

**ALLEGHENY COUNTY HEALTH DEPARTMENT (ACHD)  
AIR QUALITY PROGRAM**

November 22, 2016

**SUBJECT:**    **AKJ Clairton LLC**  
                  1500 North State Street  
                  Clairton, PA 15025  
                  Allegheny County

                  Title V Operating Permit No. 0637

**TO:**            JoAnn Truchan, PE  
                  Acting Section Chief, Engineering

**FROM:**        Melissa Jativa  
                  Air Quality Engineer

**FACILITY DESCRIPTION:**

The AKJ Clairton L.L.C. is a sludge mixing operation facility that uses coal tar decanter sludge from the USS Clairton Coke Works and different liquid diluents and a dispersant in a batch operation to produce liquefied coal waste sludge for re-use. AKJ Clairton is a minor source for particulate matter (PM), particulate matter of 10 microns or less in diameter (PM<sub>10</sub>), particulate matter of 2.5 microns or less in diameter (PM<sub>2.5</sub>), sulfur oxides (SO<sub>x</sub>), volatile organic compounds (VOCs), nitrogen oxides (NO<sub>x</sub>), carbon monoxide (CO), and Hazardous Air Pollutants (HAPs), as defined in section 2101.20 of Article XXI. However, the facility is considered a major source based on operating, managing or supporting a major source facility: U.S. Steel (Clairton).

The facility consists of two coal waste sludge processing units - unit #1 and unit #2. Both units consist of a mixing tank. Unit #1 also has an 8,000-gallon storage tank. The AKJ process units are filled and emptied as the liquefied sludge is produced, therefore, there is little if any overnight or longer-term storage of the product. If product is stored in the tank overnight, the temperature of the tank must be maintained at an elevated temperature to keep the product viscosity low enough for handling.

**EMISSION SOURCES:**

<b>I.D.</b>	<b>SOURCE DESCRIPTION</b>	<b>CONTROL DEVICE(S)</b>	<b>MAXIMUM CAPACITY</b>	<b>FUEL/RAW MATERIAL</b>	<b>STACK I.D.</b>
P001	Mixer Unit #1 & Storage Tank	NA	8,760,000 gallons	Liquefied Coal Waste Sludge	P001
P002	Mixer Unit #2	NA	16,790,000 gallons	Liquefied Coal Waste Sludge	P002

## OPERATING PERMIT APPLICATION COMPONENTS:

1. Title V Operating Permit Application No.0637, dated July 11, 2012;
2. Operating Permit No. 0637, issued December 29, 2006;
3. Installation Permit No. 0637-I001 dated March 29, 2002.

## EMISSION CALCULATIONS:

The emission calculations for this operation were reviewed and done by currently acceptable methods using valid data and assumptions.

The emissions of VOC and HAP from the AKJ sludge mixing operation are a result of the working and breathing loss emissions of VOC from the process vessel when it is refilled for a subsequent batch. The vapor concentration of these compounds is dependent upon the concentration of the compounds in the sludge, the diluent/dispersant combination, and upon the temperature of the mixing. Emissions from volatile material processing in tanks are typically separated into two categories, working losses and breathing losses. Working losses arise from the displacement of vapors in the headspace of a tank as the tank is filled. Breathing losses are due to the heating and cooling of the vapors in a vessel headspace as the ambient temperature changes between night and day. As the gas in the tank headspace is heated during the day, it expands, causing a portion of the expanded gas to be expelled from the tank. When the tank cools during the nighttime hours, the gas contracts, drawing in fresh outside air that then becomes saturated with the volatile material from the tank liquid.

The AKJ sludge mixing operation is a batch process. Using the Gas Law principals, the emissions can be calculated by knowing the batch volume, mixing unit batch fill time, estimated higher vapor concentration based on higher liquid concentration and higher temperature, component molecular weight, and maximum operating tank temperature. Two different diluents for the coal waste sludge may be used: Light Cycle Oil or Carbon Black Oil. If Light Cycle Oil is used as a diluent, an additional dispersant (either Tall Oil or #6 Fuel Oil Emulsion) must also be used. Maximum potential emissions are based on exclusively using the diluent/dispersant combination that produced the highest emissions during testing. Vol.% of component in unit headspace based on emission testing on: 2/19/01 - Tall Oil; 3/28/01 - Fuel Oil Emulsion; and 4/5/01 - Carbon Black Oil. For the unit #1, after mixing, the diluted sludge is transferred to a storage tank; therefore, the working losses are multiplied by two for both emissions - from the mixing unit and the storage tank.

The number of batches produced per day is dependent upon the generation rate of coal waste sludge from the Clairton coke by-product recovery process. All generated tar sludge is used by AKJ in this process. The following limitations are requested to limit the potential number of batches of product produced: operation during two shifts per day with up to 4 batches per shift for a daily maximum of 8 batches per day or 8,760,000 gallons annual throughput for the unit #1 and 16,790,000 gallons throughput for the unit #2.

### **MAXIMUM POTENTIAL SUMMARY EMISSIONS**

Emission Source	Emissions, tons/yr <sup>1</sup>					
	VOC	Benzene	Toluene	Xylene	Naphthalene	Total HAPs
Mixer Unit #1 & Storage Tank	0.212	0.121	0.042	0.017	0.014	0.202
Mixer Unit #2	0.202	0.116	0.040	0.016	0.013	0.193
<b>Total</b>	<b>0.414</b>	<b>0.237</b>	<b>0.082</b>	<b>0.033</b>	<b>0.027</b>	<b>0.395</b>

<sup>1</sup> A year is defined as any consecutive 12-month period

## **HAZARDOUS AIR POLLUTANTS:**

Emissions from these processes include HAPs, most important is benzene. The calculation of the ambient concentration for benzene was based on the following parameters (worst case): emission rate - 0.003 g/s; stack height - 4.5m; stack inside diameter - 0.099m; ACFM - 40 gpm; stack gas exit temperature - 332.4K. Using EPA's SCREEN3 dispersion model, the maximum potential air concentration is 1.87ug/m<sup>3</sup> (0.59ppb).

## **APPLICABLE REGULATIONS:**

### **1. Article XXI Requirements for Issuance:**

The requirements of Article XXI, Parts B & C for the issuance this permit have been met for this facility. Article XXI, Part D, Part E & Part H will have the necessary sections addressed individually. All applicable conditions from the installation permit (0637-I001 dated March 29, 2002) have been incorporated into this operating permit.

### **2. Testing Requirements:**

Testing is not required, but the Department reserves the right to require testing in the future to assure compliance with the terms and conditions of Operating Permit No. 0637.

### **3. New Source Review (NSR) and Prevention of Significant Deterioration (PSD):**

No NSR or PSD regulations apply to this facility since potential emissions are less than the major source thresholds.

### **4. New Source Performance Standards:**

There are currently no NSPS regulations that are applicable to this facility.

### **5. NESHAPS & MACT:**

No existing NESHAP or MACT regulations apply to this facility since it is considered a minor source with respect to HAPs, and no area source MACT apply to this type of operation.

### **6. Risk Management Plan; CAA Section 112(r):**

The source is not required to have a risk management plan at this time because none of the regulated chemicals exceed the thresholds on the regulation.

## **METHOD OF COMPLIANCE DETERMINATION:**

Compliance with the emission limitations in this permit may be demonstrated by tracking the production rate of liquefied sludge and the usage of each diluent and dispersant on a monthly basis. Also, the temperature of the mixer will be limited to a maximum operating temperature of 190°F and a maximum benzene concentration in the carbon black oil diluted sludge will be limited to 1%. See Title V Operating Permit No. 0637 for the specific compliance methods, record keeping and reporting requirements for the facility.

## **RECOMMENDATIONS:**

The facility is in compliance with all applicable Federal, State and County regulations, and the facility is not in violation of the provisions of Article XXI, §2102.04.k. It is recommended that the Title V Operating Permit be issued with the emission limitations, terms and conditions in Permit No. 0637.