual waste(s) approved for a facility.~~]

- (H) All characterization data shall be submitted to ~~the director~~Ohio EPA and be accompanied by a completed chain of custody documentation. The chain of custody documentation shall be a field tracking report form to record sample custody in the field prior to and during shipment.
- (I) Incorporation by reference. The text of the incorporated materials is not included in this rule and are hereby made a part of this rule. Only the specific version specified in this rule is incorporated. Any amendment or revision to a referenced document is not incorporated until this rule has been amended to specify the new version. The materials incorporated by reference are available as follows:
- (1) ~~Other publications. The availability of these documents is provided below; however, many of the documents are also available for inspection and copying at most public libraries and "The State Library of Ohio." As used in this rule:~~
- (a) ~~Specifications of the "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods, third edition, including Volume II, Field Manual (SW-846)" as amended through January 3, 2008. Information and copies may~~

~~be obtained by writing to: "National Technical Information Service, U.S. Department of Commerce, 5285 Port Royal Rd., Springfield, VA 22161." The full text is also available in electronic format at <http://www.epa.gov/epawaste/index.htm>.~~

- (1) American Public Health Association, American Water Works Association, and Water Environment Federation SM 2540C "Total Dissolved Solids Dried at 180°C," "Standard Methods for the Examination of Water and Wastewater:" 23rd Edition, 2017. The full text of this document is available in electronic format at <http://www.standardmethods.org/>.
- (2) United States environmental protection agency, "Guidance on Choosing a Sampling Design for Environmental Data Collection EPA/240/R-02/005," published in December 2002. The full text is available at <http://www.epa.gov/nseep> or by writing to U.S. Environmental Protection Agency/National Service Center for Environmental Publications, P. O. Box 42419, Cincinnati, OH 45242-0419.
- (3) United States environmental protection agency, "Regional Screening Levels," May 2020. The full text is available in electronic format at: <https://www.epa.gov/risk/regional-screening-levels-rsls-generic-tables-may-2016>.

Effective:

Five Year Review (FYR) Dates: 11/5/2020

Certification

Date

Promulgated Under: 119.03
Statutory Authority: 3734.02
Rule Amplifies: 3734.02
Prior Effective Dates: 01/13/1992, 11/30/2002, 05/18/2015

The statistical procedure in this appendix shall be used to determine the 80% upper confidence intervals for the mean concentrations of waste characterization parameters, as required by paragraph (E) of this rule, for the test results obtained in accordance with paragraph (D) of this rule. For any set of concentration values for a parameter from independent samples of waste, the 80% upper confidence interval (CI) for the mean is as follows:

$$CI = \bar{x} + t_{80} S_{\bar{x}}$$

Where: \bar{x} = arithmetic mean of the concentration of the parameter,
 t_{80} = "t" value taken from the table below,
 $S_{\bar{x}}$ = estimate of the standard error of the mean of the concentration of the parameter, calculated as follows:

$$S_{\bar{x}} = \frac{s}{\sqrt{n}}$$

Where: n = total number of samples of a waste analyzed for the parameter.
 s = estimate of the population standard deviation of the concentration of the parameter in a waste, calculated as follows:

$$s = \sqrt{\frac{\sum_{i=1}^n x_i^2}{n-1}}$$

Where: x_i = concentration of the parameter determined for one sample of a waste.

Tabulated Values of Student's "t_{.80}"

Degrees of Freedom (n-1)*	Tabulated "t _{.80} " value**	Degrees of Freedom (n-1)*	Tabulated "t _{.80} " value**	Degrees of Freedom (n-1)*	Tabulated "t _{.80} " value**
6	1.440	11	1.363	16	1.337
7	1.415	12	1.356	17	1.333
8	1.397	13	1.350	18	1.330
9	1.383	14	1.345	19	1.328
10	1.372	15	1.341	20	1.325

* Degrees of freedom are equal to one less than the number of samples (n) tested for a waste.

** Tabulated "t" values are for a two-tailed confidence interval and a probability of 0.80 for the population mean being within the confidence interval. Additional degrees of freedom and associated "t" values can be found in standard statistical manuals when calculating the upper confidence limit with more than seven samples.

The sample concentration data may be assumed to be normally distributed and may be used directly in determining the confidence interval. The upper limit of the confidence interval is compared with the applicable concentration limits in Appendix B to this rule. The upper limit of the confidence interval shall be less than or equal to the applicable class limit.

Maximum allowable concentration (ppm or mg/l) for residual waste characterization and residual waste landfill classification.

Number	Parameter	ppm or mg/l	CAS Registry Number
1	Arsenic	1.5	7440-38-2
2	Barium	30.0	7440-39-3
3	Cadmium	0.3	7440-43-9
4	Chromium	1.5	7440-47-3
5	Fluoride	120.0	16984-48-8
6	Lead	1.5	7439-92-1
7	Mercury	0.06	7439-97-6
8	Selenium	0.3	7782-49-2
9	Silver	1.5	7440-22-4
10	Chloride	7500 *	16887-00-6
11	Iron	9.0	7439-89-6
12	Manganese	9.0	7439-96-5
13	Sodium	7500	7440-23-5
14	Sulfate	7500	14808-79-8
15	Total dissolved solids	10,000	NA
16	Phenol	105.0	108-95-2
17	Cyanide	6.0	57-12-5
18	Benzene	0.15	71-43-2
19	Carbon tetrachloride	0.15	56-23-5
20	Chlorobenzene	30.0	108-90-7
21	Chloroform	1.8	67-66-3
22	m-cresol	60.0	108-39-4
23	o-cresol	60.0	95-48-7
24	p-cresol	60.0	106-44-5
25	1,4-Dichlorobenzene	2.25	106-46-7
26	1,2-Dichloroethane	0.15	107-06-2
27	1,1-Dichloroethylene	0.21	75-35-4
28	2,4-Dinitrotoluene	0.039	121-14-2
29	Hexachloro-1,3-butadiene	0.15	87-68-3
30	Hexachlorobenzene	0.039	118-74-1
31	Hexachloroethane	0.9	67-72-1
32	Methylethylketone	60.0	78-93-3
33	Nitrobenzene	0.6	98-95-3
34	Pyridine	1.5	110-86-1
35	Tetrachloroethylene	0.21	127-18-4
36	Trichloroethylene	0.15	79-01-6
37	2,4,5-Trichlorophenol	120.0	95-95-4
38	2,4,6-Trichlorophenol	0.6	88-06-2
39	Vinyl chloride	0.06	75-01-4
40	pH	***	NA

* [Comment: A chloride value above 1250 ppm or mg/l limits disposal to areas lined with a flexible membrane liner. See OAC rule 3745-27-07(D)(3) and appendix A to that rule.]

*** The pH value must be determined and reported for informational purposes; however, the residual waste landfill classification is not dependent on the pH value.