SECTION C

WASTE ANALYSIS PLAN

Revision 0

February 2021

SECTION C - WASTE ANALYSIS PLAN

TABLE OF CONTENTS

TABLES:

ATTACHMENTS:

SECTION C - WASTE ANALYSIS PLAN

1.0 WASTE ANALYSIS PLAN PURPOSE AND SCOPE

The purpose and scope of the Waste Analysis Plan (WAP) is to describe the procedures, sampling and analysis requirements, and rationale that will be followed at the CPCC plant to ensure adequate information is available to identify and manage Resource Conservation and Recovery Act (RCRA) hazardous waste safely. This WAP has been prepared in accordance with the requirements of 40 CFR 264.13. It provides a description of the process streams and addresses the sampling and analysis associated with those waste activities related to FQW, cement kiln dust (CKD), and refractory brick disposal.

2.0 INTRODUCTION

Tulsa Cement LLC owns and operates a Portland cement plant in Tulsa, Oklahoma, under the name of Central Plains Cement Company (CPCC). Systech Environmental Corporation (Systech) owns and operates a waste management facility co-located on the CPCC site for the receiving, blending, storage, and transfer of fuel quality waste (FQW) to the cement kilns. Together, the FQW blending facility and the cement plant are operated as a resource recovery site. The cement plant manufactures Portland cement from raw limestone, sand, and shale, as well as various raw material substitutes in two dry-process rotary kilns. The kilns may obtain up to 100% of the thermal energy required in the cement manufacturing process through the combustion of FQW. The FQW replaces traditional fossil fuels such as coal, coke, and natural gas, that are used for energy recovery to provide the heat necessary for the kilns to process the raw materials. The management of FQW at CPCC is regulated under the RCRA and the Oklahoma Hazardous Waste Regulations, Oklahoma Administrative Code (OAC 252 et. al.). The combustion of the FQW in the cement kilns is regulated by the United States Environmental Protection Agency (USEPA), 40 CFR Part 63, Subpart EEE, Hazardous Waste Combustor - Maximum Achievable Control Technology (MACT) regulations.

3.0 DESCRIPTION OF PROCESS STREAMS

The feed streams associated with cement manufacturing include FQW, nonhazardous fuels, raw materials, raw material substitutes, and recycled CKD. These feed streams produce the clinker product and CKD (which may be recycled, handled as a product, or placed in a landfill as a waste). Air emissions associated with the burning of fuels and production of cement are regulated under 40 CFR 60 Subpart F, 40 CFR 61 Subpart FF, and 40 CFR 63 Subparts EEE and LLL. Consequently, only the FQW, CKD removed from the process, and spent refractory brick processes are described in this section.

3.1 Fuel Quality Waste Description

FQW at the CPCC plant is considered to be “pumpable.” FQW is received exclusively from the Systech Environmental Corporation, which is co-located at the facility and covered under OK permit OKR000025452. The fuel is stored in two large storage tanks owned by Systech and subsequently pumped to the kilns.

Liquid FQW is received from various industries and is essentially a mixture of waste solvents such as paints and paint thinners, acetone, inks, etc. Also, FQW is comprised of various petroleum materials and oils, etc. Small amounts of dissolved fine solid particles from the processes generating the wastes may be in these various fuel materials.

Tables C-1 and C-2 present the typical organic and non-organic constituent composition of FQW.

TABLE C-1 TYPICAL FQW ANALYSIS (ORGANIC CONSTITUENTS)[1]

COMPOUND	CAS NUMBER	AVERAGE WT%
ETHYL ALCOHOL	64175	1.12
METHYL ALCOHOL	67561	0.77
ISOPROPYL ALCOHOL	67630	1.85
ACETONE	67641	1.73
N-BUTYL ALCOHOL	71363	0.19
BENZENE (RESULTS FROM FREDONIA)	71432	0.06
BUTYLAMINE, TERT-	75649	0.89
BUTANOL, TERT-	75650	0.08
ISOBUTYL ALCOHOL	78831	0.33
METHYL ETHYL KETONE	78933	0.72
METHYLACETAMIDE, N-	79163	0.32
ETHYL BENZENE	100414	0.70
STYRENE	100425	0.16
VINYL ACETATE (*RMP*)	108054	0.32
ETHYLHEXYL ALCOHOL, 2-	104767	0.29
METHYL ISOBUTYL KETONE	108101	0.13
ISOPROPYL ACETATE	108214	0.36
TOLUENE	108883	1.23
PHENOL	108952	0.97
DIETHYLAMINE	109897	0.24
TETRAHYDROFURAN	109999	0.34
METHYL N-AMYL KETONE	110430	0.19
HEXANES	110543	0.60
CYCLOHEXANE	110827	0.39
GLYCOL ETHERS (SEE BELOW FOR INDIVIDUAL)	111900	1.07
N-BUTYL ACETATE	123864	0.43
DIOXANE	123911	0.38
ETHYL ACETATE	141786	0.39
ISOOCTANE	540841	0.09
BUTYLMETHYL ETHER, TERT-	1634044	0.16
DIISOPROPYL KETONE	565800	0.63
METHYL N-BUTYL KETONE (2-HEXANONE)	591786	0.19
XYLENES (MIXED ISOMERS)	1330207	1.67
PROPYLENE GLYCOL ETHYL ETHER	1569024	0.14
BUTYL ACRYLATE, TERT- POLYMERIZE ON HEAT)	1663394	0.14
DIETHYLENE GLYCOL PROPYL ETHER	6881943	0.85

COMPOUND	CAS NUMBER	AVERAGE WT%
ALIPHATICS (LOW BOILING AND HEPTANES)	N/A	0.37
ALKYL BENZENES (MID/HIGH BOILERS, UNDECANE)	N/A	19.14
WATER	7732185	21.73
SOLIDS	N/A	23.83
DIETHYLENE GLYCOL ETHYL ETHER	111900	0.72
TRIETHYLENE GLYCOL DIMETHYL ETHER	112492	0.39

[1]Organic data compiled from 2019 TRI report

TABLE C-2 TYPICAL FQW ANALYSIS (NON-ORGANIC CONSTITUENTS)[1]

PARAMETER	HWF
CHLORINE (%)[2]	0.5
ARSENIC (ppm)	10
BERYLLIUM (ppm)	1
CADMIUM (ppm)	1.6
CHROMIUM (ppm)	53.8
LEAD (ppm)	20.4
MERCURY (ppm)	0.7

[1]Non-organic data compiled from 2019 TRI report.

[2]Chlorine % value compiled from 2019 MACT data.

[1] Metals data is the average of Lafarge Fredonia calendar year 2005 analyses. The fuels blending facility that supplies the FQW to the Systech Tulsa facility is located in Fredonia, KS.

All FQW fired in the industrial furnace comes from only one source, the on-site Systech fuel processing operations. The single supplier, Systech, has prepared a Fuel Qualification Form for the FQW received by CPCC from the on-site Systech operations. The qualification form is updated as necessary if CPCC is notified or has reason to believe the FQW has changed. Each transfer from the Systech tanks to the industrial furnace is reviewed to demonstrate that the FQW meets the transfer requirements as defined in the Feedstream Analysis Plan (FAP) developed in compliance with the Hazardous Waste Combustor MACT (40 CFR 63 Subpart EEE). The heat content (determined by mathematically calculating the results of test methods based on ASTM D240 and/or ASTM D5468) of each transfer is used as a fingerprint test to ensure that the waste is as expected and is reviewed to ensure that the FQW meets the minimum energy recovery requirements of the industrial furnace.

3.2 Cement Kiln Dust and Refractory Brick

Process by-products consist of particulate matter removed from the stack emissions and used refractory brick. The particulate matter is commonly referred to as cement kiln dust (CKD). The CKD is captured by the air pollution control devices dedicated to each kiln and collected in hoppers below each unit. CKD will be sampled and analyzed to demonstrate compliance with 40 CFR 266.112(b), Bevill exemption from the definition of a solid waste.

Used refractory brick is generated periodically by the removal of this material from the kilns during maintenance. Used refractory brick is not a listed hazardous waste because it does not contain chromium and other hazardous constituents above the characteristic regulatory levels. The used refractory brick is tested by a subcontracted laboratory to confirm the absence of characteristically hazardous concentrations of constituents of concern prior to reuse or disposal. Any used refractory brick determined to have characteristically hazardous concentrations of constituents of concern will be managed as a hazardous waste.

4.0 PURPOSE OF SAMPLING AND ANALYSIS

4.1 Residue Classification and Refractory Brick Status Determination

Under 40 CFR 266.112(b), it is necessary to demonstrate that burning hazardous waste in a cement kiln does not affect process residues. Sampling and analyses are performed to demonstrate that the residue does not contain toxic compounds at levels above specified health-based limits that could reasonably be attributable to burning or processing hazardous waste. This sampling and analysis is referred to as the Bevill exclusion test.

CKD will retain the Bevill exemption as long as it can be demonstrated that the character of the residue is not affected by the burning of hazardous waste. For the purposes of waste classification, CPCC has established a plan for determining whether CKD retains the exemption or must be managed as a hazardous waste, using the F039 list for organics and the Toxic Characteristic Leaching Procedure (TCLP) list for metals. This plan is provided as Attachment C-1 of the Waste Analysis Plan.

CPCC will also sample the used refractory brick for metals to determine its status as a characteristic waste. After analysis, CPCC will handle the material according to its designation (see Section 5.2).

5.0 SAMPLING PROCEDURES AND FREQUENCIES

40 CFR 266.102(b)(2) requires owners and operators to conduct sampling and analysis as necessary to ensure that the hazardous waste, other fuels, and industrial furnace feedstocks fired into the industrial furnace are within the physical and composition limits specified in the permit. The Feedstream Analysis Plan (FAP), required by the HWC MACT, details the sampling and analysis of the feed streams to assure compliance with the limitation specified in the permit.

This section explains the sampling procedures that CPCC employs when sampling CKD and refractory brick. To collect a sample that is representative of the process stream, the sample must be collected and handled by means that will preserve its original physical form and composition, as well as prevent contamination or changes in concentration of the parameters to be analyzed. Table C-3 provides a list of sampling methods and sampling frequency to be used for each stream.

TABLE C-3 SAMPLING METHODS

FEED STREAM	SAMPLING SITE	FREQUENCY	METHOD	TYPE	CONTAINER[1]	FIELD DUPLICATE FREQUENCY
CKD	CKD screw	Daily sample	S-004	Grab	P,G	1 per 10 samples
Used Kiln Brick	Brick pile	Each batch	“whole” brick	Composite	P	1 per 10 samples

[1] Plastic (P) or Glass (G)

5.1 Cement Kiln Dust

CKD samples will be collected as close to the air pollution control device as possible in order to minimize the possibility of contamination due to ambient conditions. The sampling point for each unit will be at the screw conveyor prior to the pneumatic pump.

CPCC samples the CKD (composited from both kilns) on a daily basis when CKD is being removed from the system (either as product or waste). The samples are analyzed at the sampling interval specified in the CKD Sampling and Analysis plan, Attachment C-1.

If the TCLP analysis confirms that any constituent is present in the CKD at levels which exceed the regulatory limits given at 40 CFR 266, Appendix VII, the CKD will be sent to a Subtitle C landfill.

Sampling and analysis frequency for F039 organics and dioxin/furans in the CKD will be conducted at least once per year. During the 1995 and 2003 Trial Burns conducted at the Lafarge plant in Fredonia, Kansas, Lafarge conducted sampling and analysis of CKD for F039 listed organics during minimum combustion zone temperatures. Under these conditions, 100% fuel substitution with FQW was practiced, and principle organic hazardous constituents (POHCs) selected on the basis of maximum thermal stability were being spiked in the waste fuel feed stream. These kiln conditions favor incomplete combustion and are most likely to result in contamination of the CKD by toxic organics; however, all of the CKD samples indicated concentrations below the F039 limits specified for non-wastewater Land Disposal Restrictions (40 CFR 268.40).

5.2 Used Refractory Brick

CPCC has established the following procedures for sampling used refractory brick:

- Used brick will be piled on a concrete surface with rainwater runoff protection.
- One sample will be taken from each quadrant of the pile.
- The samples will be crushed and mixed to form a single composite sample to represent the entire pile.
- The sample will be analyzed at an off-site laboratory, for TCLP metals.
- If the sample exceeds the regulatory level for any TCLP metal, it will be considered hazardous.
- If the brick is hazardous, it will be sent off-site for proper treatment or disposal within 90 days of determination that it is a regulated hazardous waste.
- If the brick is non-hazardous, it will be reused as a raw material ingredient in the manufacture of cement.
- Non-hazardous used brick will be recycled within one year.

6.0 SAMPLE ANALYSIS

The samples described in Section C.5 will be prepared and analyzed according to the methods described below:

CPCC will subcontract a qualified laboratory to perform the total metal analysis on the refractory brick. All CKD-related analyses are performed following Methods 6020A, 7470A, 8260B, 8082, 8270C, 8082S, 8260S, 8270S, or 8290, as appropriate from Test Methods for Evaluating Solid Waste, Physical/Chemical Methods, SW-846. Table C-4 describes the methods of preparation and analysis for each parameter, as well as a description of the reason for the analysis.

TABLE C-4 ANALYTICAL PARAMETERS, METHODS, AND RATIONALE

PARAMETER	PREPARATION[1]	ANALYSIS	REASON FOR ANALYSIS
Volatile Organics	SW-846	Method 8260	CKD Exemption Determination
Semi-volatiles		Method 8270	CKD Exemption Determination
Pesticides & PCB's		Method 8081, 8082	CKD Exemption Determination
Misc. VOC's & Herbicides		Methods 8015 & 8151	CKD Exemption Determination
TCLP Metals		Methods 1311, 6010 and 7000-series (as needed)	CKD Exemption Determination
Dioxins/Furans		Method 8280	CKD Exemption Determination
F039 Organics			CKD Exemption Determination
TCLP Metals	SW-846	Method 1311	Refractory Brick Hazard Classification

[1] One or more of the methods are used in a modified, amended, revised, or updated form in accordance with the following quotations from the Federal Register, February 8, 1990, pages 4440-4445, EPA Proposed Rules - Preamble to SW-846 3rd edition.

- "This notice, or the subsequent final rule, should not be constructed to require the use of SW-846, Third Edition methods except where specifically prescribed by regulation."
- "Except for those situations where the RCRA regulations specify use of a particular method, it is appropriate for the chemist to use judgement, tempered by experience, in selecting an appropriate set of methods from SW-846 or the scientific literature for preparing and analyzing a given sample."
- "Implicit in the preceding argument is the fact that SW-846 was designed largely for use in showing that a waste does not contain certain hazardous constituents or characteristics. In that regard, many SW-846 sample preparation methods are designed around trace analysis rather than the percent level determinations often required for concentrated wastes. These methods, however, might be suitable for percent level determination analysis when appropriately modified by the analyst."

ATTACHMENT C-1 CKD SAMPLING AND ANALYSIS PLAN

CPCC CEMENT KILN DUST SAMPLING AND ANALYSIS PLAN

February 2021

Original sampling plan developed in March 1993 by Radian Corporation, Herdon, Virginia, and revised by Lafarge in 2006 and 2009 for the Tulsa, Oklahoma Plant. Tulsa Cement, LLC dba Central Plains Cement Company assumed responsibility for the RCRA Permit in 2012

1.0 INTRODUCTION

This document defines the sampling and analysis protocol to be followed to ensure quality data for the characterization of cement kiln dust (CKD) generated by CPCC. CKD sampling and analyses will be performed to meet the requirements regarding regulation of residues as outlined in 40 CFR 266.112. All sampling and analysis will be performed in accordance with procedures specified in the most current version of EPA's Test Methods for Evaluating Solid Waste: Physical/Chemical Methods Compendium, SW-846.

CPCC may modify this document to accommodate changes in regulations or to provide new or additional information.

2.0 ORGANIZATIONAL RESPONSIBILITY

CPCC will have overall responsibility for implementing the sampling activities discussed in this document. These activities include providing and training sampling personnel, scheduling sample collection events, periodically reviewing field sampling procedures to ensure that they are being conducted properly and adhering to appropriate health and safety requirements. The Environmental Manager will serve as the primary point of contact and control concerning sampling activities at the plant.

CPCC is responsible for providing sufficient quantities of CKD to the laboratory for use as field/trip blanks. CPCC may delegate any or all of these sampling activities at its discretion.

The commercial laboratory selected by CPCC will have overall responsibility for implementing the analytical activities discussed in this document. These activities include training analytical personnel in the requirements of CKD sample preparation and analysis, ensuring that all analyses are conducted in a timely fashion according to specified SW-846 protocols and adhering to any special analytical techniques and QA/QC procedures (e.g., CKD trip blank) required by the nature of the CKD matrix. The laboratory will have experience in preparing and analyzing CKD matrices. The laboratory Client Services Coordinator or his/her designee will serve as the primary point of contact and control concerning analytical activities at the laboratory.

The laboratory may not subcontract any analytical work without the prior express written consent of CPCC. If work is subcontracted, the original laboratory will be responsible for overseeing subcontractor operations.

The laboratory is responsible for supplying and preparing sampling kits as specified in Section 4.3 and sample containers as specified in Section 4.4, and then shipping them to CPCC as needed. Preparation includes any necessary equipment pre-cleaning that must be performed to meet specified protocols.

3.0 DATA QUALITY OBJECTIVES

Data quality objectives (DQOs) are guidelines for certain characteristics of data that indicate the usefulness or reliability of the data. The DQOs for the CPCC CKD sampling and analysis episodes are specified in terms of accuracy, precision, comparability, completeness, representativeness, and practical quantitation limits (PQLs). The procedures prescribed in this document are intended to ensure that the specified DQOs for CPCC CKD sampling and analysis are achieved and valid data are obtained.

In any instance where a DQO is not achieved during a sampling and analysis episode, the CPCC Environmental Manager will be notified at once. The Environmental Manager is responsible for ensuring that any necessary corrective action is taken as soon as practicable after notification.

3.1 Accuracy

Accuracy is a measure of how closely a measured value agrees with the true value of a parameter. Accuracy will be evaluated using matrix spike and surrogate recoveries to determine the extent of matrix interference, and field/trip/lab blank analysis to determine the extent of any sample contamination.

The DQO for matrix spike and surrogate recoveries is the recovery range specified in each applicable method in SW-846 or the acceptable recovery range specified by a laboratory performing the analysis.

Bias determined from the matrix spike recovery information will be used to correct measured analyte values when the average recovery is less than the minimum acceptable recovery range specified; bias corrections using the average recovery will be performed as specified in SW-846. No bias correction will be performed when the method used self-corrects for bias (e.g., isotope dilution), or when the matrix spike recovery is greater than or equal to the minimum of the acceptable recovery range specified in SW-846. The DQO for field/trip/lab blanks is an analyte concentration below the sample detection limit for all analytes of concern. If analytes are detected in blanks, corresponding sample concentrations for those analytes will be evaluated to determine if the sample concentrations are attributable to contamination according to criteria specified in SW-846. Affected samples will be noted.

3.2 Precision

Precision is a measure of the agreement among individual measurements of the same parameter performed under similar conditions. It indicates the extent of inherent variability in sampling and analysis procedures. Analytical precision will be evaluated using matrix spike/matrix spike duplicate (MS/MSD) pairs.

The DQO for relative percent difference (RPD) between results of duplicate pair analyses for target organic analytes is 50% or less; for target inorganic analytes, the DQO for RPD is 30% or less. If a DQO for precision is not met, the impact on data quality will be evaluated. Where indicated, the more conservative of the matrix spike duplicate pair analyses, i.e., the one leading to higher analyte sample concentrations, will be used in lieu of the average recovery for any data reduction. In some instances, re-analysis may be warranted.

3.3 Comparability

Comparability is a measure of the degree of confidence with which one data set can be compared to another. The DQO for comparability will be ensured by using the same sampling and analysis procedures for each sampling episode. Analytical data will be reported in the same manner and using the same units for each test for all samples of the same fraction.

3.4 Completeness

Completeness is a measure of the amount of valid data that is collected from a sampling and analysis episode compared to the amount of data that was desired to be produced. Completeness may not always be achieved due to mishaps in sampling and sample shipping, analytical difficulties, etc.

The DQO for completeness for each sampling episode is 100%. If completeness for any sampling and analysis episode is less than 100%, the circumstances must be documented, and the impact on data quality must be evaluated. Supplemental sampling and analysis may be required if deemed appropriate.

3.5 Representativeness

Representativeness is a measure of the degree to which the analytical results represent the population from which the sample was obtained. The DQO for representativeness will be ensured by following standard sampling and analysis techniques prescribed in SW-846 and in this document.

3.6 Practical Quantitation Limits (PQLs)

The PQLs for target metal analytes using the standard SW-846 methods specified in Section 5.2 of this Attachment will be less than or equal to the TCLP Extract Concentration Limits for those metals, as specified in 40 CFR Part 266, Appendix VII.

The PQLs for target organic analytes using the standard SW-846 methods specified in Section 5.2 of this Attachment will be less than or equal to the PQLs as listed in the methods for this type of matrix. In cases where the method specified PQL is not attainable due to sample matrix interferences, any data generated in those instances will be flagged accordingly.

4.0 SAMPLING PROCEDURES

The sampling procedures outlined below assume that the full set of sample fractions will be collected during the same sampling and analysis episode. If less than the full set of sample fractions for various different analyses is collected during a sampling episode, the procedures will be modified accordingly to accommodate only the specific sample fractions necessary for each particular sampling episode.

The prescribed sampling procedures may also require modification based on plant- specific circumstances. The CPCC Environmental Manager must give prior approval before any modifications to sampling procedures can be implemented.

All personnel involved in any aspect of sampling will be adequately trained to perform their specific duties. In addition, they will be familiar with and abide by all relevant health and safety requirements, including the proper use of any necessary personal protective equipment (PPE).

4.1 General Precautions

CKD is a powerful adsorbent. It may adsorb volatile organic compounds (VOCs) that are present in surrounding air to the extent that VOCs are detected when CKD samples are analyzed, producing a "false positive" result. Since VOCs can be generated in various ways (from vehicles, machinery, paints, solvents, adhesives, etc.) and can occur virtually anywhere, utmost caution will be observed when collecting VOC fractions of CKD samples. Empty or filled VOC sample containers will not be stored near waste-derived fuel-burning operations, vehicle exhausts, or painting, spraying, waxing, or other chemical operations, etc., to the extent practicable. Samples will not be collected if conditions persist around the sampling location that are conducive to the presence of VOCs (e.g., presence of gasoline engines, etc.). The Environmental Manager or designee will be responsible to ensure that conditions around the sampling location are conducive to collecting a sample.

4.2 Sample Fractions

Four sample fractions will be retrieved from one grab sample collected at each sampling location at the CPCC plant in the following order:

1. VOCs;
2. Semivolatiles, including Pesticides and PCBs;
3. Polychlorinated dibenzo-p-dioxins/dibenzofurans (Dioxins/Furans) (this fraction may be discontinued following the initial sampling episode for Dioxins/Furans at each site after analytical results are evaluated); and
4. Metals.

4.3 Sampling Conditions

CKD will be sampled only during normal waste-burning operations. The sampled CKD will be representative of CKD generated during steady-state operating conditions. Sampling personnel will confirm steady-state operation with the current Shift Kiln Burner Operator.

4.4 Sampling Locations

According to 40 CFR 266.112(b), to demonstrate that burning hazardous waste in a cement kiln does not affect waste-derived residue, i.e., CKD, the residue must not contain toxic compounds (above specified health-based limits) that could reasonably be attributable to burning or processing the hazardous waste. Therefore, samples collected during each sampling episode at the plant will represent recently generated CKD to minimize any environmental contamination that is not attributable to burning or processing hazardous waste. As such, CKD samples will be taken as close to the Air Pollution Control Device (APCD) waste dust outlets as practicable. The sampling point is at the screw conveyor prior to the pneumatic pump.

4.5 Sampling Frequency

Metals. CPCC will sample for TCLP metals in the CKD at a frequency to be determined through the evaluation of historical results. A sampling interval adequate to provide a 95% confidence level that the limits will not be exceeded will be statistically derived, and these calculations, as well as the proposed sampling interval, will be submitted to the Agency before the current sampling interval is modified. A minimum sampling frequency of once per quarter will be maintained.

Non-Metals: CKD is sampled for non-metal constituents during the worst-case operating conditions (minimum combustion chamber temperature maximum hazardous waste feed rate) during the Compliance Performance Test. If none of the technology-based Land Disposal Restriction limits for waste code F039 non-wastewaters re exceeded in these sample, CPCC will sample for non-mental in the CKD at least annually.

5.0 ANALYTICAL PROCEDURES

5.1 General Precautions

CKD is a powerful adsorbent. It may adsorb volatile organic compounds (VOCs) that are present in surrounding air to the extent that VOCs are detected when CKD samples are analyzed, producing a "false positive" result. Since VOCs can be generated in various ways (from vehicles, machinery, paints, solvents, adhesives, etc.) and can occur virtually anywhere, utmost caution will be observed when preparing or analyzing VOC fractions of CKD samples. VOC sample containers will not be stored near vehicle exhausts, or near painting, spraying, waxing, or other chemical operations, etc., to the extent practicable.

5.2 Analytical Methods

The samples from each sampling location will be analyzed for VOCs using SW-846 Method 8260, for Semi volatiles using Method 8270, Pesticides and PCBs using Method 8081, Dioxins/Furans using Method 8280, for TCLP Metals using Methods 1311, 6010, and 7000-series methods (as needed), and for miscellaneous VOCs and Herbicides using Methods 8015 and 8151, respectively. This method list may be condensed, expanded, or otherwise substituted by the laboratory as long as the methods selected adequately analyze all target analytes. All applicable laboratory calibration, quality assurance/quality control (QA/QC), and auditing procedures will be followed.

5.3 Target Analyte List

The regulations at 40 CFR 266.112(b) allow the owner or operator of a cement kiln to choose either of two criteria to demonstrate that the burning of FQW does not significantly affect the resulting CKD. CPCC has chosen to comply with the criteria contained in 40 CFR 266.112(b)(2), which compares the concentration of nonmetal and metal constituents of concern in the waste-derived CKD with health- based limits. As described below, CPCC may use the criteria contained in 40 CFR 266.112(b)(1) as a secondary criterion to confirm results prior to making a final determination. The specific requirements used for the primary method described in 40 CFR 266.112(b)(2) are:

- The concentration of nonmetal constituents of concern (i.e., toxic constituents from Appendix VIII, 40 CFR 261 that could be reasonably attributed to the hazardous waste and the Products of Incomplete Combustion listed in 40 CFR 266 Appendix VII) in the hazardous waste-derived CKD generally must not exceed the limits specified in 40 CFR 268.40 for waste code F039 (non-waste waters), "Treatment Standards for Hazardous Wastes". Constituents of concern not in the F039 list do not have specified concentrations. There are special considerations for problems with limits of detection that exceed the concentrations specified in the F039 list as explained at § 266.112(b)(2).

  Table 1 in Appendix A contains the list and comparison limits of nonmetal constituents of concern that are used to determine compliance with 40 CFR 266.112(b). This list has been developed from the following lists:

    - The Products of Incomplete Combustion (PICs), which are listed in 40 CFR, Part 266, Appendix VII;
    - The toxic constituents from 40 CFR Part 261 Appendix VIII, that reasonably could be attributed to the WDF (reasonably expected analytes, or REAs); and
    - The chemicals that have specified non-wastewater limits as listed in the F039 entry in 40 CFR 268.40.

  The determination of which REAs to include on the list is based on the list of waste codes which the facility is approved to receive that are included within the 40 CFR 261 Appendix VIII. If a REA or a PIC is listed in the non-wastewater limits in the F039 entry at 40 CFR 268.40, then it was included in the list in Table 1. This list is not expected to be modified since it represents significantly more compounds than have been identified in the many years of WDF quarterly sampling at other similar facilities. The lack of presence of these compounds from the CKD residues demonstrates the effectiveness of the high destruction removal efficiency and the inherent capabilities of the pyro processing system.

- Table 2 of Appendix A contains the list and comparison limits of metal constituents of concern that are used to determine compliance with 40 CFR 266.112(b). This list includes the twelve BIF residue metals (i.e., antimony, arsenic, barium, beryllium, cadmium, chromium, lead, mercury, nickel, selenium, silver and thallium) contained in Appendix VII, 40 CFR 266.

- The CKD will be sampled and analyzed as often as necessary to determine whether the CKD generated during each 24-hour period has concentrations of constituents of concern in excess of those referenced in the two preceding paragraphs.

The target analyte list was developed by compiling all 40 CFR Part 261, Appendix VIII Hazardous Constituents that could reasonably be attributed to the hazardous waste code included in the Part A and all 40 CFR Part 266, Appendix VII Nonmetal Residue Concentration Limits, and then reducing that compilation to include only those constituents that can be analyzed by SW-846 methods according to 40 CFR Part 264, Appendix IX. The laboratory will analyze all listed target analytes that the laboratory is capable of analyzing; the laboratory will provide CPCC with an exact list of any compounds on the target analyte list that it is not capable of analyzing. Matrix and analytical spikes will be performed using representative target analytes.

5.4 SW-846 Method Modification

In instances where SW-846 methods require modification for analysis of CKD samples with analyte detection limits at or below analyte health-based limits, the laboratory will verify that the modification is valid, and will document the procedures and data used to make the validity determination. No method modification can be made without the prior express written consent of CPCC.

APPENDIX A
TARGET ANALYTE LISTS

TABLE 1 NON-METALS TARGET ANALYTE LIST

COMMON NAME	CHEMICAL ABSTRACTS NO.	CONC. MG/KG
p-Nitroaniline	100-01-6	28
p-Nitrophenol	100-02-7	29
cis-1,3-Dichloropropene (as part of 1,3-Dichloropropene)	10061-01-5	18
trans-1,3-Dichloropropene (as part of 1,3-Dichloropropene)	10061-02-6	18
N-Nitrosopiperidine	100-75-4	35
4,4'-Methylenebis(2-chloroaniline)	101-14-4	30
4-Bromophenyl phenyl ether	101-55-3	15
Heptachlor epoxide	1024-57-3	0.066
2,4-Dimethylphenol	105-67-9	14
p-Cresol (as part of Cresols or Cresylic Acid)	106-44-5	5.6
p-Dichlorobenzene	106-46-7	6
p-Chloroaniline	106-47-8	16
Ethylene dibromide	106-93-4	15
3-Chloropropene (Allyl chloride)	107-05-1	30
Ethylene dichloride	107-06-2	6
Acrylonitrile	107-13-1	84
Methyl isobutyl ketone	108–10–1	33
m-Cresol (as part of Cresols or Cresylic Acid)	108-39-4	5.6
Toluene	108-88-3	10
Chlorobenzene	108-90-7	6
Phenol	108-95-2	6.2
Pyridine	110-86-1	16
Dichloroethyl ether [Bis(2-chloroethyl) ether]	111-44-4	6
Dichloromethoxy ethane [Bis(chloromethylether)]	111-91-1	7.2
Diethylhexyl phthalate [Bis(2-ethylhexyl) phthalate]	117-81-7	28
Di-n-octyl phthalate	117–84–0	28
Hexachlorobenzene	118-74-1	10
Isosafrole	120-58-1	2.6
2,4-Dichlorophenol	120-83-2	14
2,4-Dinitrotoluene	121-14-2	140
1,4-Diethyleneoxide	123-91-1	170
Methacrylonitrile	126-98-7	84

COMMON NAME	CHEMICAL ABSTRACTS NO.	CONC. MG/KG
Tetrachloroethylene	127-18-4	6
Dimethyl phthalate	131-11-3	28
Xylene	1330–20–7	30
Polychlorinated biphenyls	1336-36-3	10
Ethyl acetate	141–78–6	33
Kepone	143-50-0	0.13
1,2-Dichloroethylene	156-60-5	30
Hexachloropropene	1888-71-7	30
Indeno[1,2,3-cd]pyrene	193-39-5	3.4
Fluoranthene	206-44-0	3.4
Chrysene	218-01-9	3.4
Pronamide	23950-58-5	1.5
Methyl parathion	298-00-0	4.6
Phorate	298-02-2	4.6
Disulfoton	298-04-4	6.2
Aldrin	309-00-2	0.066
Isodrin	465-73-6	0.066
DDT	50-29-3	0.087
Benzo[a]pyrene	50-32-8	3.4
2,4-Dinitrophenol	51-28-5	160
Famphur	52-85-7	15
4,6-Dinitro-o-cresol	534-52-1	160
Dibenz[a,h]anthracene	53-70-3	8.2
2-Acetylaminefluarone	53-96-3	140
m-Dichlorobenzene	541-73-1	6
N-Nitrosodiethylamine	55-18-5	28
Carbon tetrachloride	56-23-5	6
Parathion	56-38-2	4.6
3-Methylcholanthrene	56-49-5	15
Benz[a]anthracene	56-55-3	3.4
Chlordane	57-74-9	0.26
Lindane	58-89-9	0.066
2,3,4,6-Tetrachlorophenol	58-90-2	7.4
p-Chloro-m-cresol	59-50-7	14

COMMON NAME	CHEMICAL ABSTRACTS NO.	CONC. MG/KG
Ethyl ether	60–29–7	160
Dieldrin	60-57-1	0.13
2,6-Dinitrotoluene	606-20-2	28
Pentachlorobenzene	608-93-5	10
Phenacetin	62-44-2	16
Aniline	62-53-3	14
1,1,1,2-Tetrachloroethane	630-20-6	6
Acetone	67–64–1	160
Chloroform	67-66-3	6
Hexachloroethane	67-72-1	30
n-Butyl alcohol	71–36–3	2.6
Benzene	71-43-2	10
1,1,1-Trichloroethane	71-55-6	6
Endrin	72-20-8	0.13
Methoxychlor	72-43-5	0.18
DDD	72-54-8	0.087
Methyl bromide	74-83-9	15
Methyl chloride	74-87-3	30
Methyl iodide	74-88-4	65
Methylene bromide	74-95-3	15
Vinyl chloride	75-01-4	6
Methylene chloride	75-09-2	30
Bromoform	75-25-2	15
Ethylidene dichloride	75-34-3	6
1,1-Dichloroethylene	75-35-4	6
Trichlorofluoromethane	75-69-4	30
Dichlorodifluoromethane	75-71-8	7.2
Heptachlor	76-44-8	0.066
Hexachlorocyclopentadiene	77-47-4	2.4
Isobutyl alcohol	78-83-1	170
Propylene dichloride	78-87-5	18
Methyl ethyl ketone (MEK)	78-93-3	36
1,1,2-Trichloroethane	79-00-5	6
Trichloroethylene	79-01-6	6

COMMON NAME	CHEMICAL ABSTRACTS NO.	CONC. MG/KG
1,1,2,2-Tetrachloroethane	79-34-5	6
Toxaphene	8001-35-2	2.6
Methyl methacrylate	80-62-6	160
Pentachloronitrobenzene (PCNB)	82-68-8	4.8
Diethyl phthalate	84-66-2	28
Dibutyl phthalate	84-74-2	28
2,6-Dichlorophenol	87-65-0	14
Hexachlorobutadiene	87-68-3	5.6
Pentachlorophenol	87-86-5	7.4
2,4,6-Trichlorophenol	88-06-2	7.4
Dinoseb	88-85-7	2.5
Naphthalene	91-20-3	5.6
beta-Chloronaphthalene	91-58-7	5.6
Methapyrilene	91-80-5	1.5
N-Nitrosodi-n-butylamine	924-16-3	17
N-Nitrosopyrrolidine	930-55-2	35
Safrole	94-59-7	22
2,4-D	94-75-7	10
o-Cresol (as part of Cresols or Cresylic Acid)	95-48-7	5.6
o-Dichlorobenzene	95-50-1	6
o-Chlorophenol	95-57-8	5.7
1,2,4,5-Tetrachlorobenzene	95-94-3	14
2,4,5-Trichlorophenol	95-95-4	7.4
1,2-Dibromo-3-chloropropane	96-12-8	15
Ethyl methacrylate	97-63-2	160
Acetophenone	98-86-2	9.7
Nitrobenzene	98-95-3	14
5-Nitro-o-toluidine	99-55-8	28
Hexachlorodibenzo-p-dioxins (HxCDD)		0.001

TABLE 2 METALS TARGET ANALYTE LIST

COMPOUND	CAS NO.	CONCENTRATION LIMIT (MG/L)
Antimony	7440-36-0	1
Arsenic	7440-38-2	5
Barium	7440-39-3	100
Beryllium	7440-41-7	0.007
Cadmium	7440-43-9	1
Chromium	7440-47-3	5
Lead	7439-92-1	5
Mercury	7439-97-6	0.2
Nickel	7440-02-0	70
Selenium	7782-49-2	1
Silver	7440-22-4	5
Thallium	7440-28-0	7