SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT

Preliminary Draft Staff Report

Proposed Rule 1445 – Control of Toxic Emissions from Laser and Plasma Arc Metal Cutting

August 2024

Deputy Executive Officer
Planning, Rule Development, and Implementation
Sarah L. Rees, Ph.D.

Assistant Deputy Executive Officer
Planning, Rule Development, and Implementation
Michael Krause

Planning and Rules Manager
Planning, Rule Development, and Implementation
Kalam Cheung, Ph.D.

Author:	Danielle Collado – Assistant Air Quality Specialist
Contributors:	Rodney Davis – Air Quality Engineer II Mitch Haimov – Senior Air Quality Engineering Manager Farzaneh Khalaj, Ph.D. – Air Quality Specialist Alejandro Nieto Mora - Air Quality Engineer I Kevin Ni – Program Supervisor, CEQA Tony Tian, Ph.D. – Program Supervisor Jillian Wong, Ph.D. – Assistant Deputy Executive Officer Chris Yu – Air Quality Specialist
Reviewed by:	Michael Laybourn – Program Supervisor John Jones – Senior Deputy District Counsel Brian Tomasovic – Assistant Chief Deputy Counsel Barbara Radlein – Planning and Rules Manager, CEQA

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EXECUTIVE OFFICER:

WAYNE NASTRI

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EXECUTIVE SUMMARY

Laser and plasma arc metal cutting equipment is used in various industries, including metal fabricators, parts manufacturers, and sheet metal manufacturing. Based on available information, approximately 185 facilities operate approximately 295 permitted laser and plasma arc cutting units. Laser and plasma arc cutting operations that cut metals generate fumes and smoke from the vaporization of molten metal. These fumes and smoke can potentially contain toxic air contaminant emissions, including hexavalent chromium and nickel depending on the composition of metal being cut. Hexavalent chromium is considered a highly toxic human carcinogen agent. Proposed Rule 1445 – Control of Toxic Emissions from Laser and Plasma Arc Metal Cutting (PR 1445) is intended to reduce toxic emissions from permitted laser and plasma arc cutting units processing metal.

PR 1445 is a source-specific rule that is part of a comprehensive South Coast AQMD program to reduce toxic metal particulates. PR 1445 addresses an air quality priority to reduce toxic emissions in Community Emission Reduction Plans (CERPs) developed pursuant to Assembly Bill 617 (C. Garcia, Stats. of 2017, Ch. 136). Additionally, reducing toxic metal particulates from laser and plasma arc cutting operations has been included as an air toxics control measure from South Coast AQMD 2016 Air Quality Management Plan (AQMP). The proposed rule will reduce toxic emissions by addressing point source and fugitive emissions from new and existing laser and plasma arc cutting equipment. Point sources will be addressed by establishing control device requirements, where the cutting of metals with higher toxic emissions would be required to operate with higher efficiency air pollution control devices. Fugitive emissions will be addressed by establishing uniform, industry-wide requirements for building enclosures, housekeeping, and best management practices. PR 1445 also includes parametric monitoring requirements to ensure optimal air pollution control device performance.

This Staff Report is organized into three chapters. Chapter 1 provides background information regarding PR 1445 and a general description of the equipment and control devices. Chapter 2 provides a summary and explanation of PR 1445 requirements. Chapter 3 provides a summary of the impact assessments.

1 CHAPTER 1 - BACKGROUND

1.1 INTRODUCTION

Proposed Rule 1445 (PR 1445) intends to reduce emissions of toxic air contaminants from laser and plasma arc equipment used for metal cutting. Laser and plasma arc metal cutting equipment is used in various industries including metal fabricators, parts manufacturers, and sheet metal manufacturing. Laser and plasma arc cutting processes create fumes and smoke from vaporizing molten metal. The generated fumes can contain carcinogens such as nickel and other toxic metal particulates dependent on the composition of the metal cut. These processes also heat metal to temperatures where oxidized compounds, such as hexavalent chromium, can be formed.

Under Assembly Bill (AB) 617, South Coast AQMD has been working with stakeholders to identify air pollution sources and to develop control strategies within designated overburdened communities. Some communities have identified toxic emissions from metal processing facilities (including metal cutting) as an air quality priority in their Community Emission Reduction Plans (CERPs).[1] Reducing toxic metal particulates from laser and plasma arc cutting operations has also been included as an air toxics control measure from the South Coast AQMD Air Quality Management Plan (AQMP).[2]

South Coast AQMD permits are required for laser and plasma arc cutting equipment and the associated air pollution control devices, except for those specified under Rule 219.[3] However, no source-specific South Coast AQMD rule exists for facilities using this equipment. PR 1445 will further reduce toxic emissions from laser and plasma arc cutting equipment by implementing emission reduction strategies for point source and fugitive emissions. For point sources, air pollution control device requirements are included to address emissions directly generated from metal cutting processes. Emission reduction strategies such as housekeeping, best management practices (BMPs), and testing requirements will be implemented to minimize fugitive emissions.

1.2 HEALTH EFFECTS

Laser and plasma arc cutting operations that cut metal generate particulate emissions, and the composition of particulates depends on the composition of the metal cut. Toxic compounds, such as nickel, manganese, copper, and phosphorus, are commonly found in metals cut by laser and plasma arc units resulting in toxic emissions from the metal cutting process. Some metals, such as stainless steel and other alloy metals, contain high chromium content by weight percentage. For example, typical stainless steel is composed of 16-22% chromium by weight. The heat during laser and plasma arc cutting of chromium containing metals oxidizes the elemental chromium, resulting in hexavalent chromium emissions from the cutting process. Hexavalent chromium is considered a highly toxic human carcinogen agent. Other alloys, like Invar 36 and Inconel, contain high amounts of nickel, resulting in high levels of nickel emissions during the cutting process. Although

[1] South Coast AQMD, 2022, Community Emission Reduction Plan. Retrieved July 26, 2024 from https://www.aqmd.gov/docs/default-source/Agendas/Governing-Board/2022/2022-June3-027.pdf

[2] South Coast AQMD, 2016 Air Quality Management Plan. Retrieved January 14, 2023 from https://www.aqmd.gov/docs/default-source/clean-air-plans/air-quality-management-plans/2016-air-quality-management-plan/final-2016-aqmp/final2016aqmp.pdf

[3] Rule 219 - Equipment not Requiring a Written Permit Pursuant to Regulation II identifies specific laser and plasma arc cutting equipment that is not required to obtain a permit.

all toxic compounds can cause adverse health effects, compounds such as hexavalent chromium and nickel are of more significant concern because they have been observed to be critical contributors to elevated cancer and non-cancer health risks due to their high toxicity. The following is a summary of toxicity information for hexavalent chromium and nickel.

Hexavalent Chromium

In 1986, the California Air Resources Board (CARB) identified hexavalent chromium as a human carcinogen and toxic air contaminant. A "toxic air contaminant" or TAC is defined as "an air pollutant which may cause or contribute to an increase in mortality or an increase in serious illness, or which may pose a present or potential hazard to human health" (Health and Safety Code Section 39655(a)).

Hexavalent chromium is one of the most potent carcinogens.[4] Hexavalent chromium is a multipathway toxic air contaminant, meaning there are multiple exposure pathways for a person to be exposed, such as inhalation and ingestion. Inhalation of hexavalent chromium can cause both cancer and non-cancer health effects. Inhalation of hexavalent chromium over a long period increases the risk of lung and nasal cancer. The non-cancer effects of being exposed to hexavalent chromium at high levels over time can cause or worsen health conditions such as irritation of the nose, throat, and lungs; allergic symptoms (wheezing, shortness of breath); and nasal sores and perforation of the membrane separating the nostrils.

The California Environmental Protection Agency's Office of Environmental Health Hazard Assessment (OEHHA) developed cancer potency factors to estimate cancer risk associated with hexavalent chromium exposure. Using OEHHA's methodology to determine health risk, continual exposure to 0.045 ng/m^3 of hexavalent chromium for 30 years is estimated to increase cancer risk to 25 in a million.

Nickel

In 1991, CARB published an "Initial Statement of Reasons for Rulemaking – Proposed Identification of Nickel as a Toxic Air Contaminant." This report evaluated the presence of nickel in the atmosphere and its potential adverse effect on public health. Epidemiologic studies of the carcinogenic effects of nickel have found an increased risk of lung and nasal sinus cancer. From this study, CARB identified nickel as a TAC in 1991.[5]

In 2008, OEHHA developed a Technical Support Document in response to legal requirements that describe acute, 8 hour, and chronic reference exposure levels (RELs), which was later adopted in December of 2008. In 2012, the Technical Support Document was revised to present methodology reflecting the latest scientific knowledge and technique, and considering possible differential effects on the health of infants, children, and other sensitive subpopulations. These revisions resulted in updated acute, 8-hr, and chronic RELs for nickel and nickel compounds and the adoption of the revised Technical Support Document in 2012.[6] In addition to carcinogenic effects,

[4] Office of Environmental Health and Hazard Assessment. *Health Effects of Hexavalent Chromium*. Retrieved January 13, 2023 from https://oehha.ca.gov/air/health-effects-hexavalent-chromium .

[5] California Environmental Protection Agency Air Resources Board. *Fact Sheet: Nickel*. Retrieved June 11, 2024 from https://ww2.arb.ca.gov/sites/default/files/2021-01/factsheetnickel.pdf

[6] Office of Environmental Health and Hazard Assessment. *Nickel Reference Exposure Levels.* Retrieved June 11, 2024 from https://oehha.ca.gov/media/downloads/crnr/032312nirelfinal.pdf

nickel also causes a variety of non-carcinogenic acute effects such as gastrointestinal distress, pulmonary fibrosis, and lung and kidney damage.[7]

1.3 REGULATORY HISTORY

Existing Regulations

Laser and plasma arc cutting equipment and the associated air pollution control devices are subject to various South Coast AQMD rules and regulations. Since PR 1445 is focused on reducing toxic emissions, the following is a summary of existing toxic related requirements under South Coast AQMD Regulation XIV - Toxics and Other Non-Criteria Pollutants.

Rule 1401 - New Source Review of Toxic Air Contaminants

Rule 1401 is a permit unit-based rule that applies to any increase in toxic risk from new, relocated, or modified equipment. Under Rule 1401, new and modified permitted sources cannot exceed a maximum individual cancer risk of one in one million. The maximum individual cancer risk is the estimated probability of a potential maximally exposed individual contracting cancer as a result of exposure to toxic air contaminants. Rule 1401 also has requirements for cancer burden, which represents the estimated increase in the occurrence of cancer cases in a given population due to exposure to TACs, as well as non-cancer chronic and acute hazard index thresholds. Rule 1401 has been amended several times to add or modify new compounds. Laser and plasma arc cutting operations that cut metals composed of materials listed in Rule 1401 Table I are evaluated to demonstrate compliance with Rule 1401 during the permit application process.

Rule 1402 - Control of Toxic Air Contaminants from Existing Sources

Rule 1402 establishes facility-wide risk requirements for existing facilities that emit TACs and implements the state AB2588 Air Toxics "Hot Spots" program. It contains requirements for toxic emissions inventories, health risk assessments, public notification, and risk reduction. A maximum individual cancer risk exceeding 10 in one million, as demonstrated by an approved health risk assessment, triggers public noticing requirements. A maximum individual cancer risk of 25 in one million, as demonstrated by an approved health risk assessment, triggers the requirement for the facility to reduce its facility-wide risk. Any facility where the facility-wide emissions of TACs exceed the significant risk level of 100 in one million is required to achieve risk reductions to a level below 100 in one million within three years from the initial risk reduction plan submittal.

Other Control Strategies

The need for developing a source specific rule for laser and plasma arc cutting emissions was determined after a review of sources and health effects from toxic air contaminant emissions. South Coast AQMD planning resources, such as the Air Quality Management Plan (AQMP) and Community Emissions Reduction Plan (CERP), outline the need and approach to addressing communal concerns regarding toxic emissions from laser and plasma arc metal cutting operations.

AQMP Control Measures

[7] United States Environmental Protection Agency. *Nickel Compounds*. Retrieved July 31, 2024 from https://www.epa.gov/sites/default/files/2016-09/documents/nickle-compounds.pdf

Since 2000, the South Coast AQMD has prepared Air Toxics Control Plans to outline the overall strategy for the agency's approach to reduce toxic emissions and protect public health. In 2010, the existing Air Toxics Control Plan was expanded into a "Clean Communities Plan" that placed a greater emphasis on the cumulative effects of air toxics on neighborhoods and communities. The 2016 AQMP provided an update on the air toxics control strategy and included source specific control measures to present areas of focus for air toxics over the next several years. This 2016 AQMP update included control measure TXM-05 (Control of Toxic Metal Particulate Emissions from Laser and Plasma Arc Cutting) intended to reduce hexavalent chromium and other metal toxic air contaminants, including nickel. Control approaches identified included filter technology, such as HEPA filters, improved control of fugitive emissions, and improvements to housekeeping and maintenance to reduce potential impacts to surrounding communities. The 2016 AQMP air toxic control measures, including TXM-05, will help accelerate clean air efforts in Environmental Justice areas because many of the PR 1445 facilities are within disproportionately impacted communities.

AB 617 CERPs Community Concerns

In July 2017, AB 617 (C. Garcia, Stats. of 2017, Ch. 136) was signed into California law to address local air pollution in communities that are overburdened by air pollution. As mandated under AB 617, South Coast AQMD must, in consultation with CARB, develop and adopt a Community Emissions Reduction Plan (CERP) for each selected community. The CERP development process included a comprehensive public outreach program with community members, business owners, resource agencies, and other stakeholders in the affected community. To date, there are six AB 617 communities with a CERP approved by the South Coast AQMD Governing Board. The approved CERPs include a list of air quality concerns identified by stakeholders, as well as control actions intended to improve air quality. Through the CERP development process, people living near metal processing facilities expressed concerns about exposure to elevated concentrations of hexavalent chromium and other toxic metal particulates. Examples of metal processing facilities include a wide variety of operations such as metal finishing (e.g., plating, anodizing, metal spray coating), heat treating, plasma arc cutting, and other operations. As a result of these concerns, the following CERPs included a series of actions to reduce community air pollution from metal processing facilities.

- East Los Angeles, Boyle Heights, West Commerce
- South Los Angeles
- Southeast Los Angeles

1.4 PROCESS AND EQUIPMENT DESCRIPTIONS

Laser and plasma arc metal cutting generates fumes and smoke from the molten metal. Particles emitted from the fumes vary in size, allowing larger particles to land on surfaces while lighter particles diffuse and become airborne.

Laser Cutting

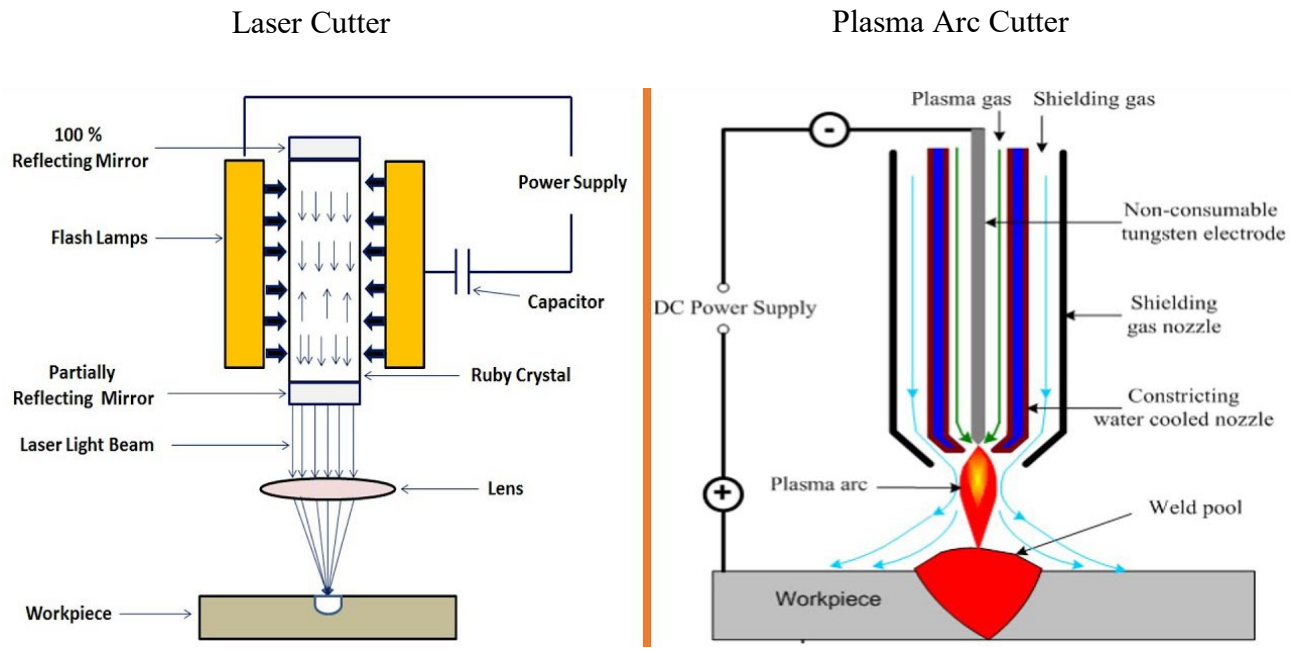
Laser cutting is a fabrication process that employs a focused, high powered laser beam to cut material into custom shapes and designs. This process is suitable for a wide range of materials, including metal, plastic, wood, glass, and paper. There are two main types of lasers used in industry wide applications. CO_2 lasers are considered an older technology, typically used for metal

engraving or non-metal cutting due to lower power density. Fiber optic laser is commonly used for metal cutting, where amplified light is channeled through a fiber optic cable (see Figure 1). On exiting the fiber cable, the amplified light is collimated or straightened and then hyper focused by a lens onto the material to be cut. Assist gas (oxygen, nitrogen, or air) is used primarily to eject molten material during the cutting process and is automatically selected based on the metal and depth cut. Main industry categories that use laser cutters include sheet metal manufacturing, aircraft engine and engine parts manufacturing, and metal merchant wholesalers.

Plasma Arc Cutting

Plasma arc cutters are electrically powered and utilize high temperature (approximately 30,000 degrees Fahrenheit) and a high velocity jet of gas (approximately 20,000 feet per second) exiting from a small orifice at the torch tip to melt and vaporize a localized area of metal (see Figure 1). As the plasma strikes the surface, the metal is rapidly weakened, and the high velocity gas removes the material to produce the desired cuts. Plasma arc cutting is suitable for a wide range of metal materials, including stainless steel, mild steel, alloy steel, and aluminum, and it cuts through metal with thicknesses ranging between 0.5 millimeter (mm) to 180 mm. Plasma arc cutting is unsuitable for non-conductive materials like wood, plastic, or rubber. Main industry categories using plasma arc cutting equipment include sewage treatment facilities, recyclable materials merchant wholesalers, metal service centers, and metal fabricators.

Figure 1 - Laser and Plasma Arc Cutting



Fixed and Portable Laser and Plasma Arc Cutting Devices

Metal cutting facilities operate what is referred to as either fixed or portable laser or plasma arc cutting equipment. Fixed equipment is typically used in one location within a building and is

typically used in metal fabricators or "job shops" due to the ability of this equipment to process more materials. Units are associated with customized cutting platforms that range in size, typically determined by the application and productivity of the unit, where customized cutting platforms can be as large as 25 feet wide by 54 feet in length. Portable cutting equipment is typically smaller and can be used inside or outside a building. The portable units are used to cut pipe, oversized metals, or during construction and maintenance. Figures 2 and 3 are examples of a fixed laser cutter and a portable plasma arc cutter.

Figure 2 - Fixed Laser Cutter

Figure 3 - Portable Plasma Arc Cutter

1.5 COLLECTION OF PARTICULATE EMISSIONS

For fixed laser and plasma arc cutting operations, the table-top cutting platform or worktable is used to hold the metal while the laser or plasma arc cutter is cutting shapes. Worktables can also be a vital component of the air pollution control device system by ensuring that toxic metal particulates generated during the cutting process are contained. The most common worktable styles are downdraft tables and water tables. In addition to worktables, some portable plasma arc cutting equipment is vented to a portable air pollution control device, sometimes called a fume extractor. The following paragraphs describe the various commonly used particulate emission collection systems for facilities that use laser and plasma arc cutting equipment.

Downdraft Table

The downdraft system uses a blower to extract smoke from laser and plasma arc cutting below the plate. The volume and velocity of plasma smoke depend on the application. However, a downdraft table is typically custom configured for the installation. Small downdraft tables are common in shops utilizing handheld plasma cutting equipment. Larger downdraft tables are used for laser and plasma arc cutting systems. A single zoned downdraft table is used for smaller systems, meaning the entire table is one open area underneath the cutting bars. The single zone is cost effective for machines up to approximately 6 feet by 12 feet. Larger tables are typically divided into multiple zones, with dampers that open and close so that fumes are extracted only in the area where the machine is cutting. The specific configuration will depend on the facility design and customer needs. Figure 4 shows a typical plasma arc cutter where emissions are collected through a downdraft worktable. Figure 5 shows a laser cutting system with a downdraft worktable within an enclosure that is closed during cutting operations.

Figure 4 - Downdraft Table

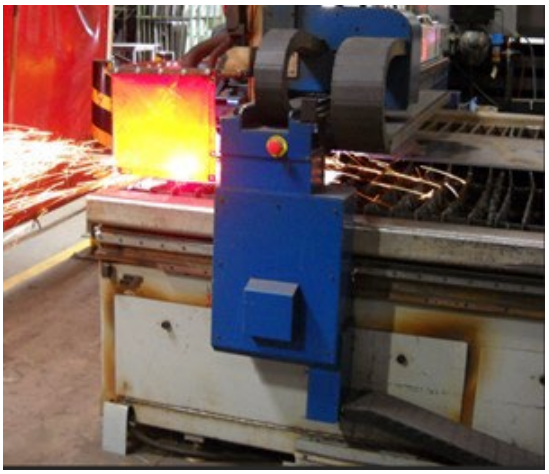
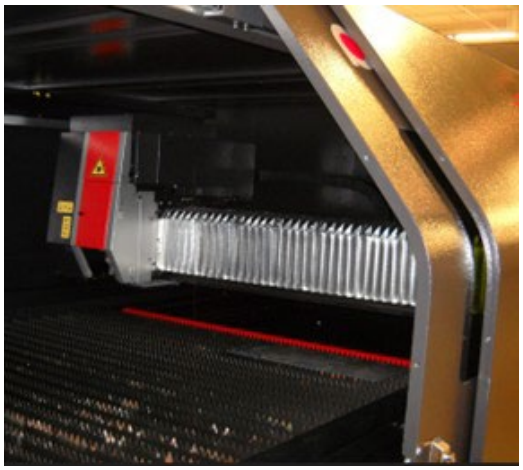


Figure 5 - Enclosed Downdraft Table



Water Table

A water table is typically comprised of a tank of water placed beneath the cutting surface. It can have an adjustable or static design. Vertical metal bars are positioned within the tank to support the material during the cutting process (See Figure 6). An adjustable table allows the operator to raise and lower the water level. For a static water table, the position of the metal in relation to the water level cannot be adjusted during cutting. There are three different cutting techniques that can be used. A 1994 study described wet cutting as when the burner was 70 mm below the water surface, semidry was described as when the water is approximately 50 mm under the plate and presumably dry cutting was when the water level was more than 50 mm under the plate.[8] Other studies describe semi wet cutting as cutting where the water level is 0.25 to 0.125 inches below the bottom of the metal being cut.[9] Semi wet and wet cutting are commonly used cutting techniques to collect and control fumes from metal cutting on a water table. During the wet cutting process, water collects and absorbs the majority of the fumes and smoke.[9] A water table can also be ventilated to an air pollution control device to increase control efficiency further (see Figure 7).

[8] Bromsen, 1994. *Emission of Fume, Nitrogen Oxides, and Noise in Plasma Cutting of Stainless and Mild Steel*. Retrieved on July 31, 2024 from https://www3.epa.gov/ttn/chief/efdocs/welding.pdf

[9] The Fabricator. *Putting heavy-duty on the table*. Retrieved on July 26, 2024 from https://www.thefabricator.com/thefabricator/article/plasmacutting/putting-heavy-duty-cutting-on-the-table

Figure 6 - Water Table

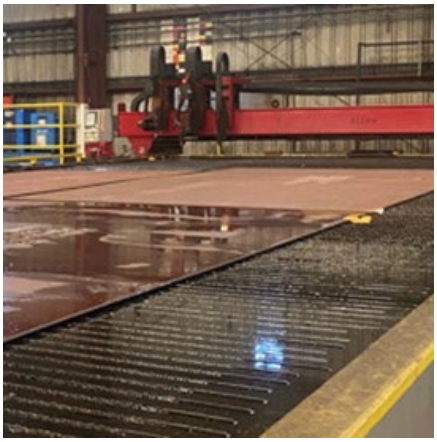


Figure 7 - Water Table with Ventilation

Portable Collection Devices

Some facilities employ portable particulate collection systems to collect emissions when cutting is conducted in different locations. These portable systems operate on the same principle as a downdraft table and use an air stream to collect particulate emissions that are directed to filters. Figure 8 provides examples of portable air pollution control devices.

Figure 8 - Portable Air Pollution Control Devices

1.6 CONTROL OF PARTICULATE EMISSIONS

An air pollution control device reduces air contaminant emissions. The level of control can be measured through several metrics, including control efficiency (e.g., 99%), outlet concentration (e.g., 0.1 ppm), or mass emission rate (e.g., 0.3 lb/hr). The level of control of the air contaminant by technology can be established by conducting a source test or through manufacturer specifications. The following is a summary of air pollution control devices that reduce emissions from laser or plasma arc cutting.

Filtration

The majority of laser and plasma arc cutting equipment is connected to a ventilation system to draw emissions toward an air pollution control device that could be located within or outside the building. The ventilated air is directed to fabric filtration, commonly referred to as a cartridge dust collector or baghouse, that removes particles from the contaminated gas stream by depositing the particles on fabric material.[10] A filter typically collects bigger particles (1 micron or bigger) through the mechanism of impaction and interception. The filter's ability to collect small micrometer and sub-micrometer particles is primarily driven by diffusion and the accumulated dust cake. As dust builds up on the filter, the differential pressure across the filter increases.[5] To avoid differential pressure increases, the filter needs to be cleaned periodically. The most common cleaning methods are shaking, reverse air, and reverse pulse or pulse jet. Air pollution control devices associated to laser and plasma arc cutting equipment typically use a pulse jet cleaning method, where short duration pulses of compressed air are used to clean the filters.[11] Pulse jet cleaning of cartridge filters is popular for laser and plasma arc cutting units because it can treat high loadings, operate at constant differential pressure, and occupy less space than traditional baghouse-type fabric filters.

In addition to cartridge dust collectors, many air pollution control systems for laser and plasma arc cutting units include HEPA filters (high efficiency particulate air filter). The HEPA filters are typically the last stage of filter media. This system arrangement allows the less expensive, lower control efficiencies filters upstream of the HEPA filters to capture most of the metal particulates to extend the life of the more expensive HEPA filter. When HEPA filters are loaded with dust, they must be replaced with new filters to prevent rupture and to allow sufficient airflow through the system. HEPA filters are individually tested and certified by the manufacturer to have a control efficiency of not less than 99.97% on particles that are 0.3 microns in size.[12] ULPA (ultra-low penetration air filter) filters represent a more advanced form of filtration and are individually tested and certified by the manufacturer to have a minimum control efficiency of 99.999 % for the removal of particles with 0.12 micrometer diameter or larger.[12] HEPA and ULPA filters are best applied when a high collection of submicron particles is required, such as when toxic or hazardous particulates cannot be cleaned from the filter. U.S. EPA guidance recommends these filters as

[10] United States Environmental Protection Agency (US EPA). Monitoring by Control Techniques – Fabric Filters. Retrieved July 2, 2024 from https://www.epa.gov/air-emissions-monitoring-knowledge-base/monitoring-control-technique-fabric-filters

[11] United States Environmental Protection Agency (US EPA). Air Pollution Control Technology Fact Sheet. Retrieved July 2, 2024 from https://www.epa.gov/sites/default/files/2020-10/documents/ff-pulse.pdf

[12] United States Environmental Protection Agency (US EPA). Air Pollution Control Technology Fact Sheet. Retrieved July 2, 2024 from https://www3.epa.gov/ttncatc1/dir1/ff-hepa.pdf

secondary filters for highly toxic materials or fine submicron particulates, such as hexavalent chromium and other toxic metal particulates.

Water Table

Dry Cutting, semi wet, and wet cutting are techniques to collect and control fumes from metal cutting. During the wet cutting process, the water collects and absorbs the majority of the fumes and smoke. There are limited particulate control efficiency studies available for water tables. In the 1994 study cited previously, a "comparable" method was used to measure the total emission of airborne fumes and nitrogen oxides during different cutting tests in an exhaust channel. The 1994 study concluded the three different cutting techniques (i.e., dry, semidry, and wet) provided a constant ratio between the amount of emitted fumes of 100:10:1 (dry = 100, semidry = 10, and wet =1). As previously mentioned, there are examples of systems in South Coast AQMD where emissions from cutting on a water table are collected by an overhead ventilation system and directed to a filter-based air pollution control device to increase overall particulate control efficiency. In addition, staff has been provided a source test for a plasma arc cutting system on a water table prepared for the San Joaquin Valley Unified Air Pollution Control District. The source test was used to determine total and hexavalent chromium emissions and measurements were collected from two sample ports in a temporary exhaust stack. According to the source test report, the metal tested had a chromium content of 0.11% and the emission rate of hexavalent chromium was 1.58E-10 pounds per inches of metal cut.

Portable Control Devices

Portable particulate collection systems operate on the same principle as a downdraft table and use an air stream to collect particulate emissions that are directed to filters. Manufacturers offer a variety of filtration systems for portable dust collectors, and based on a review of product specification sheets, HEPA final filtration is available for most models.

1.7 AFFECTED FACILITIES

PR 1445 would apply to facilities operating permitted laser or plasma arc units that cut metal. Approximately 185 facilities are expected to be impacted by PR 1445, with an estimated 295 pieces of permitted metal cutting equipment across the facilities.

Table 1 shows an inventory of permitted laser and plasma arc units and the corresponding air pollution control devices. As shown in the Table, there are 120 laser units and approximately 175 permitted plasma arc cutters, 100 of which are fixed, and 75 of which are portable.

Table 1 - Permitted Existing Laser and Plasma Arc Units and Their Associated APCDs

	Number of Laser Units	Number of Fixed Plasma Units	Number of Portable Plasma Units
Dust Collector with Cartridge Filters	60	34	19
Dust Collector with HEPA/ULPA final filtration	54	24	21
Water Tables	N/A	24	N/A
Both (Water Table and Dust Collector)	N/A	8	N/A
None	3	10	35
Total	**117**	**100**	**75**

Table 2 provides the main industry categories for laser and plasma arc cutting equipment identified by North American Industry Classification System (NAICS) codes.

Table 2 - Main Industry Categories of Affected Units

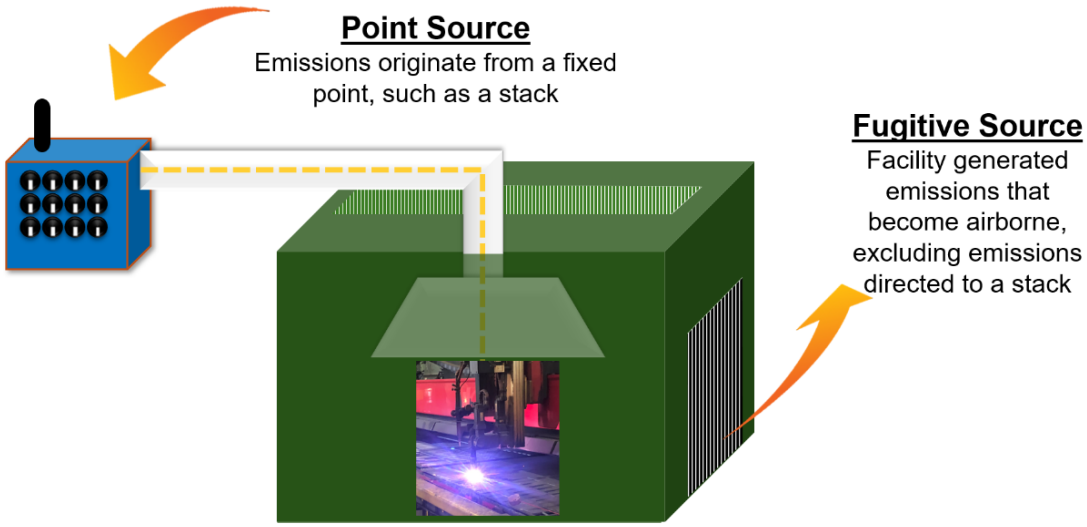
Equipment Description	NAICS Code	Sector	Final Level
Laser Cutter	332322	Manufacturing	Sheet Metal Manufacturing
	336412	Manufacturing	Aircraft Engine and Engine Parts Manufacturing
	423510	Wholesale Trade	Metal Service Centers and Other Metal Merchant Wholesalers
Plasma Arc Cutter	221320	Utilities	Sewage Treatment facilities
	423930	Wholesale Trade	Recyclable Materials Merchant Wholesalers
	423510	Wholesale Trade	Metal Service Centers and Other Metal Merchant Wholesalers

1.8 FACILITY EMISSION SOURCES AND GENERAL CONTROL APPROACH

Emissions leaving a facility are categorized into point source and fugitive emissions. Point source emissions originate from a fixed point, such as the opening of an exhaust stack. Fugitive emissions

are all other emissions, excluding the stack emissions, that leave the facility. These can include emission sources not collected or controlled by an air pollution control device and are allowed to escape the facility building structures through openings, often facilitated through air currents passing through the building at openings. Both point and fugitive emissions can impact nearby receptors. Figure 9 illustrates the two general types of facility emission sources.

Figure 9 - Facility Emission Sources



PR 1445 includes a comprehensive approach to reduce point source and fugitive emissions from facilities conducting laser and plasma arc metal cutting activities.

1.9 NEED FOR PROPOSED RULE 1445

PR 1445 intends to reduce toxic air contaminant emissions from laser and plasma arc cutting operations. It establishes minimum control device requirements and adds performance testing for air pollution control devices to adequately capture point source emissions and reduce fugitive emissions. In addition, requirements such as housekeeping, enclosures, and best management practices are established to further reduce fugitive emissions.

Establishing Minimum Control Device Requirements

Laser and plasma arc metal cutting units that have been issued a permit have undergone a permit evaluation to estimate criteria pollutant and toxic emissions. These emissions are dependent on several parameters, including operating schedule and permit conditions that specify amounts and types of metals that can be cut. Units emitting toxic emissions are subject to Rule 1401, where an air toxic analysis is conducted to quantify health risk factors, such as maximum cancer risk (MICR) and acute and chronic hazard indices (HIA and HIC). These factors are determined by conducting a risk assessment using parameters such as distance to sensitive receptors, emission estimations, and facility information. Risk factors may also differ depending on the requirements and risk assessment methodology applicable at the time of the permit evaluation.

A review of permit applications for laser and plasma arc cutting equipment identified hexavalent chromium and nickel as key toxic air contaminants responsible for elevated Rule 1401 health risk values, making these TACs an area of concern for rule development. HEPA final filtration has been identified as appropriate for use in the control of toxic metal particulate emissions by the Industrial Ventilation: A Manual of Recommended Practice for Design 31st Edition.[13] HEPA final filtration is commonly used to reduce emissions from laser and plasma arc cutting in South Coast AQMD. As described previously, existing cutting equipment can be subject to permit conditions that limit the types and quantities of material cut and, as shown in Table 1, units are controlled using a variety of APCDs (dust collectors, dust collectors with HEPA/ULPA final filtration, and water tables). Establishing a minimum control device requirement will address the lack of standardized control device requirements and further reduce point source emissions.

Establishing Fugitive Emission Control Requirements

In addition to point source emissions, better control of fugitive emissions through robust housekeeping, enclosures, and best management practices is necessary to further reduce toxic emissions from laser and plasma arc cutting. Table 3 compares fugitive emissions control requirements in current South Coast AQMD toxic metal particulate rules. As shown in Table 3, these rules establish requirements for routine housekeeping, enclosures, and best management practices as part of a comprehensive strategy to reduce fugitive emissions.

Table 3 - Comparison of Fugitive Source Requirements in Toxic Metal Rules

Rule Provisions	Rule 1407 Metal Melting (Various Metals)	Rule 1407.1 Metal Melting (Various Metals)	Rule 1426 Metal Finishing (Various Metals)	Rule 1430 Metal Grinding (Various Metals)	Rule 1469 Anodizing and Plating (Hexavalent Chromium)	Rule 1469.1 Chromium Spraying (Hexavalent Chromium)	PR 1445 Laser and Plasma Arc (Hexavalent Chromium, Nickel)
Housekeeping	Yes	Yes	Yes	Yes	Yes	Yes	*Proposed*
Enclosures	Yes	Yes	Yes	Yes	Yes	Yes	*Proposed*
Best Management Practices	No	No	Yes	No	Yes	Yes	*Proposed*
Parametric Monitoring	Yes	Yes	Yes	Yes	Yes	Yes	*Proposed*

Improved housekeeping reduces the potential for fugitive metal dust to accumulate on surfaces and then be disturbed and re-entrained in the ambient air. The use of approved housekeeping methods to collect particulate matter can reduce the potential for fugitive emissions associated with cleaning activities. Additionally, approved cleaning methods, cleaning frequencies, and requirements for areas to be cleaned are commonly used strategies to reduce potential fugitive

[13] The American Conference of Governmental Industrial Hygienists. Industrial Ventilation: A Manual of Recommended Practice for Design 31st Edition. Retrieved on July 31, 2024 from https://portal.acgih.org/s/store#/store/browse/detail/a158a00000CgqcfAAB

emissions. Improved housekeeping also involves properly handling collected wastes by depositing and maintaining materials in closed containers. Building enclosure requirements are another strategy to reduce potential fugitive emissions by reducing air currents that can cause metal particulates within the building to become airborne and be carried outside the building. Building enclosures can also reduce cross drafts within a building that can negatively impact the collection efficiency of a ventilation-based air pollution control device. Best management practices prescribe how an owner or operator conducts metal cutting and other ancillary operations to prevent the release or generation of fugitive emissions.

Establishing Parameter Monitoring Requirements

Capture efficiency (a measure of how well a system collects pollutants) is a critical element of an air pollution control device. Emissions not directed to an air pollution control device would become fugitive emissions. Capture efficiency could be determined during the permit application process or through a source test. However, source testing could be challenging for laser and plasma arc cutting equipment because the tests are generally conducted over an extended period, while metal cutting activities tend to be intermittent and not continuous. Many recently adopted South Coast AQMD toxic metal rules establish routine parametric monitoring as an alternative or supplemental requirement to ongoing source tests (see Table 3 - Comparison of Fugitive Source Requirements in Toxic Metal Rules).

PR 1445 establishes parametric monitoring measures (smoke test, air velocity measurements, and pressure drop monitoring) for filter-based air pollution control devices. Requiring facilities to conduct smoke tests and air velocity measurement tests routinely can ensure the ventilation system for the air pollution control device collects emissions as designed. Measuring pressure drop across the exhaust filters can notify an operator of potential filtration system issues such as clogged or torn filters. Adding routine smoke tests, air velocity measurements and requirements to install gauges and monitor filtration system pressure drop further reduces fugitive emissions.

1.10 PUBLIC PROCESS

The development of PR 1445 is being conducted through a public process. A PR 1445 Working Group has been formed to provide the public and stakeholders an opportunity to discuss important details about the proposed rule and provide staff with input during the rule development process. The PR 1445 Working Group is composed of representatives from businesses, environmental groups, public agencies, and consultants. South Coast AQMD has held six working group meetings conducted virtually using Zoom. The meetings were held on June 1, 2023, September 14, 2023, November 1, 2023, March 13, 2024, May 1, 2024, and July 24, 2024. In addition, a Public Workshop is scheduled on August 28, 2024 to present PR 1445 and receive public comment.

As part of PR 1445 rule development, staff conducted site visits at ten (10) facilities. Out of the ten facilities, six (6) were job shops, two (2) were aerospace, one (1) was a manufacturer, and one (1) was categorized as utility.

2 CHAPTER 2 - SUMMARY OF PROPOSED RULE 1445

2.1 OVERALL APPROACH

The objective of PR 1445 is to reduce point source toxics emissions while also preventing fugitive emissions from facilities conducting laser and plasma arc metal cutting operations. PR 1445 establishes standardized control device requirements based on achieved-in-practice control technology and requirements to prevent, detect, repair, and capture potential toxic emissions from becoming fugitive. Parametric monitoring requirements, building requirements, best management practices and housekeeping requirements for equipment emitting toxic emissions will prevent fugitive emissions from leaving facilities by containing and collecting any emissions associated with the metal cutting process.

2.2 PROPOSED RULE STRUCTURE

PR 1445 includes the following subdivisions containing all the requirements for metal cutting facilities.

(a) Purpose
(b) Applicability
(c) Definitions
(d) Control Device Requirements
(e) Performance Specifications for Unit(s) Vented to a Filter-Based Air Pollution Control Device
(f) Testing Requirements
(g) Pressure Drop Requirements for Unit(s) Vented to a Filter-Based Air Pollution Control Device
(h) Building Requirements
(i) Housekeeping
(j) Best Management Practices
(k) Source Testing
(l) Recordkeeping Requirements
(m) Exemptions

Appendix 1 - Smoke Test Procedures
Appendix 2 - Capture Velocity Measurement Procedures

2.3 PROPOSED RULE 1445

Subdivision (a) – Purpose

The purpose of this proposed rule is to reduce toxic air contaminant emissions from laser and plasma arc equipment used for metal cutting.

Subdivision (b) – Applicability

This proposed rule applies to the owner or operator that has been issued or is required to obtain a South Coast AQMD permit for any laser or plasma arc cutting equipment used for metal cutting.

For reference, Rule 219 – Equipment Not Requiring a Written Permit Pursuant to Regulation II provides equipment, processes, and operations that emit small amounts of air contaminants an exemption from South Coast AQMD permitting requirements, unless those equipment, processes, and operations are excluded from exemption pursuant to Rule 219 subdivision (e) – Exceptions. The Rule 219 provisions related to Metal Cutting are included in subparagraph (d)(5)(H). Specifically, subparagraph (d)(5)(H) exempts the specified equipment and associated air pollution control equipment from obtaining permits provided the equipment is not used to process stainless steel or alloys containing 0.1 percent by weight or more of chromium, nickel, cadmium or lead, and used for maintenance and repair. Lastly, subparagraph (d)(5)(H) specifies that laser cutting, etching, and engraving equipment rated at more than 400 watts are not exempted from obtaining permits.

As mentioned, Rule 219 subdivision (e) – Exceptions, establishes instances where otherwise exempt equipment, processes, and operations are required to obtain written permits. One of the instances specified in subparagraph (e)(2)(A) is when the Executive Officer has determined that uncontrolled emissions from equipment, processes, or operations exceed any of the health risk limits established in Rule 1401 - New Source Review of Toxic Air Contaminants. After such a determination is made by the Executive Officer and written notification has been provided to the owner or operator of the equipment, the equipment is thereafter subject to South Coast AQMD permitting requirements.

Subdivision (c) – Definitions

PR 1445 includes definitions for specific terms. For ease of identification, these terms will be capitalized when they appear in the rule. Some of the definitions are based on definitions from existing South Coast AQMD rules, while other definitions are unique to PR 1445. For certain definitions, additional clarification is provided in this chapter where the definition is used with a specific provision. Please see the proposed rule for the complete list of definitions.

Subdivision (d) – Control Device Requirements

Control device requirements are based on technical feasibility and control technology guidance documents. As mentioned in Chapter 1, air pollution control devices with HEPA final filtration are currently in use for each category of laser and plasma arc cutting equipment and are recommended by the U.S. EPA for controlling toxic air particulates.

PR 1445 control device requirements for units are based on several factors, including whether a unit is considered new, existing, portable, or fixed. Additionally, PR 1445 control device requirements are also based on the types of metal being cut and, for existing units, the current control technology in use.

Paragraph (d)(1) – New Units

Under Paragraph (d)(1), an owner or operator shall not operate a new portable or new fixed unit unless emissions are collected and vented to an air pollution control device. New is defined as a unit or an air pollution control device with a permit issued on or after the date of PR 1445 adoption. Permit date is defined as the earliest date that a permit to construct or a permit to operate was issued and the permit is currently active. Permits that have been issued where the permit subsequently becomes inactive and cannot be reinstated do not establish the permit date for that equipment. Paragraph (d)(1) further requires that the air pollution control device is equipped with

final stage filters that are individually tested and certified by the manufacturer to have a control efficiency of at least 99.97 percent on 0.3 micron or smaller particles. This provision allows for the use of filters that meet the HEPA definition and allows the use of filters with higher control efficiencies (i.e., ULPA).

Paragraph (d)(2) – Existing Units

PR 1445 establishes a control device requirement for existing portable and fixed units. "Existing" is defined as units where the permit was issued before the PR 1445 adoption date and only applies to permits that are currently active at the time of adoption. If a permit has been inactivated and is not able to be reinstated, the equipment would be permitted as a New Unit and the permit date resets. Portable is defined as units that can be moved around a facility or if the unit is listed as handheld in the equipment description, or as various locations in the equipment location section of a South Coast AQMD permit. Fixed is defined as a unit that is installed in a building and not considered to meet the definition of portable.

Subparagraph (d)(2)(A) prohibits an owner or operator from operating a Unit unless emissions are directed to an air pollution control device that meets a minimum air pollution control device requirement by the applicable future compliance date. For a Unit that doesn't meet the minimum air pollution control device requirement, subparagraph (d)(2)(B) requires the owner or operator submit a complete permit application by the applicable due date. Separate control device efficiency and compliance schedules are established for portable and fixed units. As shown in Tables 4 and 5 below, the intent of PR 1445 requirements for existing units is to require a higher efficiency control device for units that cut stainless steel or nickel alloys due to the higher potential for toxic emissions.

Table 4 - Requirement and Compliance Schedule for Existing Portable Units

Metal Processed	Minimum Air Pollution Control Device Requirement	Permit Application Due Date	Effective Date**
Metals Other than Stainless Steel, Nickel Alloy, or Unknown Metal	99% control efficiency or greater by weight*	January 1, 2027	No later than 18 months after a South Coast AQMD permit is issued or three years after the permit application due date, whichever date is earlier
Stainless Steel, Nickel Alloy or Unknown Metal	Operated with HEPA or better final filtration	July 1, 2026	

*for total suspended particles or particulate matter 10 microns or less in diameter

** In cases where the operator is in violation because of a failure to demonstrate or maintain exemption eligibility criteria under paragraph (m)(4), the operator shall submit complete permit application(s) for equipment that meets the Minimum Air Pollution Control Device Requirement within 90 days of receiving a written notice from the Executive Officer and shall demonstrate compliance with subdivision (d) requirements no later than 18 months after the permit is issued and no later than two years after receiving the written notice.

Table 5 applies to fixed units and includes an additional column to differentiate the type of air pollution control device in use.

The intent of Table 5 is to establish longer compliance timeframes for units that are presently controlled by an air pollution control device (i.e., dust collector or water table with permit conditions that require fully submerged cutting) and shorter compliance timeframes for equipment without controls or for equipment that is vented to an air pollution control device with lower control efficiencies. A dust collector is defined in paragraph (c)(5) as an air pollution control device designed to remove particulates from a gas stream using fabric filters in the shape of a tube or an envelope or other air filters that are built into a frame or cartridge. Paragraph (c)(29) includes a definition for a water table and fully submerged is defined in paragraph (c)(11) as metal cutting where the metal and entire electrical arc are fully under water or completely under water. As shown, a water table must include permit conditions that require fully submerged metal cutting for the owner or operator to be subject to the accompanying Table 5 permit application due date(s). Under PR 1445, an owner or operator can seek a permit modification to add a permit condition to require fully submerged cutting prior to January 1, 2027/2028, as applicable.

Table 5 - Requirement and Compliance Schedule for Existing Fixed Units

Metal Processed	Air Pollution Control Device Type	Minimum Air Pollution Control Device Requirement	Permit Application Due Date	Effective Date
Metals Other than Stainless Steel, Nickel Alloy, or Unknown Metal	No APCD or APCD not identified below	99% control efficiency or greater by weight*	January 1, 2028	No later than 18 months after a South Coast AQMD permit is issued or three years after the permit application due date, whichever date is earlier
	Water Tables with Permit Conditions that Require Fully Submerged Metal Cutting, or Dust Collectors, or Both		January 1, 2038	
Stainless Steel, Nickel Alloy, or Unknown Metal	No APCD or APCD not identified below	99.97% control efficiency or greater by weight* Or Operated with HEPA or better final filtration	January 1, 2027	No later than 18 months after a South Coast AQMD permit is issued or three years after the permit application due date, whichever date is earlier
	Water Tables with Permit Conditions that Require Fully Submerged Metal Cutting, or Dust Collectors, or Both		January 1, 2037	

*for total suspended particles or particulate matter 10 microns or less in diameter

Paragraphs (d)(3) and (d)(4) - Control Efficiency Demonstrations

Paragraphs (d)(3) and (d)(4) specify the procedures an owner or operator may use to demonstrate that the minimum air pollution control device requirements of Tables 1 and 2 from PR 1445 are met. For a unit that exclusively cuts metals other than stainless steel, nickel alloy, or an unknown metal, the proposed rule provides the following options to demonstrate control efficiency: subparagraph (d)(3)(A) - performing a source test that is then reviewed and approved by the Executive Officer with results demonstrating compliance, subparagraph (d)(3)(B) - control technology fact sheets issued by the U.S. EPA, or subparagraph (d)(3)(C) - manufacturers' specifications of guaranteed particulate removal efficiency. Subdivision (k) of PR 1445 includes the procedures for conducting a source test, including prior approval of a source test protocol.

For a unit used to cut Stainless Steel, Nickel Alloy, or an Unknown Metal, paragraph (d)(4) identifies control device demonstration options as either performing a source test pursuant to subdivision (k) that is then reviewed and approved by the Executive Officer with results demonstrating compliance or manufacturers' specifications for individually tested and certified filters.

Paragraph (d)(5) – Demonstration of Metals Cut

As mentioned, PR 1445 allows the use of an air pollution control device with lower control efficiency for units that exclusively cut metals other than stainless steel, nickel alloys, or unknown metals. Paragraph (d)(5) then establishes procedures for an owner or operator to conduct recordkeeping to demonstrate the metals processed by a Unit if permit conditions do not already require such recordkeeping.

Subdivision (e) – Performance Specifications for Unit(s) Vented to a Filter-Based Air Pollution Control Device

Capture efficiency (how well a system collects pollutants) is a critical element of an air pollution control device. PR 1445 prohibits the operation of a portable or fixed unit unless compliance with performance specifications for the filter-based air pollution control device is demonstrated. PR 1445 requires periodic smoke tests and capture velocity tests to ensure the air pollution device is working properly as an alternative to requiring routine source tests. Procedures for conducting smoke and capture velocity tests are included in PR 1445 Appendix 1 and 2, respectively.

For portable or fixed units, paragraph (e)(1) requires a demonstration of an acceptable smoke test that shows a direct stream of smoke to the collection location of the ventilation system without meanderings out of the direct path. As described in Appendix 1, Section 6.1, facilities are required to document smoke test results by photographs or video at each point that clearly shows the path of the smoke. Paragraph (e)(2) then requires an owner or operator of a portable or fixed unit to demonstrate a capture velocity of at least 150 feet per minute. Procedures for conducting capture velocity measurements are presented in Appendix 2.

Subdivision (f) – Testing Requirements for Unit(s) Vented to a Filter-Based Air Pollution Control Device

Paragraphs (f)(1) and (f)(2) require an owner or operator to periodically conduct smoke and capture velocity tests, respectively, based on Table 3 – Parametric Monitoring Schedule from PR 1445.

The intent is to conduct an initial test after rule adoption and recurring tests thereafter. As shown in Table 6 below, smoke tests are required every six months and capture velocity tests are required every two years.

Table 6 - Parametric Monitoring Compliance Schedule

Requirement	Existing Air Pollution Control Device		New Air Pollution Control Device	
	Initial Test*	Subsequent Test Frequency	Initial Test	Subsequent Test Frequency
Smoke Test	On or before July 1, 2025	At least once every 6 months after the prior test	Within 90 days after commencement of initial operation as allowed under South Coast AQMD permits	At least once every 6 months after the prior test
Capture Velocity	On or before January 1, 2027	At least once every 24 months after the prior test		At least once every 24 months after the prior test

*In cases where the operator is in violation because of a failure to demonstrate or maintain exemption eligibility criteria under paragraph (m)(4), the operator shall become subject to the initial test requirement within 90 days of receiving a written notice from the Executive Officer.

Under subparagraph (f)(3)(A), an owner or operator of a unit that does not meet either the smoke test or capture velocity performance standards must notify the Executive Officer within 24 hours of a failed demonstration. Notifications can be made by calling the 800-CUT-SMOG number. Subparagraph (f)(3)(B) requires the owner or operator to perform necessary actions or repairs to meet the performance specifications of subdivision (e).

Subdivision (g) – Pressure Drop Requirements for Unit(s) Vented to a Filter-Based Air Pollution Control Device

Subdivision (g) includes requirements for facilities that operate a filter-based air pollution control device. For an existing air pollution control device, the requirements are effective beginning July 1, 2025 and the requirements for new equipment become effective on the date of initial operation. Subparagraph (g)(1)(A) requires a pressure gauge to indicate in inches of water column the pressure drop across each filter stage of the air pollution control device, and subparagraph (g)(1)(B) requires the device to be operated in accordance with manufacture specifications and readily visible. Subparagraph (g)(1)(C) requires the owner or operator to maintain the pressure drop at or below the maximum pressure drop and at or above the minimum pressure drop as specified by the manufacturer unless the permit includes pressure drop conditions.

It is recognized that some small portable air pollution control devices may rely on indicator lights or other mechanisms to indicate when a filter is ready for changing or otherwise not working properly. Under paragraph (g)(2), an owner or operator may elect to meet paragraph (g)(1) requirements by following manufacturer specifications provided permit conditions for the portable air pollution control device do not require installation of a pressure gauge.

Paragraph (g)(3) requires the owner or operator to record the pressure drop at least once per day on days when metal cutting is conducted.

As mentioned, subparagraph (g)(1)(C) requires an owner or operator to maintain a filter-based air pollution control device to be at or below the maximum pressure drop and at or above the minimum pressure drop. Under paragraph (g)(4), if a pressure drop is outside an acceptable range, the owner operator is required to cease cutting activities pursuant to (g)(1), notify the Executive Officer, and perform the necessary actions or repairs to meet the pressure drop requirements. Notifications can be made by calling 1-800-CUT-SMOG.

Subdivision (h) – Building Requirements

Paragraph (c)(3) defines a building as a type of enclosure that is a permanent structure with a floor, walls surrounding the unit, and a roof to prevent exposure to the elements (e.g., precipitation, wind, run-off). Beginning July 1, 2025, paragraph (h)(1) requires each fixed unit to be operated within a building.

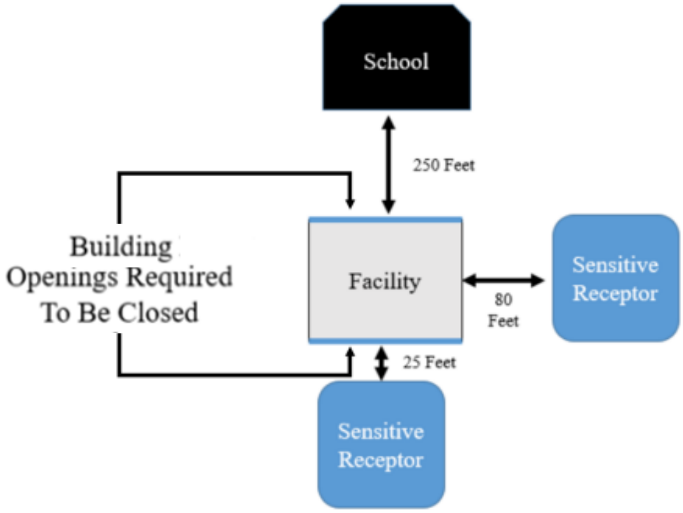
Paragraphs (h)(2), (h)(3), and (h)(4) – Prevention of Cross Drafts

PR 1445 also establishes the requirements to eliminate or minimize cross draft from activities that can affect air pollution control device collection efficiency and result in fugitive emissions. Beginning January 1, 2026, paragraph (h)(2) requires openings within 20 feet of a unit to be closed, except for the movement of vehicles, equipment, or people for ingress or egress from the building. Options for closing building openings include a door that closes, overlapping floor to ceiling strip curtains, or a vestibule.

Paragraph (h)(3) prohibits the concurrent opening of building openings at opposite ends of a building enclosure during metal cutting to eliminate cross-drafts. Under this paragraph, the owner or operators are required to ensure that any building enclosure opening that is on opposite ends of the building enclosure where air movement can pass through are not simultaneously open except during the passage of vehicles, equipment or people by either closing or using one or more of the subparagraph (h)(2)(A) through (h)(2)(C) methods for the enclosure opening(s) on at least one of the opposite ends of the building.

Paragraph (h)(4) establishes additional requirements for building openings facing a sensitive receptor or school. Except for the movement of vehicles, equipment, or people, the owner or operator is required to close any building opening or use any of the methods that prevent cross draft that directly faces and opens towards the nearest: (h)(4)(A) sensitive receptor, other than the nearest school, that is located within 1,000 feet, as measured from the property line of the sensitive receptor to the building opening; and (h)(4)(B) school that is located within 1,000 feet, as measured from the property line of the school to the building opening. If more than one school is within 1,000 feet of the building, only openings that directly face the nearest school are required to be closed to comply with subparagraph (h)(4)(B). Also, if more than one sensitive receptor that is not a school are within 1,000 feet of the building, only openings that directly face the nearest sensitive receptor are required to be closed to comply with subparagraph (h)(4)(A). Figure 10 provides an example for building opening restrictions required under paragraph (h)(4).

Figure 10 - Building Openings Required To Be Closed When Within 1,000 Feet of Sensitive Receptors and Schools



Paragraphs (h)(5) and (h)(6) – Outdoor Metal Cutting

It is recognized that some metal cutting will need to occur outside of a building. The provisions of Paragraph (h)(5) are for portable units and are applicable based on the Rule 1445 Table 1 - Requirement and Compliance Schedule for Existing Portable Unit(s) effective dates (i.e., either July 1, 2026 or January 1, 2027 depending on the type of metals cut). Under subparagraph (h)(5)(A), grade level operations must be conducted within a wind barrier. Paragraph (c)(30) defines a wind barrier as a barrier that extends on at least three sides around and is located within ten feet of metal cutting activities, with each side extending from no more than six inches above grade to at least two feet above the height of metal cutting plane and extending two feet beyond where metal cutting takes place. For non-grade level operations, subparagraph (h)(5)(B) allows the option for an owner or operator to demonstrate that emissions will be collected by conducting an acceptable smoke test pursuant to the PR 1445 Appendix 1 methodology on the day that cutting occurs.

Paragraph (h)(6) establishes a compliance option for facilities cutting larger pieces of metal (i.e., ten feet or greater in height or length) in lieu of meeting the wind barrier requirements of paragraph (h)(5). Specifically, under subparagraph (h)(6)(A), an owner or operator may elect to operate an air pollution control device with a collection hood greater than 1 square foot in diameter that has been demonstrated to achieve the capture velocity specifications of paragraph (e)(2) as determined pursuant to Appendix 2 of PR 1445. Subparagraph (h)(6)(B) further specifies that an acceptable smoke test must be conducted on the day of metal cutting under this compliance option.

Subdivision (i) – Housekeeping

PR 1445 housekeeping requirements are intended to prevent the accumulation of metals that can become fugitive, through the use of approved cleaning methods beginning January 1, 2025. Approved cleaning methods are defined in paragraph (c)(2) as cleaning using a wet mop, damp cloth, wet wash, low pressure spray nozzle, HEPA Vacuum, or a combination of the above

methods that minimize fugitive dust emissions. Subparagraphs (i)(1)(A) and (i)(1)(B) establish cleaning frequencies for areas around a unit or an air pollution control device, respectively. Paragraph (i)(2) establishes a compliance option for facilities conducting outdoor cutting within a wind barrier and is intended to clarify that the cleaning area is limited to the area within the wind barrier. Lastly, paragraph (i)(3) specifies that material generated from cleaning activities must be stored in closed leak-tight containers. Paragraph (c)(15) defines leak tight as the condition whereby any contained solids or liquids are prevented from escaping or spilling out.

Subdivision (j) – Best Management Practices

A best management practice prescribes how an owner or operator shall conduct metal cutting and other ancillary operations to prevent the release or generation of fugitive emissions. PR 1445 subdivision (j) requirements apply to the owner or operators of a filter-based air pollution control devices. Paragraph (j)(1) requires periodic inspections of the air pollution control device and paragraph (j)(2) requires the owner or operator to ensure that airflow is not restricted between the unit and the air pollution control device. Paragraph (j)(3) specifies that used filter media must be stored in leak tight containers at all times.

Subdivision (k) – Source Testing

PR 1445 does not include routine source testing requirements, but a facility may elect to conduct source testing to demonstrate that Table 2 - Requirement and Compliance Schedule for Existing Fixed Unit(s) minimum air pollution control device requirements are met. Subdivision (k) identifies procedures for conducting a source test, including Executive Officer's review and approval of a source test protocol, required notifications, and reporting.

Subdivision (l) – Recordkeeping

PR 1445 recordkeeping requirements are consistent with other recently adopted and amended toxic rules.

Subparagraph (l)(1)(A) requires records to document compliance with the minimum air pollution control device requirements contained in subdivision (d). Examples include a manufacturer guarantee of filter performance, filter specification sheets, source test reports, etc. Subparagraph (l)(1)(A) also requires documentation when filters are replaced for all filter stages installed in a filter-based air pollution control device subject to this rule.

Subparagraph (l)(1)(B) requires records to demonstrate compliance with the performance standards (smoke/capture velocity) tests conducted pursuant to subdivision (f), subparagraph (h)(5)(B), and subparagraph (h)(6)(B), as applicable. Examples of information that must be maintained include the name of the person conducting tests, date/time of demonstration, unit identification, description of equipment used/calibration dates, and results.

Subparagraph (l)(1)(C) requires records of pressure drop readings on days when metal cutting is conducted and any notifications made to South Coast AQMD if pressure drop readings are not within an acceptable range.

Subparagraph (l)(1)(D) requires records to document daily and weekly housekeeping is being conducted. A checklist would satisfy this requirement.

Subparagraph (l)(1)(E) requires records to document subdivision (j) best management practices are being implemented, including the name of the person conducting inspections and maintenance activities, date/time of inspections, units inspected, and descriptions of any maintenance or repair activities.

As mentioned, PR 1445 allows for use of a lower efficiency air pollution control device in instances where the unit is cutting metals other than stainless steel, nickel alloy or unknown metals. Paragraph (l)(2) is applicable to a unit that does not have permit conditions specifying the types of metals that can be cut and requires the owner or operator to maintain Safety Data Sheets to document the composition of metals cut. Paragraph (l)(2) recordkeeping requirements are applicable based on Table 1 - Requirement and Compliance Schedule for Existing Portable Unit(s) and Table 2 - Requirement and Compliance Schedule for Existing Fixed Unit(s) air pollution control device effective dates.

For new units, PR 1445 includes requirements to conduct smoke/capture velocity tests based on the initial date of operation. Paragraph (l)(3) requires an owner or operator to maintain records to document the initial operation date of the air pollution control device. The documentation also must include the permit number for the unit and a list of unit(s) vented to the air pollution control device, including permit numbers.

Paragraph (l)(4) specifies that records to demonstrate compliance with subdivisions (l) and (m) must be maintained for at least five years, with the most recent two years of records onsite and available to South Coast AQMD staff upon request.

Subdivision (m) – Exemptions

As mentioned, PR 1445 is applicable to units that have South Coast AQMD permits and those that are required to obtain permits. Under the specified conditions, subdivision (m) exempts units from portions of PR 1445.

For a facility where all units have permit conditions that prohibit the cutting of metals that contain more than 0.1% of any Rule 1401 toxic air contaminant, subparagraph (m)(1)(A) exempts the facility from subdivisions (d), (e), (f), (g), (h), (i), (j) and (k), and paragraphs (l)(1) through (l)(3). For the purposes of this rule, the list of toxic air contaminants will be based on Table 1 of Rule 1401, as amended on September 1, 2017, and also includes chromium. Subparagraph (m)(1)(B) requires the owner or operator to maintain records, including manufacturer-supplied Safety Data Sheet(s), to document the composition of metals cut.

Subparagraph (m)(2)(A) excludes new units from the requirements of subdivisions (d), (e), (f), (g), (h), (i), (j) and (k), and paragraphs (l)(1) through (l)(3), provided there are permit conditions that prohibit the cutting of metals that contain more than 0.1% of any Rule 1401 toxic air containment (including chromium), and records are maintained pursuant to subparagraph (m)(2)(B).

Paragraph (m)(3) excludes units from the building related requirements paragraphs (h)(2), (h)(3), and (h)(4), provided the units are within a permanent total enclosure that is vented to an air pollution control device that meets the control device requirements included in subdivision (d). Paragraph (c)(21) defines a permanent total enclosure as a permanent building or permanent containment structure, enclosed with a floor, walls, and a roof to prevent exposure to the elements (e.g., precipitation, wind, run-off) that has limited openings to allow access for people and vehicles, that is free of breaks or deterioration that could cause or result in fugitive emissions, and has been evaluated to meet the design requirements set forth in U.S. EPA Method 204, excluding

Section 6.2.[14] For the purposes of PR 1445, strip curtains are not acceptable for use as a permanent total enclosure.

Paragraph (m)(4) excludes portable units from subdivisions (d), (e), (f), (g), (h), (i) and (k), and paragraphs (l)(1) through (l)(3) provided the unit is used exclusively for maintenance and repair activities for less than 40 hours in a calendar year, and the owner or operator maintains an activity data report each time the unit is used specifying the operating hours used for maintenance and report and any other activity. Table 1 – Requirement and Compliance Schedule for Existing Portable Unit(s) and Table 3 – Parametric Monitoring Compliance Schedule include footnote references to specify the compliance procedures for an owner or operator that is notified that a Unit is no longer eligible for this exemption.

Paragraph (m)(5) excludes an owner or operator of an Existing Unit from the subdivision (d) control device requirements provided the permit application for the Unit was deemed complete on or after September 1, 2017, health risk has met the requirements in subdivision (d) of Rule 1401 – New Source Review of Toxic Air Contaminants based on risk assessment procedures adopted on or after September 1, 2017, and the permit contains conditions to limit emissions. Subparagraph (m)(5)(C) requires a complete permit application be submitted no later than one year before the applicable Table 1 – Requirement and Compliance Schedule for Existing Portable Unit(s) or Table 2 – Requirement and Compliance Schedule for Existing Fixed Unit(s) permit application due date to obtain a modified permit that includes conditions to limit toxic emissions and specify the unit is eligible for the exemption. Paragraph (m)(5) also excludes an owner or operator of an Existing Unit that is allowed to operate without an air pollution control device from most rule requirements provided the above conditions are met.

Paragraph (m)(6) establishes procedures for an owner or operator of an Exiting Unit with low emissions to seek an exemption from the subdivision (d) control device requirements. Under subparagraph (m)(6)(A), a complete permit application must be submitted no later than one year before the applicable Table 1 – Requirement and Compliance Schedule for Existing Portable Unit(s) or Table 2 – Requirement and Compliance Schedule for Existing Fixed Unit(s) permit application due date. Subparagraph (m)(6)(A) also specifies that the application must demonstrate low risk potential based on the most recent South Coast AQMD Risk Assessment Procedures for Rule 1401 - New Source Review of Toxic Air Contaminants when the application is deemed complete. To qualify for the exemption, subparagraph (m)(6)(B) specifies that the permit application must be approved by the Executive Officer. Subparagraph (m)(6)(C) requires the permit to include conditions to limit toxic emissions and specify the Unit is exempt from the applicable Rule 1445 requirements.

Appendix 1 specifies the procedures for conducting smoke tests and the necessary documentation, including photographs or video of each sampling point that clearly shows the path of the smoke.

Appendix 2 specifies the procedures for conducting capture velocity tests based on a five point grid pattern, with the results of the individual measurements averaged. The procedures are consistent with other South Coast AQMD toxic rules when measuring airflow at a plane. If the

[14] Method 204 - Permanent (PTE) or Temporary Total Enclosure (TTE) for Determining Capture Efficiency. (2022, September 14). US EPA. https://www.epa.gov/emc/method-204-permanent-pte-or-temporary-total-enclosure-tte-determining-capture-efficiency

collection hood is less than one square foot in diameter, a single capture velocity measurement in the center of the hood is acceptable.

3 CHAPTER 3 - IMPACT ASSESSMENT

3.1 AFFECTED SOURCES

Based on available information, approximately 185 facilities will be subject to PR 1445 requirements. At these facilities, there are approximately 295 units, many of which presently meet the proposed minimum air pollution control device requirements included in Table 1 – Requirement and Compliance Schedule for Existing Portable Unit(s) and Table 2 - Requirement and Compliance Schedule for Existing Fixed Unit(s). Based on a review of the South Coast AQMD permit database and site visits conducted, it is estimated that the air pollution control devices for up to 48 laser units and up to 91 plasma arc units will need to be upgraded. The timeframe for such upgrades is dependent on the types of metals cut with a priority placed on units used to cut stainless steel or nickel alloys. Applicable facilities would be subject to PR 1445 building enclosure, housekeeping, best management practices, and recordkeeping requirements. As previously mentioned, most units with an air pollution control device utilize a filter-based system to capture and collect cutting emissions. These filter-based air pollution control devices would be subject to PR 1445 parametric monitoring requirements (e.g., smoke/capture velocity tests and pressure drop monitoring).

3.2 EMISSIONS IMPACT

PR 1445 will reduce point source emissions by implementing minimum air pollution control device requirements for laser and plasma cutting units with the potential to emit toxic air contaminants based on what is technically feasible and achieved in practice. The intent of these requirements is to have units with higher toxic emissions potential to be subject to more stringent air pollution control device requirements with an accelerated compliance schedule. Emissions from each facility are based on several factors such as throughput, type of metal processed, and efficiency of existing control devices. Quantifying the point source emission reductions is difficult as many sources do not report emissions, and most facilities do not conduct source testing. However, emission potentials are estimated during the permit evaluation process. Fugitive emissions will be reduced through the implementation of performance standards, testing requirements, and building requirements. Performance standards and testing requirements will ensure the air pollution control device system is capturing emissions generated from the cutting process by requiring acceptable smoke tests and capture velocity measurements while building requirements will reduce and prevent emissions from being released into the atmosphere. Other requirements for housekeeping and best management practices are also included to reduce potential emissions from facility operation and maintenance activities. Fugitive emissions are difficult to quantify but contribute to ambient toxic air contaminant emissions.

3.3 CALIFORNIA ENVIRONMENTAL QUALITY ACT

Pursuant to the California Environmental Quality Act (CEQA) and South Coast AQMD's certified regulatory program (Public Resources Code Section 21080.5, CEQA Guidelines Section 15251(l) and South Coast AQMD Rule 110), the South Coast AQMD, as lead agency, is currently reviewing the proposed project (PR 1445) to determine if it will result in any potential adverse environmental impacts. Appropriate CEQA documentation will be prepared based on the analysis.

3.4 SOCIOECONOMIC IMPACT ASSESSMENT

A socioeconomic impact assessment will be conducted and released for public review and comment at least 30 days prior to the South Coast AQMD Governing Board Hearing, which is scheduled for November 1, 2024 (subject to change).

3.5 DRAFT FINDINGS UNDER CALIFORNIA HEALTH AND SAFETY CODE SECTION 40727

Requirements to Make Findings

California Health and Safety Code Section 40727 requires that prior to adopting, amending or repealing a rule or regulation, the South Coast AQMD Governing Board shall make findings of necessity, authority, clarity, consistency, non-duplication, and reference based on relevant information presented at the public hearing and in the staff report.

Necessity

PR 1445 is needed to reduce emissions of toxic air contaminant emissions from laser and plasma arc cutting equipment used for metal cutting.

Authority

The South Coast AQMD Governing Board has authority to adopt PR 1445 pursuant to the California Health and Safety Code Sections 39002, 39650 et. seq., 39666, 40000, 40001 40440, 40441, 40702, 40725 through 40728, 41508, and 41700.

Clarity

PR 1445 is written or displayed so that its meaning can be easily understood by the persons directly affected by it.

Consistency

PR 1445 is in harmony with and not in conflict with or contradictory to, existing statutes, court decisions or state or federal regulations.

Non-Duplication

PR 1445 will not impose the same requirements as or in conflict with any existing state or federal regulations. The proposed rule is necessary and proper to execute the powers and duties granted to, and imposed upon, the South Coast AQMD.

Reference

By adopting PR 1445, the following statutes which the South Coast AQMD hereby implements, interprets or makes specific are referenced: California Health and Safety Code sections 39659 (regulations to establish programs for hazardous air pollutants), 39666 (Air Toxics Control Measures), 41700 (nuisance), Federal Clean Air Act (CAA) Section 112 (Hazardous Air Pollutants), and CAA Section 116 (more stringent state standards).

3.6 COMPARATIVE ANALYSIS

California Health and Safety Code Section 40727.2 requires a comparative analysis of the proposed rule requirements with those of any Federal or District rules and regulations applicable to the same equipment or source category. The comparative analysis will be conducted and released in the draft staff report at least 30 days prior to the South Coast AQMD Governing Board Hearing on PR 1445, which is anticipated to be held on November 1, 2024.