

Protocol for Leachable Toxic Waste Characterization for Samples Containing Cyanide

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Purpose

In accordance with section 49 (2) of the Hazardous Waste Regulation (HWR), the director hereby makes a variation to the prescribed use of US EPA Method 1311 for the analysis of cyanide in the characterization and classification of leachable toxic waste for cyanide.

The following protocol authorizes the use of a variation of the BC Modified Leachate Extraction Procedure (MLEP) to use 0.125 M of Sodium Hydroxide (NaOH) for the analysis of cyanide only. This variance does not apply to the analysis of other substances. The variance provides for the health and safety of laboratory workers during analysis of wastes suspected to contain cyanide. Cyanide tests results generated by MLEP using 0.125 M NaOH may also be used to ensure that other substances may be tested safely using US EPA Method 1311.

The BC MLEP is described in Part 2 of schedule 4 of the HWR; the variation by using 0.125 M NaOH is described in this protocol.

All cyanide testing of waste samples for the purpose of classification as hazardous or non-hazardous waste must be conducted in accordance with this variation [HWR s. 49(3)].

This variance does not apply to the testing of wastes (cyanide or other contaminants) to determine eligibility for disposal in a secure landfill or secure building; the standard MLEP test is used for this application (including testing for cyanide), as prescribed in Part 2 of Schedule 4 of the HWR.

Introduction

The characterization of a waste as leachable toxic waste is prescribed in the HWR and requires the use of the US EPA Method 1311, also known as the Toxicity Characteristic Leaching Procedure (TCLP). Free cyanide or easily dissociable cyanide species in a sample may be volatilized to cyanide gas by this method, resulting in low-biased cyanide measurements and potentially posing a health hazard for laboratory workers.

Potential waste samples suspected to contain cyanide should be tested for cyanide using MLEP (with 0.125 M NaOH), as described below, prior to being tested for other substances by TCLP.

The complete waste characterization process will be based on the analytical results to ensure that the waste is properly characterized and managed.

It is expected that the party requesting the analysis will advise the laboratory of any potential cyanide hazard to ensure the safety of the laboratory personnel and the appropriate use of the test method for waste characterization.

Protocol

This protocol applies only to the classification of potential hazardous wastes for cyanide. US EPA Method 1311 is required to be used for the classification of leachable toxic waste for all substances other than cyanide as prescribed in section 1 of the HWR.

1. Testing of Waste Known or Suspected to Contain Cyanide (for Leachable Cyanide)

The test method to be used for assessment of leachable cyanide is the BC MLEP with the following two procedural changes, based on US EPA Method 9013 (Cyanide Extraction Procedure for Solids and Oils):

- A. Use 0.125 M Sodium Hydroxide (NaOH) as the extraction fluid (instead of reagent water).
- B. Confirm pH is ≥ 10 following extraction. If pH drops below 10 during or after extraction, add 6 M NaOH to the extract in 1.0 mL increments until pH remains above 12, then repeat the extraction (for an additional 1 hour, verifying pH is ≥ 10 at completion).

The analytical test results are to be measured as Weak Acid Dissociable (WAD) Cyanide for evaluation of the Leachate Quality Standard for cyanide in Table 1 of Schedule 4 of the HWR.

2. Testing of Other Substances in Wastes Containing Cyanide

The waste characterization for leachate toxicity for substances or contaminants of concern, other than cyanide, must be conducted using the US EPA Method 1311 (TCLP) as per the HWR (s.1).

However, if analytical test results from the MLEP (using 0.125 M NaOH) as described above shows that the waste sample exceeds the Leachate Quality Standard for Cyanide (20 mg/L), the waste characterization for leachate toxicity for substances other than cyanide must be conducted with US EPA Method 1311 (TCLP) using a fume hood or other engineering or ventilation controls sufficient to protect the safety of laboratory workers.

Notes

The director may revise this protocol in the future and, therefore, users must ensure that only the current version of this protocol is used.