#### **Oregon Department of Environmental Quality**



# **Air Curtain Incinerator Emissions Test**

**Results Summary** 

## **Background**

An Air Curtain Incinerator is a device that forcefully pushes a curtain of air across an open chamber in which burning occurs. The air curtain swirls in the firebox, increasing the heat and making it burn consistently across the area. Therefore, the ACI burns more efficiently and produces less particulate matter and harmful smoke. As a result, it is an alternative to traditional open burning.

ACIs don't have the smokestack traditionally used to measure and quantify emissions. Various techniques have been used in the past leading to limited criteria air pollutants emissions data and almost no air toxics data. With funding provided by <u>Oregon SB-762</u>, DEQ designed a system to capture ACI emissions and quantify them using <u>EPA stack test methods</u>.

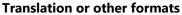
The greatest challenge when testing an ACI is capturing emissions from the open combustion chamber, which requires continuous loading of materials. Emissions data must be obtained while also accounting for interferences, such as existing external emissions, ambient air, etc., and ensuring the collection method does not interfere with the air curtain.

DEQ worked with <u>Montrose Environmental Services</u>, known for its air measurement practices and laboratory services, to design and implement the ACI emissions testing and prepare the <u>final report</u>.

In collaboration with the <u>Oregon Department of Forestry</u>, <u>Oregon Department of Agriculture</u> and <u>Clean Water Services</u>, testing occurred on an Airburners BurnBoss T24 model ACI on May 23 - 25, 2023. It used ash wood removed as part of Oregon's <u>emerald ash borer response efforts</u>. The EAB is an exotic invasive forest pest recently discovered in the state.







#### **Results**

When compared to emission factors from various <u>open burning studies</u>, the ACI source test results show significant reductions in particulate matter and carbon monoxide emissions. Also, they demonstrate potential health risks from toxic air pollutant emissions are much lower than previous estimates used by the DEQ's Cleaner Air Oregon program for evaluating this risk from ACIs.

Table 1 – Particulate Matter and Carbon Monoxide

Scenario	Emission Factors				
	PM/PM2.5 (lbs./ton)	Reduction	CO (lbs./ton)	Reduction	Source
ACI Source Test	4.3 (total PM)	-	14.5	-	DEQ Source Test
Pile Burning	25.5 (PM2.5)	83.3%	179	91.9%	USFS Study
Broadcast Burning	36.0 (PM2.5)	88.2%	180	91.9%	USFS Study
Open Burning	17 (total PM)	75%	140	89.6%	AP 42
Hardwood Broadcast Burning	36 (total PM)	88.2%	224	93.5%	AP 42
Conifer Dozer Piled	12 (total PM)	64.6 %	74	80.4%	AP 42

### **Table 2 – Risk-Driving Air Toxics**

<b>Primary Risk-Driving</b>	CAO Emission Factor	Source Test Results	Reduction
Air Toxic	(lbs./ton) (lbs./ton)		Reduction
Arsenic	0.00012 (1.2E-04)	0.00005 (5.0E-05)	58%
Chromium VI	1.2E-04 (0.00012)	6.0E-05 (0.00006)	50%
Manganese	4.7E-02 (0.047)	1.8E-03 (0.0018)	98%

### **Conclusion**

Emissions data results will be used to inform DEQ's programs and future practices and policies for ACIs. The agency remains dedicated to researching and developing creative solutions that contribute to a greener and more sustainable future. It continues to protect the environment and public health while also removing barriers to the use of emissions reduction technologies.

#### **Contact**

For more information, please visit DEQ's <u>Air Curtain Incinerator Emission Testing web page</u> or contact <u>Smoke@deg.oregon.gov</u>.

## **Non-discrimination statement**

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