FUEL PROCUREMENT AND MONITORING PLAN

L'ANSE WARDEN ELECTRIC COMPANY, LLC.
157 South Main Street
L'Anse, Michigan 49946

Revised September 2020

TABLE OF CONTENTS

Section **Page**

1 INTRODUCTION 1-1

2 FUEL MANAGEMENT PROCEDURES 2-1
2.1 Natural Gas 2-2
2.2 Tire Derived Fuel 2-2
2.2.1 Limits 2-2
2.2.2 Specifications 2-3
2.2.3 Quality Control Procedures 2-3
2.3 Railroad Ties 2-4
2.3.1 Limits 2-4
2.3.2 Specifications 2-4
2.3.3 Quality Control Procedures 2-5
2.4 Wood Chips 2-8
2.4.1 Limits 2-8
2.4.2 Specifications 2-8
2.4.3 Quality Control Procedures 2-9
2.5 Fines/Bark 2-9
2.5.1 Limits 2-9
2.5.2 Specifications 2-10
2.5.3 Quality Control Procedures 2-10
2.6 Engineered Fuel Pellets 2-11
2.6.1 Limits 2-11
2.6.2 Specifications 2-11
2.6.3 Quality Control Procedures 2-11

3 PLAN IMPLEMENTATION, AUDITING, AND MAINTENANCE 3-1

4 FUEL SAMPLING 4-1
4.1 Summary of Sampling Locations 4-1
4.2 Solid Fuel Sampling Methods 4-2
4.2.1 Wood Chips, Fines and Bark, and CDF Sampling Procedures 4-2
4.2.2 TDF and Pellets Sampling Procedures 4-4

5 SAMPLE ANALYSIS 5-1

6 MONITORING AND RECORD KEEPING 6-1

LIST OF FIGURES

Title

Figure 1 Site Layout

LIST OF TABLES

Title

Table 1 Acceptable Fuel and Material Limits

SECTION 1

INTRODUCTION

The L'Anse Warden Electric Company, LLC. (LWEC) Facility ("the Facility") is located in L'Anse, Baraga County, Michigan. The Facility operates under the State of Michigan Renewable Operating Permit (ROP) Number MI-ROP-B4260-2011 and Source-wide Permit to Install (PTI) MI-PTI-B4260-2011, as updated and amended. Changes allowing the use of engineered fuel pellets (pellets) are described in PTI 128-18.

The Fuel Procurement and Management Plan (FPMP) has been developed to satisfy the requirements of the air permitting for the Facility and to assure that only the fuels as allowed under the permitting outlined in **Section 2** of this document are burned in the Facility boiler (designated EUBOILER#1 in the air permit).

As specified in the air permit, the FPMP (the "Plan") addresses the following information:

- A description of fuel to be burned.
- Inspection and sorting procedures and protocol used to eliminate prohibited fuels and minimize unacceptable fuel.
- Procedures for rejecting and/or removing unacceptable fuel, including determination of whether wood has been treated with pentachlorophenol.
- Supplier qualification, processing and inspection procedures for each supplier of source separated fuel.
- Auditing procedures including records of fuel specification, load identification, quality control of load and fuel piles.
- Odor minimization.

The FPMP also details the methods and practices for evaluating alternative fuels to ensure compliance with permit limits.

SECTION 2

FUEL MANAGEMENT PROCEDURES

Fuel for EUBOILER#1 is procured by independent fuel aggregation contractors and processed primarily at the adjacent Fuel Aggregation Facility (FAF). The contract terms between the fuel aggregation contractors and LWEC identify procedures for inspecting and rejecting fuel due to non-conformance with specifications. The fuel aggregation contractor will maintain manifests for all fuels delivered to the FAF that identify the fuel source, weight, composition, and date of delivery. All fuels delivered to the Facility will be manifested for source identification, weight, composition, and date of delivery. Processed fuel is currently delivered to the Facility in covered self-unloading (walking floor) trucks. Fuel is generally unloaded into an enclosed Receiving Hopper Building near the Fuel Storage Building at the Facility. Tire Derived Fuel (TDF) is delivered directly to the Fuel Storage Building area, stored, and metered separately. Engineered fuel pellets (pellets) may also be delivered and stored similar to TDF or may be delivered to the enclosed Receiving Hopper via truck delivery either separately or mixed with other approved fuels. Depending on usage rates, pellets may also be delivered to the FAF for mixing at known ratios with other approved fuels as they are brought to the Facility. Fuel rate is monitored on a daily basis through weighing of trucks as they enter the facility and empty into the Receiving Hopper or areas at the plant. A monthly "true-up" is performed to ensure monthly emission estimates are correct. Fuels not meeting LWEC specifications are rejected at the Facility, segregated from fuels accepted at the FAF, and are transported offsite by the fuel aggregation contractor.

The Fuel Storage Building at the Facility is covered and enclosed with access on one side through three separate overhead doors to allow filling by means of mobile equipment like a front end loader in the event of an unloading hopper equipment failure. **Figure 1** provides a diagram of the Facility layout.

As designated in the permit, the fuels outlined in **Section 2.1** through **Section 2.6** below are allowed to be burned in EUBOILER#1. A summary of the acceptable fuels and applicable fuel limits is presented in **Table 1**.

In accordance with the PTI, the maximum annual heat input for EUBOILER#1 is 2,656,800 MM Btu per calendar year based on a 12-month rolling time period as determined at the end of each calendar month. Fuel usage and quality will be monitored to assure compliance with this limitation.

Odor minimization will be accomplished by maintaining the fuel building and fuel unloading hopper in an enclosed status, with the exception of malfunctions, routine maintenance, inspection, and unloading of trucks. The fuel transfer conveyors are also enclosed.

2.1 NATURAL GAS

During start up, natural gas will be used for fuel for EUBOILER#1. Other fuels will then be added. Natural gas may be periodically fired on a supplemental basis to stabilize combustion.

Natural gas use is limited to less than 25% of the annual heat input to maintain Facility classification as a small power production facility. The amount of natural gas (volume and heat input) will be monitored and recorded monthly to demonstrate compliance with the permit limitations.

2.2 TIRE DERIVED FUEL

TDF consists of shredded tires processed at an off-site processing facility. This processing also includes the removal of foreign objects and most metal.

2.2.1 Limits

Refer to **Table 1** for permitted fuel limits. Records will be maintained according to the PTI to demonstrate compliance with the permit limitations. As used throughout this document, weights will be "as received" unless otherwise noted (i.e. at the moisture condition of the fuel as it arrives

at the Facility). Note that "as received" is defined in the PTI as meaning "the heating value of the solid fuel, including all moisture and ash forming materials present."

2.2.2 Specifications

TDF will be supplied to the aggregation contractor from several sources. The source suppliers will be licensed and permitted to operate in their State of origin. Requirements for processed TDF delivered to the Facility will include: shredded TDF only with an average size of 1-2 inches by visual inspection and TDF must only consist of small individual pieces (no "clumping" or "entanglement"). Whole tires or large pieces of rubber are unacceptable, and no foreign materials may be present within the TDF. LWEC expects that the TDF will have a heating value of approximately 15,500 British Thermal Units per pound (BTU/Lb) or greater, and an average moisture content of approximately 3% or less, sulfur content less than 2%, lead less than 25 parts per million (ppm), and chlorine of approximately 2,000 ppm or less, with an average of less than 1,000 ppm.

2.2.3 Quality Control Procedures

Quality Control procedures are in place at the Facility to ensure the materials supplied meet the specified fuel requirements. Each load delivered to the Facility will be accompanied by a manifest describing the material as TDF and including the load weight. Loads of TDF may be rejected because of improper weights, excess wire, or debris. Loads that are rejected will be documented, including the source supplier and reason for rejection. The Facility is equipped with a camera system on the feed to the boiler to allow monitoring of the fuel as it enters the fueling system. If operators note foreign material or debris in the fuel stream it will be addressed.

New sources of TDF will provide information on the fuel to ensure it meets the definition of tire-derived fuel, though even USEPA has noted that TDF tends to be very consistent.

Monthly samples will be collected by the fuel aggregation contractor and composited into a quarterly sample for laboratory analysis of sulfur, chlorine, and lead content. Analysis results will be reviewed to ensure sampling and analysis were properly completed and any outliers were timely addressed. Since LWEC has had a fuel sampling and analysis program for more than 10

years, fuel analysis has demonstrated that the fuel is consistent and that any anomalies are generally associated with issues in sampling or analysis. Analysis results will be reviewed against historical data and results from LWEC's independent internal sampling program to evaluate fuel consistency on an annual basis as part of LWEC's auditing program.

2.3 RAILROAD TIES

This fuel category consists of cross-tie derived fuel (CDF), which results from the processing of creosote-treated railroad ties (CTRT). Included in the definition of CTRT are creosote-treated bridge timbers and cross braces. In most cases, the aggregation contractor sorts, screens, and grinds CTRT prior to delivering the material to the Facility as CDF. Processing also includes the removal of foreign objects and most metal. CDF is also received via truck and railroad car.

2.3.1 Limits

Refer to **Table 1** for permitted fuel limits. The amount of CDF (by weight) will be monitored and recorded in a spreadsheet to track usage and to demonstrate compliance with the permit limitations. Note: the annual limit is less than the daily limit times 365 days annually. Weights will be "as received".

The purpose of establishing chlorine limits and use of the screening program described below is to ensure the Facility does not combust pentachlorophenol-treated railroad ties. Chlorine content of the CTRT will be limited to 400 ppm based on field studies to differentiate creosote-treated versus pentachlorophenol-treated wood, and in accordance with the PTI. Compliance with the 400 ppm chlorine standard will be demonstrated using the fuel sampling and laboratory analysis procedures described in **Section 2.3.3** below as well as information from suppliers and the fuel sampling/analytical program.

2.3.2 Specifications

CTRT will be supplied from several sources to the aggregation contractor where they will be ground to a uniform consistency. The CTRT will be inspected prior to grinding in accordance with the process described in **Section 2.3.3**. Only wood that has creosote treatment is acceptable.

CTRT and the resulting CDF is expected to have a heating value of at least 8,000 BTU/Lb and a moisture content less than 30% on an annual average basis. Generally the sulfur content is less than 2%, lead less than 20 ppm, and chlorine not exceeding 400 ppm.

The aggregation contractor is required to specify to their suppliers that copper, chromium, and arsenic (CCA) compounds and pentachlorophenol-treated railroad ties are unacceptable under this fuel category. CCA-treated ties are typically greenish in color.

2.3.3 Quality Control Procedures

Quality Control procedures are in place to ensure the materials supplied meet the specified fuel requirements. The aggregation contractor has procedures to reject unacceptable materials. Records will be kept for all rejected loads, the reason for the rejection, and the disposition of the rejected load.

When loads are trucked to the Facility, LWEC checks the scale tickets and can reject loads because of excess snow or debris, as examples.

To avoid inadvertently receiving pentachlorophenol-treated wood, screening of the CTRT or processed CDF is performed before processing/handling at the FAF as described below.

Quality Control Screening Procedures

All whole CTRT or processed CDF brought to the FAF will have been from screened carloads/truck loads or carloads/truck loads manifested from sources known to be only creosote treated wood. The fuel aggregation contractor will conduct screening of CTRT for elevated levels of chlorine by testing the first 100 ties that are received from railroad subdivisions for which there are no pre-existing screening data for chlorine concentration levels. The aggregation contractor will track the subdivision origin (i.e., the geographic location designation used by the railroads to identify specific sections of railroad track) of railroad tie shipments delivered for processing to LWEC. Samples of subsequent railcar or truck loads will be screened at a rate between approximately one and five percent of received CTRT depending on the size of the railcar or truck load. Once the preliminary screening confirms acceptable chlorine levels, the CTRT is then staged in a dedicated area for processing.

For CTRT that is processed off-site and delivered in processed form to the FAF, the aggregation contractor will perform four (4) screenings of truck deliveries and twelve (12) screenings of railcar deliveries or provide laboratory analysis results. A weekly random sample of the processed CDF undergoes analytical testing for chlorine content as described further below.

To conduct the screening, the aggregation contractor uses X-ray Fluorescence (XRF) technology as a screening tool to detect chlorine levels in railroad ties prior to processing and then delivery to LWEC. The aggregation contractor performs the screening to establish an initial assessment of acceptable chlorine content in CTRT, as the amount of chlorine in the fuels used by LWEC is directly related to the potential HCl emissions from Boiler #1. XRF technology works by atoms of the sample absorbing energy from X-rays, temporarily exciting the atoms and emitting secondary X-rays. Each chemical element emits X- rays at a unique energy level.

The hand-held XRF analyzer [Olympus Innov-X DP-4000 unit (or similar)] is either factory or site calibrated to screen for chlorine content of the CTRT. Literature reviews and data obtained by the aggregation contractor during a field calibration study conducted in November 2015 using the XRF analyzer have established a correlation between the chlorine content of railroad ties from analytical data and the response of the XRF analyzer. The analytical data and the XRF analyzer response were correlated based on calibration curves provided by the analyzer manufacturer and/or site-specific calibrations. An XRF analyzer response of 1,600 ppm on whole railroad ties corresponded to a laboratory analytical result of 400 ppm; however, this correlation is subject to change after factory maintenance of the XRF analyzer or updated field calibrations. The aggregation contractor will keep records of maintenance and calibrations.

Based on results obtained to date, the aggregation contractor has implemented the following procedures to screen CTRT:

- Railroad ties with an XRF analyzer response of 1,600 ppm or greater will be rejected. The 1,600 ppm threshold is based on data the contractor collected in 2015 to support LWEC. This screening level will be adjusted as necessary based on subsequent factory calibrations and/or field calibrations as the fuel monitoring program is implemented. Calibration of the XRF analyzer will be performed on a schedule

recommended by the manufacturer or more frequently as determined by the aggregation contractor.

- Railroad ties with an XRF analyzer response less than 1,600 ppm are CTRT and will be processed for LWEC.

- Railroad ties from railroad subdivisions not previously screened will be screened with the XRF analyzer. The first 100 ties from a railroad subdivision will be screened against a 1,600 ppm threshold. Screening will be performed for all railroad ties in each load from specific subdivisions if readings exceed 1,600 ppm via the XRF analyzer.

If screening or testing of CTRT indicates elevated chlorine levels (i.e., analytical reading levels above 400 parts per million of chlorine), the aggregation contractor will screen all CTRT in the load from the specific railroad subdivision or supplier. CTRT with screening levels greater than 400 ppm will not be processed and will be temporarily stored prior to shipment offsite as a non-conforming material.

The XRF screening data will be used in conjunction with the fuel sampling and laboratory analysis data to refine the screening techniques described above.

Prior to acceptance of CDF, laboratory analysis results or screening results will be provided verifying the chlorine content of the processed material. Screening information is kept on-file by the aggregation contractor.

LWEC will conduct audits of the FAF at a minimum of once per week to visually observe what is being ground along with sampling as described herein.

Quality Control Sampling and Analysis Procedures

Weekly samples will be collected by the fuel aggregation contractor and composited into a monthly sample for laboratory analysis of sulfur, chlorine, and lead content. Analysis results will be reviewed to ensure sampling and analysis were properly completed and any outliers were timely addressed. Analysis results will be reviewed against historical data and results from

LWEC's independent internal sampling program to evaluate fuel consistency on an annual basis as part of LWEC's auditing program.

2.4 WOOD CHIPS

Wood chips include primarily hardwood species that are received or processed into uniform chips at the aggregation facility. Processing includes removal of most metal and other foreign objects, where applicable. Wood chips also include residuals from the sawmill industry. Some softwoods are also included under the wood chip classification. Softwood and hardwood used as dimensional lumber that is free from bark and has not been painted or treated in any manner is included in this category but is not currently received. Wood chips will be supplied to the aggregation contractor from several sources.

2.4.1 Limits

The PTI and ROP do not contain material limits for wood chips. Based on prior testing results, wood chips have been very consistent. The amount of wood chips (by weight) burned will be monitored and recorded as required by the permit. Weights will be "as received".

2.4.2 Specifications

Wood chips will be derived from various clean wood sources. Examples include slash and chip screen residue derived from screening operations at local paper mills. The wood chips may be from a variety of tree species and will be of uniform consistency with an average size of 1-2 inches with a minimum of bark content. Wood chips will generally have a heating value greater than 7,000 BTU/Lb and a moisture content of less than 40% (though the material is stored outside and it is possible that higher moisture content is simply the result of being stored outdoors). Generally, the sulfur content of the fuel is less than 2%, chlorine content is less than 100 ppm, and the lead content is less than 10 ppm or below the detection limit.

2.4.3 Quality Control Procedures

Quality Control procedures are in place at the FAF and the Facility to ensure that the materials supplied meet the specified fuel requirements. The aggregation contractor will be responsible for inspecting the materials upon delivery to the FAF and will verify that the materials meet the specifications in **Section 2.4.2**. The FAF will also be responsible for disposition of materials that do not meet the specification requirements. All wood chip source materials brought to the processing facility will be manifested to identify source supplier, weight, and date of delivery. Records will be kept for all loads; records for rejected loads will include the reason for the rejection, and the disposition of the rejected load.

When loads are trucked to the Facility, LWEC staff receive a scale ticket and check to ensure that the material described on the load sheet are the materials being delivered and the weight is recorded. Operators also monitor the boiler using a camera system fixed to the boiler feed and will address debris or foreign material if needed.

Monthly samples will be collected by the aggregation contractor and composited into a quarterly sample for laboratory analysis of sulfur, chlorine, and lead content. Since LWEC has had a fuel sampling and analysis program for more than ten years, fuel analyses have demonstrated that the fuel is consistent and that any anomalies are generally associated with problems in sampling or analysis. Analysis results will be reviewed against historical data and results from LWEC's independent internal sampling program to evaluate fuel consistency on an annual basis as part of LWEC's auditing program.

2.5 FINES/BARK

Fines/bark are waste products from the lumber and paper mill industries. Fines/bark normally consist of sawdust fines collected during the production process, and tree bark removed during the production process.

2.5.1 Limits

Refer to **Table 1** for permitted fuel limits. Records will be maintained according to the PTI to demonstrate compliance with the permit limitations. Weights will be "as received".

2.5.2 Specifications

Fines/bark will be supplied to the aggregation contractor from several sources. The fines must be of a uniform consistency with no large slab waste included, the fines may be from various species of tree. The bark must be of a uniform consistency with no large slab waste included. Large pieces of bark are unacceptable, and must be processed by the aggregation contractor to achieve the proper size and consistency. Wood fines/bark will generally have a heating value greater than 7,000 BTU/Lb and a moisture content of less than 40% (though the material is stored outside and it is possible that higher moisture content is simply the result of being stored outdoors). Generally, the sulfur content of the fuel is less than 2%, chlorine content is less than 100 ppm, and the lead content is less than 10 ppm or below the detection limit.

2.5.3 Quality Control Procedures

The aggregation contractor will be responsible for the identification of fines/bark materials. The FAF will also be responsible for disposition of materials that do not meet the specification requirements. All fines/bark materials brought to the processing facility will be manifested to identify source supplier, weight, and date of delivery.

Records will be kept for all loads; records for rejected loads will include the reason for the rejection, and the disposition of the rejected load.

When loads are trucked to the Facility, LWEC Staff receive a scale ticket and check to ensure that the material described on the load sheet are the materials being delivered and the weight is properly recorded. Operators also monitor the boiler using a camera system fixed to the boiler feed and will address debris or foreign material if needed.

Monthly samples will be collected by the aggregation contractor and composited into a quarterly sample for laboratory analysis of sulfur, chlorine, and lead content. Analysis results will be reviewed against historical data and results from LWEC's independent internal sampling program to evaluate fuel consistency on an annual basis as part of LWEC's auditing program.

2.6 ENGINEERED FUEL PELLETS

Engineered fuel pellets are an engineered fuel made from non-recyclable paper, label, and manufacturing residual and similar materials. This is generally pre-consumer paper and packaging waste. The pellets are a non-hazardous secondary material as defined by USEPA in 40 Code of Federal Regulations (CFR) Part 241. The fuel pellets generally contain a mixture of 60 to 85% paper and cardboard and 15 to 40% plastics including polyethylene, polypropylene, polyester, nylon, and trace amounts of other plastics. By monitoring the raw materials, the BTU value, moisture content, and other fuel parameters are consistent.

2.6.1 Limits

Refer to **Table 1** for permitted fuel limits. Records will be maintained according to LWEC's permits to demonstrate compliance with the permit limitations. Weights will be "as received".

2.6.2 Specifications

The pellets are supplied to the Facility by an outside contractor and will meet the criteria established for non-hazardous secondary materials that are not solid wastes and used as fuel as outlined in 40 CFR Part 241. The fuel pellets shall be ½-inch to ¾-inch diameter and up to approximately 3-inches in length (various lengths) and shall have less than 20% fines under ¼-inch in size. Pellets generally have a heating value greater than 10,000 BTU/Lb with a moisture content less than 2%. An annual average chlorine content of 1,300 ppm or less (as-received) is desirable but variations can be accommodated by adjusting sorbent use. Generally, the sulfur content is less than 2% and the lead content is less than 2 ppm or below the detection limit.

2.6.3 Quality Control Procedures

Quality Control procedures are in place at the Facility to ensure that the pellets supplied meet the specified fuel requirements. All engineered fuel pellets brought to the Facility will be manifested to identify source supplier, weight, and date of delivery. Heating content (BTU/Lb) and chlorine content (ppm, as received) will be recorded from the shipping papers. Heating content and chlorine values provided by the supplier will be on an average basis for pellets produced prior to shipping and will be representative of pellets shipped.

Fuel pellets that do not meet the specification requirements will be returned to the manufacturer or properly disposed. Records will be kept for all rejected loads, the reason for the rejection, and the disposition of the rejected load.

Monthly samples will be collected for laboratory analysis of sulfur, chlorine, and lead content. Analysis results will be reviewed against historical data and potentially results from LWEC's independent internal sampling program to evaluate fuel consistency on an annual basis as part of LWEC's auditing program. Analysis of representative samples by the supplier of engineered fuel pellets may be used to comply with this requirement. Suppliers that LWEC contracts with will have an extensive record of data demonstrating consistency and pellet quality comparable to the specifications used in the PTI application.

SECTION 3

PLAN IMPLEMENTATION, AUDITING, AND MAINTENANCE

The FPMP describes methods and procedures used by both LWEC staff and its contractors to ensure compliance with permit limits. The Plan will be updated as needed when revisions to sampling and analytical methods are needed, specifications require adjustment, and similar circumstances. FPMP revisions will be submitted to the EGLE AQD District Supervisor.

LWEC will do an annual review of the fuel analytical information to ensure that fuel continues to meet the required specifications. This review will include consolidating analytical information from each of these fuels for comparison to the specifications and resulting emissions. In cases where trending suggests that fuel will not meet the limits in the future, LWEC will work with suppliers to address the concerns and/or search for additional suppliers.

Changes to fuel suppliers will not require revisions to the FPMP, provided the processed fuel continues to meet the definitions and specifications outlined in the Plan. Similarly, changes to the FPMP will not be required in the event new fuel aggregation contractors are utilized, provided the processes and procedures outlined in the FPMP remain in effect with the new contractor.

If additional fuels are proposed for use at the Facility that are not defined in the FPMP and do not meet the characteristics of the fuels outlined in the plan, a modification to the FPMP and a PTI application will be required. The new fuel cannot be used at the Facility unless authorized by a PTI and a revised FPMP is submitted to the EGLE AQD.

SECTION 4

FUEL SAMPLING

For purposes of this plan, solid fuel sampling will be performed using procedures similar to those contained in the National Emission Standards for Hazardous Air Pollutants for Industrial/Commercial/Institutional Boilers and Process Heaters, also referred to as the Boiler MACT rule, as described in 40 CFR §§63.7521(c) and (d). It should be noted that procedures in the Boiler MACT are not always appropriate and will be used as reference only. For example, the Boiler MACT does not specifically reference TDF, CDF, or engineered fuel pellets. The sections below describe the aggregation contractor's fuel sampling program for the fuels provided to LWEC.

4.1 SUMMARY OF SAMPLING LOCATIONS

A sample will be obtained for each fuel on a preset frequency as described above and then composited into a sample that will be sent to a laboratory for analysis. Fuel sampling will be conducted in accordance with the methods described below. **Table 4-1** below identifies the locations to be used.

Table 4-1
Fuel Sampling Locations

Fuel	Sampling Location
Wood Chips	Sampled from the wood pile located at the FAF
Fines and Bark	Sampled from the pile located at the FAF (if present)
CDF	Sampled from the active CDF storage bin(s) in the Fuel Storage Building at the plant.
TDF	Sampled from the TDF storage pile located at the LWEC Facility
Pellets	Sampled from the pellet storage pile located at the LWEC Facility

A brief discussion of the proposed sampling methods is provided in the following subsections. Other sampling methods may be used that are mutually agreed upon between the aggregation contractor and LWEC.

4.2 SOLID FUEL SAMPLING METHODS

The following sections describe the procedures for sampling solid fuels. The sampling methods for CDF (processed CTRT) are implemented on a weekly basis to produce a monthly composite sample. The sampling methods for wood chips, fines and bark, and TDF are designed to collect a monthly sample of each fuel that is subsequently composited into a quarterly sample of each fuel for analysis. Sampling of engineered fuel pellets will be conducted by LWEC as needed to supplement supplier analysis data.

4.2.1 Wood Chips, Fines and Bark, and CDF Sampling Procedures

The following fuels will be sampled from their respective storage pile on a weekly (CDF) and monthly (wood chips and fines and bark) basis via a single grab sample. To minimize moisture loss from the sample, the weekly and monthly samples will be stored in an air tight sampling bag.

- Wood chips
- Fines and Bark (if present for use as fuel)
- CDF

The applicable procedure for collecting fuel samples from a pile follows:

(1) Notify the LWEC operator that a sample will be collected.
(2) For each weekly/monthly sample, select a sampling location at the surface of the pile. The sample should be collected from the portion(s) of the pile that are most likely to be used as fuel (i.e., "fresh" sections of the pile). Samples will be collected from dedicated piles of the material.
(3) At the sampling site, dig into the pile to a uniform depth of approximately 18 inches. Insert a clean shovel into the hole and withdraw a sample, making sure that large pieces do not fall off during sampling. For CDF being sampled from the bins in the Fuel Storage Building, use a clean shovel to withdraw a sample from the active face of CDF as it approaches the conveyor belt, making sure that large pieces do not fall off during sampling.
(4) Transfer the samples to a clean plastic bag for further processing. Seal and label the bag with the following information:

a. Fuel Type (i.e., Wood Chips, CDF, or Fines and Bark).
b. Date and Time of Sample.
c. Sample Technician Initials.

(5) Notify the LWEC operator when sampling is complete.
(6) Fill out the chain of custody to document the prepared samples. The chain of custody will need to be initiated by the technician that obtained the samples, and the technician that prepared the samples, if prepared by a different individual.
(7) Notes for the chain of custody:
   a. Sample ID should consist of fuel type and week/month/quarter/calendar year.
   b. Complete the Analysis Requested portion of the form using the methods specified in **Table 5-1** of this plan.
   c. Technician that collected and prepared the sample should sign the chain of custody in the first "Relinquished by" section block of the form.
   d. It is not necessary to complete a new chain of custody for each weekly/monthly sample; the first chain of custody form can be supplemented with the subsequent weekly or monthly sample information.

Compositing Samples

The weekly CDF samples will be composited to a monthly sample. The monthly wood chip and fines and bark (if present) samples will be composited into a sample to be analyzed on a quarterly basis. A composite sample will be generated separately for wood chips and CDF according to the procedure as follows:

(1) Thoroughly mix each weekly/monthly sample bag and pour the weekly/monthly samples into a common pile over a clean plastic sheet. Create a composite sample monthly/quarterly by mixing the pile thoroughly.
(2) Break sample pieces larger than three (3) inches into smaller sizes.
(3) Make a pie shape with the entire composite sample and subdivide it into four (4) equal parts.
(4) Separate one (1) of the quarter samples as the first subset (for analyses). If this subset is too large for the shipping container, repeat the procedure in Step (3) of this section with the quarter sample and obtain a one-quarter subset from this sample.
(5) Place this subset into the composite sample bag and label with the following as appropriate:
   (a) Fuel Type.
   (b) Weeks, month, quarter, and calendar year (e.g., Weeks 1-5, January, first quarter 2018).
   (c) Company Name.
(6) This subset will be shipped to the contract lab for analyses. Fill out the chain of custody to be shipped with the prepared samples. The chain of custody will need to be initiated by the technician that obtained the samples, and the technician that prepared the samples, if prepared by a different individual.

(7) Separate another of the monthly/quarter samples (from the quartered pie discussed in Step 4) for each composite and place into another bag. This sample will be retained as a duplicate sample for the fuel sample and stored on-site by the aggregation contractor. The duplicate samples will be labeled and analyzed just as the samples above in Step 5, with the exception that these samples will be marked as "Duplicate Composite."
(8) Each month, there should be two samples, a composited CDF sample for analysis and a duplicate CDF sample. Each quarter, a composited wood chip sample and fines and bark sample (if present) for analysis and a duplicate of each sample will be prepared. The duplicate samples should be held for retention on-site until laboratory results are reviewed and accepted. After the laboratory results are reviewed and accepted the duplicate samples can be discarded.
(9) Notes for the chain of custody for the composite sample:
    (a) Sample ID should consist of fuel type and weeks/month/quarter/calendar year.
    (b) Complete the Analysis Requested portion of the form using the methods specified in **Table 5-1** of this plan.
    (c) Technician that collected and prepared the sample should sign the chain of custody in the first "Relinquished by" section block of the form.
    (d) The weekly/monthly chain of custody forms do not need to be included with the composite chain of custody form.
(10) Ship each sample in a clean plastic bag in a sturdy shipping container.

The contract laboratory will be responsible for grinding the sample to perform the analysis. The need for grinding should be indicated in the Special Instructions/Comments section in the chain of custody form.

4.2.2 TDF and Pellets Sampling Procedures

The TDF and pellets samples will be collected from the LWEC site. An aggregation contractor operator or LWEC staff will utilize the following procedure for obtaining a TDF or pellets sample.

(1) Notify the LWEC operator that a sample will be collected.
(2) For each sample, select a minimum of five (5) sampling locations uniformly spaced over the surface of the pile. The samples should be collected from the portion(s) of the pile that are most likely to be used as fuel (i.e., "fresh" sections of the pile).
(3) At each sampling site, dig into the pile to a uniform depth of approximately 18 inches. Insert a clean shovel into the hole and withdraw a sample, making sure that large pieces do not fall off during sampling. Use the same shovel to collect all samples.
(4) Transfer all samples to a clean plastic bag for further processing. Label the bag with the following information:
    a. Fuel Type.
    b. Date and Time of Grab Sample.

c. Sample Technician Initials.

(5) Notify the LWEC operator when sampling is complete.
(6) A clean sample bag should be used for each sample.
(7) Fill out the chain of custody to document the prepared samples. The chain of custody will need to be initiated by the technician that obtained the samples, and the technician that prepared the samples, if prepared by a different individual.
(8) Notes for the chain of custody:
    a. Sample ID should consist of fuel type and week/month/quarter/calendar year.
    b. Complete the Analysis Requested portion of the form using the methods specified in **Table 5-1** of this plan.
    c. It is not necessary to complete a new chain of custody for each sample, the first chain of custody form can be supplemented with the subsequent weekly/monthly sample information.
(9) Technician that collected and prepared the sample should sign the chain of custody in the first "Relinquished by" section block of the form.

Compositing TDF Samples

The monthly TDF samples will be composited into one (1) sample to be analyzed on a quarterly basis. A composite sample will be generated according to the procedure from §63.7521(d) as follows:

(1) Thoroughly mix each monthly sample bag and pour the three samples into a common pile over a clean plastic sheet. Create a composite sample by mixing the pile thoroughly.
(2) If possible break sample pieces larger than three (3) inches into smaller sizes.
(3) Make a pie shape with the entire composite sample and subdivide it into four (4) equal parts.
(4) Separate one (1) of the quarter samples as the first subset (for analyses). If this subset is too large for grinding, repeat the procedure in Step (3) of this section with the quarter sample and obtain a one-quarter subset from this sample. If the quarter sample is too large, subdivide it further using the same procedure.
(5) Place this subset into the composite sample bag and label with the following:
    (a) Fuel Type.
    (b) Weeks, quarter and calendar year (e.g., Weeks 1-13, First quarter 2018).
    (c) Company Name.
(6) This subset will be shipped to the contract lab for analyses. Fill out the chain of custody to be shipped with the prepared samples. The chain of custody will need to be initiated by the technician that obtained the samples, and the technician that prepared the samples, if prepared by a different individual.
(7) Separate another of the quarter samples (from the quartered pie discussed in Step 4) for each composite and place into another bag. This sample will be retained as a duplicate sample for the fuel sample and stored on-site by the aggregation contractor. The

duplicate samples will be labeled and analyzed just as the samples above in Step 5, with the exception that these samples will be marked as "Duplicate Composite."

(8) Each quarter, there should be a composited TDF sample prepared for shipment and one (1) duplicate sample for retention on-site. The duplicate sample may be discarded after laboratory results are reviewed and approved.

(9) Notes for the chain of custody for the composite sample:
   (a) Sample ID should consist of fuel type and months/quarter/calendar year.
   (b) Complete the Analysis Requested portion of the form using the methods specified in **Table 5-1** of this plan.
   (c) Technician that collected and prepared the sample should sign the chain of custody in the first "Relinquished by" section block of the form.
   (d) The weekly chain of custody forms do not need to be included with the composite chain of custody form.

(10) Ship the clean plastic bag in a clean 5-gallon plastic bucket or similar shipping container.

The contract laboratory will be responsible for grinding the sample to perform the analysis. The need for grinding should be indicated in the Special Instructions/Comments section in the chain of custody form.

Compositing Pellet Fuel Samples

The weekly or monthly pellet samples will be composited (if sampled weekly) into one (1) sample to be analyzed on a monthly basis. A composite sample will be generated according to the procedure from §63.7521(d) as follows:

(1) Thoroughly mix each incremental sample bag and pour the samples into a common pile over a clean plastic sheet. Create a composite sample by mixing the pile thoroughly.
(2) If possible break sample pieces larger than three (3) inches into smaller sizes.
(3) Make a pie shape with the entire composite sample and subdivide it into four (4) equal parts.
(4) Separate one (1) of the quarter samples as the first subset (for analyses). If this subset is too large for grinding, repeat the procedure in Step (3) of this section with the quarter sample and obtain a one-quarter subset from this sample. If the quarter sample is too large, subdivide it further using the same procedure.
(5) Place this subset into the composite sample bag and label with the following:
   a. Fuel Type.
   b. Weeks, month/quarter and calendar year (e.g., Weeks 1-4, March 2018).
   c. Company Name.
(6) This subset will be shipped to the contract lab for analyses. Fill out the chain of custody to be shipped with the prepared samples. The chain of custody will need to be initiated

by the technician that obtained the samples, and the technician that prepared the samples, if prepared by a different individual.

(7) Separate another of the quarter samples (from the quartered pie discussed in Step 4) for each composite and place into another bag. This sample will be retained as a duplicate sample for the fuel sample and stored on-site at LWEC. The duplicate samples will be labeled and analyzed just as the samples above in Step 5, with the exception that these samples will be marked as "Duplicate Composite."

(8) Each month, there should be a grab or composited pellet sample prepared for shipment and one (1) duplicate sample for retention on-site. The duplicate sample may be discarded after laboratory results are reviewed and approved.

(9) Notes for the chain of custody for the composited sample:
   a. Sample ID should consist of fuel type and months/quarter/calendar year.
   b. Complete the Analysis Requested portion of the form using the methods specified in **Table 5-1** of this plan.
   c. Technician that collected and prepared the sample should sign the chain of custody in the first "Relinquished by" section block of the form.
   d. The weekly chain of custody forms do not need to be included with the composite chain of custody form.

(10) Ship the clean plastic bag in a clean 5-gallon plastic bucket or similar shipping container.

The contract laboratory will be responsible for grinding the sample to perform the analysis. The need for grinding should be indicated in the Special Instructions/Comments section in the chain of custody form.

SECTION 5

SAMPLE ANALYSIS

An independent laboratory will be contracted to analyze samples collected in accordance with this plan. **Table 5-1** summarizes the analytical methods to be used as well as the nominal detection levels. The results will be provided to LWEC in a timely manner. Analytical methods may change is additional information becomes available.

Table 5-1
Analytical Methods and Detection Limits

Fuel Type	Required Analysis	Typical Analytical Methods	Expected Minimum Detection Level
TDF	Sulfur Concentration	ASTM D4239, *"Standard Test Method for Sulfur in the Analysis of Coal and Coke Using High-Temperature Tube Furnace Combustion"*	0.02 weight %
	Heat Content	ASTM D5865, *"Standard Test Method for Gross Calorific Value of Coal and Coke"*	Not Applicable
	Moisture Content	ASTM E3173, *"Standard Test Method for Moisture in the Analysis Sample of Coal and Coke"*	Not Applicable
	Chlorine Concentration	SW-846-9056, *"Determination of Inorganic Anions by Ion Chromatography"*	50.0 ppm
	Lead	EPA 3050/6010 or 6020	20 ppm
	Ash Content	ASTM D3174, *"Standard Test Method for Ash in the Analysis Sample of Coal and Coke from Coal"*	Not Applicable
	Wire Content	ASTM D6700, *"Standard Practice for Use of Scrap Tire Derived Fuel"*	Not Applicable

Table 5-1
Analytical Methods and Detection Limits

Fuel Type	Required Analysis	Typical Analytical Methods	Expected Minimum Detection Level
Pellets	Ash Content	ASTM D1102, *"Standard Test Method for Ash in Wood"*	Not Applicable
	Heat Content	ASTM E711, *"Standard Test Method for Gross Calorific Value of Refuse-Derived Fuel by the Bomb Calorimeter"*	Not Applcable
	Moisture Content	ASTM E871, *"Standard Test Method for Moisture Analysis of Particulate Wood Fuels"*	Not Applicable
	Chlorine Concentration	ASTM D6721 *"Standard Test Method for Determination of Chlorine in Coal by Oxidative Hydrolysis Microcoulometry"*	50.0 ppm
	Sulfur Concentration	ASTM D4239, *"Standard Test Method for Sulfur in the Analysis of Coal and Coke Using High-Temperature Tube Furnace Combustion"*	0.02 weight %
Wood Chips, CDF, and Fines and Bark	Ash Content	ASTM E1755-01, *"Standard Test Method for Ash in Biomass"*	Not Applicable
	Heat Content	ASTM E711, *"Standard Test Method for Gross Calorific Value of Refuse-Derived Fuel by the Bomb Calorimeter" (for Bark)* ASTM D5865, "*Standard Test Method for Gross Calorific Value of Coal and Coke" (for all other fuels)*	Not Applicable
	Moisture Content	ASTM E871, *"Standard Test Method for Moisture Analysis of Particulate Wood Fuels"*	Not Applicable
	Chlorine Concentration	SW-846-9056, *"Determination of Inorganic Anions by Ion Chromatography"*	50.0 ppm
	Sulfur Concentration	ASTM D4239, *"Standard Test Method for Sulfur in the Analysis Sample of Coal and Coke Using High-Temperature Tube Furnace Combustion"*	0.02 weight %
	Lead	EPA 3050/6010 or 6020	20 ppm

SECTION 6

MONITORING AND RECORDKEEPING

Fuel monitoring and record keeping will include the following:

1. Type and amount of each fuel burned in EUBOILER #1 to calculate the calendar day, monthly, and 12-month rolling totals for comparison to the permit limits. Calendar day tonnages are based on calibrated feed bin and/or daily scale weights as trucks deliver fuel to the Facility, as adjusted for the number of days of fuel received. LWEC staff make adjustments to the monthly total to accommodate inventory adjustments. For example, when measuring fuel usage each day, it is possible that the daily amounts may differ from monthly amounts because of round-off errors. At times the moisture content of the fuel changes onsite and this change must be accommodated. These "errors" are corrected when the monthly amounts are recorded.

2. Sulfur, chlorine, and Lead (Pb) content of each fuel burned in EUBOILER #1. Representative information on pellets can be provided by the pellet supplier.

3. Review of new fuel analytical information. In cases where analytical information indicates that fuels fall outside of acceptable ranges for BTU content (as received), sulfur, chlorine, or lead content, the sample will be reanalyzed or a new sample will be taken to resolve the discrepancy. In cases where the analysis results show off-specification fuel for two sampling periods in a row (two months where sampling/analysis is monthly and two quarters where sampling/analysis is quarterly) LWEC will aggressively work with the supplier to resolve the issue or possibly suspend acceptance of fuel from that supplier if the issue cannot be timely resolved. Once the fuel is demonstrated to be within the required specifications, receipt of fuel from the supplier can be resumed.

4. Monthly and calendar year records of aggregate HAP emissions from EUBOILER #1.

5. Maximum heat input per calendar month and year for EUBOILER #1. Maximum heat input will be based on monthly totals and will reflect "corrected" totals described above.

6. Records of laboratory analysis. In cases where samples were reanalyzed or new samples were collected and analyzed, the records will reflect the revised numbers.

7. All final analysis reports received will be kept on site for five years. LWEC's records will be kept at the Facility. The fuel aggregation contractor will maintain fuel sampling analytical results at its corporate office and will provide a copy of the composited monthly, composited quarterly, and other appropriate analytical results. Records from receipt of processed CDF shipments to LWEC are maintained by the aggregation contractor and are available upon request.

8. At least once per calendar year, LWEC will perform its own fuel sampling and analysis on each fuel type for comparison to limits and specifications as well as to the analytical information provided by its fuel suppliers. Any discrepancies will be discussed with the suppliers. Discrepancies may be corrected by changes to fuel sampling and analytical procedures, fuel handling and processing, as well as a change in suppliers.

In addition to monitoring and recordkeeping outlined above, fuel analysis and stack testing will be used to demonstrate compliance with the permit requirements.

Fuel analysis, control equipment performance, and compliance demonstration calculations will be used to estimate lead, sulfur dioxide (SO_2), and hydrogen chloride (HCl) emission rates for comparison to emission limits. Fuel analyses results and the basis for the emission estimates will be documented.

The permit requires keeping of the following information for EUBOILER#1:

Individual (lead and chlorine) and aggregate (tested and non-tested) HAP emissions calculations determining the monthly and annual emissions of each in tons per calendar year at the end of each calendar month, using emission factors from the compliance demonstration or the most recent emissions testing, and EGLE approved emission factors for the non-tested HAPs. These records will be maintained by Facility personnel and kept on file for a period of five years. Results of stack testing will also be maintained at the Facility for a period of at least five years.

These records will also demonstrate compliance with the daily average feed rate (TPD values from **Table 1**) and annual feed rate (TPY values from **Table 1**). An hourly rate will be calculated by dividing the monthly total of each fuel received at the Facility by the total number of hours of operation per month.

The following calculations will be used in conjunction with monitoring, testing, or recordkeeping data to determine compliance with the applicable requirements referenced in EU-BOILER#1.

Natural gas usage is monitored continuously but tracked on a monthly basis. Other fuels are weighed as they are placed in the fuel storage building and fuel usage for the boiler is compiled on a monthly basis.

Monthly heat input is calculated based on monthly fuel consumption using these typical heating values:

Natural gas:	1000 btu/scf
Tire-derived fuel	31.1 mmbtu/ton (as received)
Railroad ties (CDF)	12.7 mmbtu/ton(as received)
Fines/bark	8.7 mmbtu/ton (as received)
Wood chips	10.1 mmbtu/ton (as received)

Emissions are calculated as follows:

Emissions (lb/hr) = Monthly heat input (mmbtu/month) x Hours/month x Emission Factor (lb/mmbtu)

Twelve month rolling total emissions are calculated by adding the previous 12 months of emissions data by pollutant.

In general, emission factors are developed from stack testing, as stack testing is performed using a representative fuel blend.

This is a summary if the most recent stack testing and corresponding emission factors:

Criteria Pollutants	Emission Factor (lb/mmbtu)	Source
Particulate matter (PM)	0.006	2017-2018 stack test
PM<10 μm	0.0134	2017-2018 stack test
PM<2.5 μm	0.023	2016 stack test
Carbon monoxide	NA	Continuous Emissions Monitoring System data
Nitrogen Oxides	0.2544	2017-2018 stack test
Lead	4.95×10^{-6}	2017-2018 stack test
Volatile organic compounds	0.0008	2016 stack test

Hazardous Air Pollutants	Emission Factor (lb/mmbtu)	Source
Arsenic	6.83×10^{-7}	2017-2018 stack test
Manganese	2.31×10^{-5}	2017-2018 stack test
Nickel	1.39×10^{-6}	2017-2018 stack test

Significant natural scrubbing of the acid gas emissions occurs with burning the approved fuels. As a result, it is not recommended that emission factors for SO_2 and HCl be developed exclusively through fuel sampling.

Acid Gas Emissions	Emission Factor (lb/mmbtu)	Source
Sulfur dioxide	0.029	2017-2018 stack test
Hydrochloric Acid	0.005	2017-2018 stack test

Emission factors may be updated if additional emissions information becomes available. Emissions for other emission units will be calculated using AP-42 or other appropriate emission factors.

FIGURES

RESIDENTIAL PROPERTIES

BIT. SURFACE

MAIN STREET

DRY STORAGE WAREHOUSE

FORMER RAILROAD RIGHT OF WAY

GRAVEL

SCALE

STORM SEWER OUT TO FORMER NPDES OUTFALL 002 STORM WATER

BIT. SURFACE

LINE BLOCKED, NOT IN USE

VALVE CLOSED, LINE NOT IN USE

CATCH BASIN (TYP.)

ASH STORAGE BUILDING

EFF. PUMP HOUSE

BIT. SURFACE

ENCLOSED CONVEYOR

STORM WATER POND 2

EFF. POND 3

FLOOR DRAIN SUMP

STACK

DSI SILO

FMR. ASH SILO

TDF AND PELLET STORAGE AREA

BIOMASS FUEL STORAGE BUILDING

LAKE SUPERIOR

PARK & MARINA

RESERVE STATION SERVICE TRANSFORMER

MAINTENANCE WAREHOUSE (BUTLER BLDG.)

TDF AND PELLET STORAGE AND FEED BIN

GENERATING STATION

WOODED AREA

ENCLOSED CONVEYOR

BIT. SURFACE

MONITORING POINT 001B

GRASS

MAIN STEP-UP TRANSFORMER

BIT. SURFACE

RAMP

RECEIVING HOPPER

GRAVEL

MAIN STATION SERVICE TRANSFORMER

ELEC TWR

ALTERNATE TDF STORAGE AREA

STORM WATER POND 1

BIT. SURFACE

GRAVEL

GRASS

BRUSH

BRUSH

GRASS

GRASS

ROAD BRIDGE

NPDES OUTFALL 001 NON-CONTACT COOLING WATER, PROCESS WATER, AND STORM WATER

FALLS RIVER

WOODED AREA

APPROXIMATELY 800 FEET DOWNSTREAM TO NPDES OUTFALL 003 INTAKE SCREEN BACKWASH

DRY SORBENT INJECTION SYSTEM AREA

ASH LOADING AREA

CERTAINTEED CORP.

FUEL RECEIVING AREA

BRUSH

OVERHEAD PNEUMATIC FUEL CONVEYOR (NOT IN SERVICE)

ORV BRIDGE

FALLS RIVER

LEGEND

-o-	UTILITY POLE
BIT.	BITUMINOUS
DSI	DRY SORBENT INJECTION
EFF.	EFFLUENT
TDF	TIRE DERIVED FUEL
—x—	FENCE LINE
HV	TRANSFORMER

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DRAWING IS INTENDED FOR GENERAL LOCATION ONLY, AND NOT FOR CONSTRUCTION PURPOSES

0 80'

SCALE

FIGURE 1

File Path and Name: W:\L2600002\ADMIN\AIR\OPERATING PLANS\FPMP\2020-09\FPMP FIG1.DWG

Designed by: J.B.C. | Drawn By: J.B.C. | Checked by: LWEC | Approved by: LWEC

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Hancock, Michigan
49930

SITE LAYOUT
L'ANSE WARDEN ELECTRIC COMPANY, LLC.
L'Anse, Michigan

TABLES

Table 1 – Permit Fuel and Material Limits

Material	Limit	Time Period/ Operating Scenario
Natural Gas	Less than 25% of the annual heat input	Annual Capacity factor shall be based on a 12 month period as determined at the end of each calendar month
TDF	96.0 TPD[1]	Calendar day
	32,800 TPY[1]	12-month rolling time period, as determined at the end of each calendar month
CDF	408.0 TPD[1]	Calendar day
	72,078 TPY[1]	12-month rolling time period, as determined at the end of each calendar month
Wood Chips	No Limit	Not Applicable
Fines & Bark	129.6 TPD[1]	Calendar day
	44,280 TPY[1]	12-month rolling time period, as determined at the end of each calendar month
Chlorine content of CTRT	400 ppm	Instantaneous
Engineered Fuel Pellets	144.0 TPD[1]	Calendar day
	50,000 TPY	12-month rolling time period, as determined at the end of each calendar month

Notes:

1 = As received (i.e. at the moisture condition of the fuel as it arrives at the Facility).

All annual limits are per 12-month period, as determined at the end of each calendar month.

Calendar day tonnages are based on calibrated feed bin and/or daily scale weights as trucks deliver fuel to the Facility, as adjusted for the number of days of fuel received. LWEC staff will do a monthly "true-up" as needed to accommodate inventory adjustments, etc. as discussed in Section 6 that will be used for reporting monthly fuel consumption as well as estimating emissions.

CDF = Cross-tie derived fuel

CTRT = Creosote-treated railroad ties

MM = Million

ppm = Parts Per Million

TDF = Tire Derived Fuel

TPD = Tons per Day

TPY = Tons per Year

Yr = year