

State of Colorado

TECHNICAL SUPPORT DOCUMENT FOR
REASONABLY AVAILABLE CONTROL
TECHNOLOGY FOR MAJOR SOURCES

Supporting the

Denver Metro/North Front
Range State
Implementation Plan for
the 2008 8-Hour Ozone
National Ambient Air
Quality Standard

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COLORADO

Air Pollution Control Division

Department of Public Health & Environment

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I. Introduction

On March 12, 2008, the Environmental Protection Agency (EPA) revised the national ambient air quality standard (NAAQS) for ozone to 0.075 ppm (2008 ozone NAAQS). Colorado's Denver Metro North Front Range (DMNFR) was designated as a Marginal ozone nonattainment area, effective July 20, 2012, with an attainment date of December 31, 2015. On May 4, 2016, EPA reclassified the DMNFR to a Moderate ozone nonattainment area, setting an attainment deadline of July 20, 2018. On December 26, 2019, EPA reclassified the DMNFR to Serious, setting an attainment deadline of July 20, 2021.¹

As a result of the reclassification to a Moderate nonattainment area, Colorado submitted state implementation plan (SIP) revisions to EPA on May 31, 2017, that provide for the implementation of reasonably available control technology (RACT) at specified groups of sources, including VOC sources subject to a control techniques guideline (CTG) and major sources of VOC and NO_x in the DMNFR area. Under a Moderate ozone nonattainment area classification, major stationary sources of VOC and NO_x are those with the potential to emit 100 tons per year (tpy) or more. Colorado continued these efforts and adopted SIP provisions that provide for the implementation of RACT for the oil and gas sector on November 16, 2017, combustion equipment on July 19, 2018, and breweries and wood furniture manufacturing on November 15, 2018.

As a result of the reclassification to a Serious nonattainment area, Colorado submitted state implementation plan (SIP) revisions to EPA in May 2020, that provide for the implementation of reasonably available control technology (RACT). Under a Serious ozone nonattainment area classification, major stationary sources of VOC and NO_x are those with the potential to emit 50 tpy or more. Colorado reviewed existing SIP requirements, source permits, consulted with Division permitting and enforcement staff involved with each source, and consulted with the sources themselves. Colorado considered control strategies identified in the CTGs, EPA's Alternative Control Techniques (ACT), EPA's Reasonable Available Control Technology, Best Available Control Technology, Lowest Achievable Emission Rate Clearinghouse (RBLC), EPA's Menu of Control Measures² (as of 4/2/2010), New Source Performance Standards (NSPS), National Emission Standards for Hazardous Air Pollutants (NESHAP), and in Colorado's SIP. In comparing Colorado's major sources to the above listed documents and guidance, Colorado determined that sources are currently implementing RACT but that not all of the RACT requirements are implemented throughout Colorado's SIP.

¹ See 84 Fed. Reg. 247 (December 26, 2019).

² EPA's Menu of Control Measures, last updated 4/12/2012, at <https://www.epa.gov/air-quality-implementation-plans/menu-control-measures-naaqs-implementation>.

Colorado continues these efforts and proposed revisions to Regulation Number 7 in December 2020.

This Technical Support Document (TSD) discusses the facilities and/or emission points at major sources and the existing or proposed SIP RACT requirements for the facility or emission point(s).

II. Major NOx and VOC Sources

In evaluating Colorado's major sources, Colorado used the permitting thresholds for NOx (5 tpy) and VOC (2 tpy) to identify the emission points for which the Division needed to evaluate RACT. The following subsections discuss each major source evaluated and the existing and proposed SIP RACT requirements for the facility or emission point(s). Where a facility or emission point is subject to an existing SIP RACT requirement, that facility or emission point was not further evaluated for purposes of this RACT analysis. These SIP requirements are the same as or similar to EPA's corresponding CTGs³ or have been recently adopted as major source SIP RACT.⁴

As noted in the introduction, in evaluating major source RACT requirements, Colorado considered control strategies identified in EPA's CTGs, ACTs, RBLC, Menu of Control Measures, NSPS, NESHAP, and in Colorado's SIP. Colorado also considered control strategies implemented in other state ozone nonattainment areas. Colorado's findings concerning boilers, turbines, engines, and landfill gas flares are further discussed in Colorado's 2016 and 2018 Moderate SIP TSDs.⁵

II.a. Major sources subject to existing SIP RACT requirements

The following major sources have facilities or emission points that are subject to existing SIP RACT requirements. As such, these facilities or emission points were not further evaluated for purposes of this RACT analysis. However, in some cases, these sources will also be subject to additional, new RACT requirements related to solvent and/or combustion process adjustments of combustion equipment.

The Commission also adopted a reorganization of Regulation Number 7 in 2019.⁶ The section references listed below use the reorganized numbering.

Ball Aerospace and Technology - Boulder Campus (013-0084 major for VOC) manufacturers aerospace systems including spacecraft, instruments and sensors, radio frequency and microwave technologies, and data solutions. Ball Aerospace's coating

³ See Colorado's Moderate Ozone SIP RACT Chapter 6 (2016).

⁴ See Colorado's Moderate Ozone SIP TSD for RACT for major sources (2016) and for boilers, turbines, engines, glass melt furnaces, and aggregate kilns (2018).

⁵ See Colorado's Moderate Ozone SIP TSD for RACT for major sources (2016).

⁶ See Regulation Number 7 crosswalk, rulemaking attachment (Dec. 2019).

operations are subject to MACT HHHHHH and Regulation Number 7, Part C, Section I.L. (Manufactured Metal Parts and Metal Products). The Regulation Number 7 coating requirements are based on EPA's CTGs. However, Ball Aerospace has submitted a permit modification requesting a permit limit < 50 tpy.

AveXis (fka Astrazeneca (013-0626 major for NOx)) is a pharmaceutical manufacturer. Facility NOx emissions exceed 50 tpy. Facility equipment includes six emergency generators subject to MACT ZZZZ and four 24 MMBtu/hr natural gas fired boilers that are subject to NSPS Dc. The engines and boilers are also subject to Regulation Number 7, Part E, Section II.

Carestream Health (123-6350 major for VOC) is a paper and web manufacturing and coating facility. Carestream produces a flexible thermoplastic polyester film from polyester pellets and x-ray film, color photographic paper, and contract manufacturing products. Carestream also operates a coating assessment laboratory, which provides quality assessments of new coatings and substrate configurations, and degreasing units that are subject to Regulation Number 7, Part C, Section II. but permit and APEN exempt. Carestream's coating operations are subject to NSPS JJJJ and Regulation Number 7, Part C, Sections I.I. (Paper Coating Operations) and I.J. (Plastic-Film Coating Operations). The Regulation Number 7 coating requirements are based on EPA's CTGs. Carestream also operates two natural gas fired boilers, each rated at 206 MMBtu/hr. Carestream's boilers are subject to RACT requirements adopted into Regulation Number 7, Part E, Section II. in 2016 and 2018.

Coblaco Services (001-1316 major for VOC) is a specialty surface coating facility that paints structural steel, heavy equipment, tank linings, bridges, piping, and other similar metal parts. Coblaco's coating operations are subject to Regulation Number 7, Part C, Section I.L. (Manufactured Metal Parts and Metal Products). The Regulation Number 7 coating requirements are based on EPA's CTGs.

Comcast Digital Media Center (005-1453 major for NOx) . Facility equipment includes twelve emergency generators. Two generators are subject to NSPS IIII and MACT ZZZZ. All generators are subject to Regulation Number 7, Part E, Section II.

Coors Brewing Company Endline Plant (059-0444 major for VOC) manufactures aluminum beverage end/cans. The production lines were replaced in 2015 and the only source of VOC emissions is one cold parts cleaner. The facility is subject to Regulation Number 7, Part C, Section I.C. (Can Coating Operations) and the parts washers are subject to Regulation Number 7, Part C, Section II. The Regulation Number 7 requirements are based on EPA's CTGs.

Costco (001-1656 major for VOC) operates a retail gasoline and diesel service station with three underground gasoline storage tanks. The facility is subject to Regulation Number 7, Part B, Section IV. However, Costco modified its permit and now has a VOC permit limit < 50 tpy.

Frederick Printing (001-0262 major for VOC) is a commercial printing press operation. Facility equipment includes non-heatset-sheetfed lithographic printing presses and digital printing presses. Frederick's lithographic printing is subject to Regulation Number 7, Part C, Section IV. The Regulation Number 7 printing requirements are based on EPA's CTGs. However, Frederick Printing modified its permit and now has a VOC permit limit < 50 tpy.

Greeley Energy Facility (123-0412 major for VOC and NOx) is a utility electric power cogeneration facility. Facility equipment includes one natural gas-fired, combined-cycle combustion turbine. The turbine is subject to NSPS GG and Regulation Number 7, Part E, Section II. However, the facility has not operated since 2011 and is not planning to restart the turbines.

Gunslinger Custom Paint (059-1496 major for VOC) conducts custom painting of motorcycle parts. The facility is subject to MACT HHHHHH and Regulation Number 7, Part C, Section I.L. (Manufactured Metal Parts and Metal Products). The Regulation Number 7 coating requirements are based on EPA's CTGs. However, Gunslinger modified its permit and now has a VOC permit limit < 50 tpy.

Intertape (001-0195 major for VOC) is a pressure sensitive tape manufacturing facility. Facility equipment and operations include two production lines, one producing the film that forms the backing of the tape and one that coats the film with an adhesive material to produce the tape. The coating line is subject to NSPS RR, NESHAP JJJJ, and Regulation Number 7, Part C, Section I.J. The Regulation Number 7 coating requirements are based on EPA's CTGs.

Magellan Aurora Terminal (001-0014 major for VOC) is a petroleum distribution terminal. Facility equipment and operations include a loading rack with vapor recovery system and vapor combustion unit, fugitive equipment leaks, sixteen storage tanks, tank landings, tank cleanings, and butane and natural gasoline skid operation. The facility is subject to NESHAP BBBB. The loading rack is subject to NSPS XX, NESHAP BBBB, and Regulation Number 7, Part B, Section IV. The storage tanks are subject to NSPS K, NSPS Kb, NESHAP BBBB, and Regulation Number 7, Part B, Section IV.

Musket Corporation - Windsor Petroleum Loading (123-9581 major for VOC) is a petroleum distribution terminal. Facility equipment and operations include storage tanks, loadout, and fugitive equipment leaks. The storage tanks are subject to NSPS Kb and Regulation Number 7, Part B, Section IV. The loadout operations are subject to Regulation Number 7, Part B, Section IV. However, the terminal has not operated for several years and Musket Corporation may modify its permit.

Qwest Corporation - Zuni (001-0503 major for NOx) is a data processing center. Facility equipment includes thirteen diesel-fired emergency generators, one subject to NSPS IIII, and two natural gas-fired boilers subject to NSPS Dc. The engines and boilers are subject to Regulation Number 7, Part E, Section II.

Sandoz (014-0110 major for VOC) manufactures generic pharmaceuticals. Facility equipment and operations include two natural gas fired boilers subject to NSPS Dc, bulk production (dispensing, mixing, milling, blending, drying), storage tanks, finished dosage process, solvent use and catalytic oxidizer, packaging, and printing. Sandoz's storage tanks are subject to Regulation Number 7, Part B, Section I. and pharmaceutical manufacturing is subject to Regulation Number 7, Part C, Section V. However, Sandoz has sold their facility to Mile High Labs and is cancelling the VOC points.

Upsher-Smith Laboratories (031-0485 major for VOC) manufactures and packages generic pharmaceuticals. Facility equipment and operations include material transfer, solvent cleaning, fluid bed dryer, granulating rooms, drying rooms, drying ovens, and packaging lines. Upsher-Smith's pharmaceutical manufacturing is subject to Regulation Number 7, Part C, Section V. This facility will close in 2022.

Wastequip Manufacturing Company (059-0774 major for VOC) manufactures solid waste containers. The facility is subject to Regulation Number 7, Part C, Section I.L. (Manufactured Metal Parts and Metal Products). The Regulation Number 7 coating requirements are based on EPA's CTGs. However, Wastequip modified its permit and now has a VOC permit limit < 50 tpy.

Colorado has numerous oil and gas sector sources in the DMNFR with the potential to emit 50 tpy or more of VOC and/or NOx. Equipment and operations include natural gas processing plants, engines, storage tanks, glycol natural gas dehydrators, centrifugal compressors, reciprocating compressors, diaphragm pneumatic pumps, fugitive emissions from components, and pneumatic controllers. Petroleum liquid storage and distribution facilities are subject to Regulation Number 7, Part B, Section IV. Engines are subject to Regulation Number 7, Part E, Section I. Combustion equipment at facilities that emit or have the potential to emit greater than or equal to 50 tpy NOx are subject to Regulation Number 7, Part E, Section II. Pneumatic controllers are subject to Regulation Number 7, Part D, Section III. Other equipment and operations are subject to Regulation Number 7, Part D, Section I.⁷

II.b. ACH Foam Technologies (001-0576)

ACH manufactures expanded polystyrene blocks for use in insulation and other products. Polystyrene beads are pneumatically conveyed into a pre-expander, which starts the expansion process, and then into a bed dryer, which dries the pre-puff material. After further expansion, the pre-puff material is loaded into a block mold to form the polystyrene foam into blocks. The blocks are cured and cut into appropriate sizes. VOC emissions from the expansion process, pre-puff storage, and molding process are controlled by a natural gas fired boiler. Facility VOC emissions exceed 50

⁷ See Colorado's Moderate Ozone SIP TSD for the oil and gas industry (2017).

tpy. ACH is considering requesting a permit limit < 50 tpy to more accurately reflect facility emissions.

The Division reviewed EPA's RBLC for polystyrene production and polystyrene foam products manufacturing. The RBLC listed thermal oxidizers, enclosures, capture of released pentane followed by destruction in boilers, and throughput limit as control measures for polystyrene foam products manufacturing, and in certain cases did not require any controls.

EPA's Menu of Control Measures identifies EPA's CTG for the control of VOC Emissions from Polystyrene Foam Manufacturing (1990). As described in the CTG, polystyrene foam manufacturing consists of processes for producing foam sheet, foam board, and expandable beads. Polystyrene foam products are manufactured through extrusion or expandable bead blowing. The CTG does not include a specific RACT recommendation.

EPA's NESHAP III (National Emission Standards for Hazardous Air Pollutants for Flexible Polyurethane Foam Production), MMMMM (National Emission Standards for Hazardous Air Pollutants: Flexible Polyurethane Foam Fabrication Operations), and OOOOOO (National Emission Standards for Hazardous Air Pollutants for Flexible Polyurethane Foam Production and Fabrication Area Sources) apply to flexible polyurethane foam fabrication operations and are not applicable to ACH.

ACH is not subject to current Regulation Number 7, NSPS, or NESHAP expanded polystyrene block manufacturing requirements. Therefore, Colorado required ACH to submit a RACT analysis for emission points equal to or greater than 2 tpy VOC to the Division by July 1, 2020, to inform potential, additional emission reduction measures related to the manufacturing expanded polystyrene blocks. Colorado has adopted VOC reduction requirements for foam manufacturing in a new Part E, Section V., as discussed further below in this TSD in Section III.e. Therefore, ACH is subject to RACT requirements in Colorado's SIP.

II.c. Atlas Roofing Corporation (001-0505)

Atlas Roofing manufactures foam roofing insulation by combining MDI (methylene diisocyanate) with polyester resin (polyol) with hardeners, thickeners, and pentane. The facility equipment consists of holding and mixing storage tanks and one production line with a hydraulic mixer, conveyor belt, foam laminating machine, and trim saws. Atlas Roofing maintains and operates the facility and control equipment in a manner consistent with good air pollution control practices for minimizing emissions, including work practices to reduce fugitive emissions (e.g., covered containers). The facility VOC emissions exceed 50 tpy.

The Division reviewed EPA's RBLC for polyester resins production, which did not include sources manufacturing foam roofing insulation with polyester resin.

EPA's Menu of Control Measures did not include controls for manufacturing with polyester resin.

EPA's NESHAP U (National Emission Standards for Hazardous Air Pollutant Emissions: Group I polymers and Resins) applies to elastomer product process units. EPA's NESHAP JJJ (National Emission Standards for Hazardous Air Pollutant Emissions: Group IV Polymers and Resins) applies to thermoplastic product process units. EPA's NESHAP PPP (National Emission Standards for Hazardous Air Pollutant Emissions for Polyether Polyols Production) applies to polyether polyol manufacturing process units. These NESHAP are not applicable to Atlas Roofing.

Atlas Roofing is not subject to current Regulation Number 7, NSPS, or NESHAP foam roofing insulation manufacturing requirements. Therefore, Colorado required Atlas Roofing to submit a RACT analysis for emission points equal to or greater than 2 tpy VOC to the Division by July 1, 2020, to inform potential, additional emission reduction measures related to the manufacturing of foam roofing insulation. Colorado has adopted VOC reduction requirements for foam manufacturing in a new Part E, Section V., as discussed further below in this TSD in Section III.e. Therefore, Atlas Roofing is subject to RACT requirements in Colorado's SIP.

II.d. Avago Technologies (069-0030)

Avago manufactures electronic components. Avago operates six boilers: two 5.1 MMBtu/hr; one 12.5 MMBtu/hr subject to NSPS Dc; one 20.4 MMBtu/hr subject to NSPS Dc; and two 33.4 MMBtu/hr subject to NSPS Dc with low NOx burners. Other facility equipment and operations include integrated circuits manufacturing, assembly, and testing; regenerative thermal oxidizers; wet scrubber systems; solvent use; one 2,876 hp diesel fuel fired emergency generator operating limited to 144 hours per year and subject to NESHAP ZZZZ; and six permit and/or APEN exempt emergency generators. Facility VOC and NOx emissions both exceed 50 tpy.

In developing the combustion equipment requirements in Regulation Number 7, Part D, Section II., Colorado reviewed EPA's RBLC, EPA's NSPS, EPA's NESHAP, EPA's Menu of Control Measures, EPA's ACTs, information provided by owners and operators in the DMNFR, and RACT requirements applicable in other state ozone nonattainment areas.⁸ EPA's RBLC listed low NOx burners, flue gas recirculation, natural gas firing, and good combustion practices as control measures, and in certain cases did not require any controls.

The Division reviewed EPA's RBLC for electronics manufacturing. The RBLC listed a combustor as control measures for energy plant air vaporizers and dry etching systems, submerged filling as control measures for chemical storage, good

⁸ See Colorado's Moderate Ozone SIP TSD for RACT for major sources (2016) and for boilers, turbines, engines, glass melt furnaces, and aggregate kilns (2018).

management practices as control measure for cleaning and repairing operations, and thermal oxidizers or combustors as control measures for array processes.

EPA's Menu of Control Measures listed process modification as control measures for semi-conductor manufacturing.

EPA's NESHAP BBBBB (National Emission Standards for Hazardous Air Pollutants for Semiconductor Manufacturing) applies to the manufacturing of p-type and n-type semiconductors or active solid state devices from a wafer substrate (e.g., semiconductor diodes, semiconductor stacks, rectifiers, integrated circuits, transistors), and is not applicable to Avago.

Avago's boilers and engines are subject to the combustion equipment requirements in Regulation Number 7, Part E, Section II. Avago's solvent use is subject to the general solvent use requirements in Regulation Number 7, Part C, Section II.F. Therefore, Avago is subject to RACT requirements in Colorado's SIP.

II.e. BASF (001-1239)

BASF manufactures polyurethane-based sealants, adhesives, and coatings. Facility equipment and operations include holding and mixing storage tanks, powder handling and storage, manufacturing, and product packaging. Facility VOC emissions exceed 50 tpy.

The Division reviewed EPA's RBLC for organic evaporative losses, polymer and resin production, other polymer and resin manufacturing sources, and polyurethane foam products manufacturing. For organic evaporative losses, the RBLC listed cleaners and solvents VOC limits, high volume low pressure spray applicators, best management practices, and good operating practices as control measures. For polymer and resin production and manufacturing, the RBLC listed thermal oxidizers, closed vent systems with flares, fugitive emissions leak detection and repair, and good engineering and combustion practices as control measures. For polyurethane foam products manufacturing, the RBLC listed best management practices as control measures.

EPA's Control Techniques Guidelines for Miscellaneous Industrial Adhesives (2008) applies to adhesives used at industrial manufacturing and repair facilities. EPA's CTG Control of Volatile Organic Compound Leaks from Synthetic Organic Chemical and Polymer Manufacturing Equipment (1984) applies to equipment in process units operated to produce one or more of the synthetic organic chemicals listed in Appendix E of the proposed standards of performance for SOCOMI (46 FR 1136, January 5, 1981), methyl tert-butyl ether (MTBE), polyethylene, polypropylene, and polystyrene. EPA's CTG Control of Volatile Organic Compound Emissions from Manufacture of High-Density Polyethylene, Polypropylene, and Polystyrene Resins (1983) applies to operations that convert monomer or chemical intermediate materials obtained from the basic petrochemical industry and the synthetic organic

chemicals manufacturing industry into polymer products. These CTGs do not apply to BASF operations.

EPA's Menu of Control Measures does not include any control measures for polyurethane sealants or adhesives manufacturing.

EPA's NESHAP III (National Emission Standards for Hazardous Air Pollutants for Flexible Polyurethane Foam Production) applies to flexible polyurethane foam or rebond foam processes that are located at a major source of HAP emissions. EPA's NESHAP HHHHH (National Emission Standards for Hazardous Air Pollutants: Miscellaneous Coating Manufacturing) applies to miscellaneous coating manufacturing operations that are located at a major source of HAP emissions. EPA's NESHAP MMMMM (National Emission Standards for Hazardous Air Pollutants: Flexible Polyurethane Foam Fabrication Operations) applies to flexible polyurethane foam fabrication that operates a flame lamination source and is located at a major source of HAP emissions. EPA's NESHAP OOOOO (National Emission Standards for Hazardous Air Pollutants for Flexible Polyurethane Foam Production and Fabrication Area Sources) applies to flexible polyurethane foam fabrication facilities. These NESHAP are not applicable to BASF.

BASF's storage tanks are subject to Regulation Number 7, Part B, Section I. BASF's solvent use is subject to the general solvent use requirements in Regulation Number 7, Part C, Section II.F. Therefore, BASF is subject to RACT requirements in Colorado's SIP.

II.f. Boulder Scientific Company - Mead Facility (123-0070)

Boulder Scientific manufactures specialty chemicals, specifically Grignard reagents. Facility equipment and operations include solvent use, twelve reactors, storage tanks, scrubbers, a thermal oxidizer, and two less than 10 MMBtu/hr natural gas-fired boilers. Facility VOC emissions exceed 50 tpy. The facility is subject to MACT VVVVV. However, Boulder Scientific modified its permit and now has a VOC permit limit < 50 tpy.

II.g. Boulder Wastewater Treatment Plant (013-0057)

The Boulder Wastewater Treatment Plant treats and processes wastewater. Facility equipment and operations include a digester gas flare, two 423 hp digester gas fired engines, a dual-fuel fired boiler that is both permit and APEN exempt, and emergency generators that are permit and/or APEN exempt. Facility NOx emissions exceed 50 tpy. However, Boulder Wastewater removed the engines from the facility and submitted the appropriate cancellations, therefore, facility NOx emissions now are less than 50 tpy.

II.h. Centura Health St. Anthony (059-1511)

Centura Health is a medical campus providing health care services. Centura Health operates three 20.4 MMBtu/hr boilers subject to NSPS Dc equipped with low NOx burners and two emergency generators subject to NSPS IIII. Facility NOx emissions exceed 50 tpy.

In developing the combustion equipment requirements in Regulation Number 7, Part D, Section II., Colorado reviewed EPA's RBLC, EPA's NSPS, EPA's NESHAP, EPA's Menu of Control Measures, EPA's ACTs, information provided by owners and operators in the DMNFR, and RACT requirements applicable in other state ozone nonattainment areas.⁹

Colorado incorporated the requirements of 40 CFR Part 60, Subpart IIII for Centura Health's engines (002, 003). Centura Health's boilers are subject to the combustion equipment requirements in Regulation Number 7, Part E, Section II. Therefore, Centura Health is subject to RACT requirements in Colorado's SIP.

II.i. Circle Graphics (013-1303)

Circle Graphics is a large-format printing facility specializing in printing large billboards, signs, outdoor advertising, and custom prints mounted on fiberboard. Facility operations include solvent-based, water-based, and/or UV printing. The facility VOC permit limit exceeds 50 tpy; however, the facility is modifying their permit to more closely represent actual emissions.

EPA has published several printing related CTGs, which do not apply to digital printing operations. EPA published the Control of Volatile Organic Emissions from Existing Stationary Sources - Volume VIII: Graphic Arts - Rotogravure and Flexography (1978), Control of Volatile Organic Compound Emissions from Offset Lithographic Printing (1993), Control Techniques Guidelines for Offset Lithographic Printing and Letterpress Printing (2006), and Control Techniques Guidelines for Flexible Package Printing (2006). EPA's menu of control measures also includes recommendations for flexographic printing, flexible package printing, fabric printing, and lithographic and letterpress printing.

EPA has also published several printing related NSPS and NESHAP. EPA published the Standards of Performance for Flexible Vinyl and Urethane Coating and Printing (NSPS FFF), Standards of Performance for the Graphic Arts Industry: Publication Rotogravure Printing (NSPS QQ), National Emission Standards for the Printing and Publishing Industry (NESHAP KK), and National Emission Standards for Hazardous Air Pollutants: Printing, Coating, and Dyeing of Fabrics and Other Textiles (NESHAP OOOO). The standards do not apply to digital printing operations.

⁹ See Colorado's Moderate Ozone SIP TSD for RACT for major sources (2016) and for boilers, turbines, engines, glass melt furnaces, and aggregate kilns (2018).

EPA's RBLC include categories for fabric coating and printing, flexible vinyl and urethane coating and printing, printing-forms, printing-news print, printing-packaging, and printing-publication. While not specific to digital printing, the RBLC listed water based materials, thermal oxidizers, fountain solution VOC content, and good housekeeping practice as control measures.

Circle Graphics is not subject to current Regulation Number 7, NSPS, or NESHAP digital printing requirements. Therefore, Colorado require Circle Graphics to submit a RACT analysis for their printing and coating operations to the Division by July 1, 2020, to inform potential, additional emission reduction measures related to digital printing operations. However, Circle Graphics is modifying their permit limits below 50 tpy, which exempts them from these SIP RACT efforts.

II.j. CoorsTek

CoorsTek operates two facilities in the DMNFR with NOx emissions exceeding 50 tpy.

CoorsTek (059-0066)

CoorsTek Ninth Street Plant is an industrial ceramic manufacturing facility consisting of eighteen natural gas fired kilns, five natural gas fired spray dryers, a rubber mold press, one binder burnout oven with afterburner, seven carbide electric vacuum furnaces with afterburners, and one jet mill boiler. CoorsTek is in the process of cancelling the binder burnout oven and vacuum furnaces. The kilns range from 2.49 MMBtu/hr to 13.8 MMBtu/hr. The dryers range from 2.403 MMBtu/hr to 5.4 MMBtu/hr. Raw materials in powder form are mixed with water to form wet slurry, which is dried, molded, and fired in the appropriate kiln. Completed products include wear-resistant bricks, grinding balls, and various structural ceramic parts. Facility NOx emissions exceed 50 tpy.

Coors Tek (059-0007)

The CoorsTek Clear Creek Valley Plant (CCVP) manufactures ceramic electronic components. Facility equipment includes five natural gas fired kilns ranging from 2.5 MMBtu/hr to 8.4 MMBtu/hr, ceramic materials storage silos and handling operations, six ceramic tape casting machines, six tape mills, and two solvent storage tanks. Facility NOx emissions exceed 50 tpy.

The Division reviewed EPA's RBLC for miscellaneous combustion equipment, which did not include entries for ceramic kilns. The Division also reviewed EPA's RBLC for clay products and calciners and dryers and mineral processing facilities. The RBLC listed good design and operating practices, low NOx burners, and good combustion techniques as control measures.

EPA's Menu of Control Measures does not include control measures for ceramic kilns.

EPA's NESHAP JJJJJ (National Emission Standards for Hazardous Air Pollutants for Brick and Structural Clay Products Manufacturing) applies to facilities that are a major source of HAP emissions and that manufacture brick (e.g., face brick, structural brick, brick pavers), clay pipe, roof tile, extruded floor and wall tile, and other extruded dimensional clay products. EPA's NESHAP KKKKK (National Emission Standards for Hazardous Air Pollutants for Clay Ceramics Manufacturing) applies to facilities that are a major source of HAP emissions and that manufacture clay ceramics including pressed floor tile, pressed wall tile, or sanitaryware (e.g., sinks and toilets). EPA's NESHAP RRRRRR (National Emission Standards for Hazardous Air Pollutants for Clay Ceramics Manufacturing Area Sources) applies to clay ceramics manufacturing facilities with an atomized glaze spray booth or kiln that fires glazed ceramic ware and is an area source of HAP emissions. These standards do not apply to the CoorsTek facilities.

CoorsTek's kilns at Ninth Street and CCVP that emit NOx in excess of 5 tpy are subject to the combustion equipment requirements in Regulation Number 7, Part E, Section II. Therefore, CoorsTek is subject to RACT requirements in Colorado's SIP.

II.k. Cyxtera Communications (035-0414)

Cyxtera Communications operates a data center with thirteen diesel-fired emergency generators, five of which have NOx emissions below permitting thresholds. All of the generators are 2,200 hp and operate no more than 250 hours per year. The generators are subject to NESHAP ZZZZ. Facility NOx emissions exceed 50 tpy.

In developing the combustion equipment requirements in Regulation Number 7, Part D, Section II., Colorado reviewed EPA's RBLC, EPA's NSPS, EPA's NESHAP, EPA's Menu of Control Measures, EPA's ACTs, information provided by owners and operators in the DMNFR, and RACT requirements applicable in other state ozone nonattainment areas.¹⁰

Cyxtera's engines are subject to the combustion equipment requirements in Regulation Number 7, Part E, Section II. Therefore, Cyxtera is subject to RACT requirements in Colorado's SIP. However, Cyxtera is modifying their permit limits below 50 tpy, which exempts them from these SIP RACT efforts.

II.I. Denver International Airport (031-1260)

Denver International Airport (DIA) equipment and operations include heaters, emergency generators, and boilers. Specifically, DIA currently operates eleven natural gas fired boilers, three between 50 and 100 MMBtu/hr with low NOx burners and eight below 50 MMBtu/hr with low NOx burners. Individual airlines and companies that

¹⁰ See Colorado's Moderate Ozone SIP TSD for RACT for major sources (2016) and for boilers, turbines, engines, glass melt furnaces, and aggregate kilns (2018).

maintain facilities at DIA have separate permits for their equipment. DIA's NOx emissions exceed 50 tpy.

In developing the combustion equipment requirements in Regulation Number 7, Part D, Section II., Colorado reviewed EPA's RBLC, EPA's NSPS, EPA's NESHAP, EPA's Menu of Control Measures, EPA's ACTs, information provided by owners and operators in the DMNFR, and RACT requirements applicable in other state ozone nonattainment areas.¹¹

Colorado required DIA to submit a RACT analysis for its boilers between 50 and 100 MMBtu/hr to the Division by July 1, 2020, to inform potential, additional emission reduction measures related to the boilers. DIA's heaters, engines, and boilers are subject to the combustion equipment requirements in Regulation Number 7, Part E, Section II. Colorado has adopted additional NOx emission reduction requirements for boilers between 50 and 100 MMBtu/hr in Part E, Section II., as discussed further below in this TSD in Section III.a. Therefore, DIA is subject to RACT requirements in Colorado's SIP.

II.m. Front Range Energy (123-5097)

Front Range Energy is an ethanol manufacturing plant. Facility equipment and operations include grain receiving and storage, fermentation, distillation, six storage tanks, one 143.4 MMBtu/hr natural gas fired boiler, ethanol loadout and flare, and one diesel fuel fired 510 hp emergency engine, which are subject to permit RACT requirements. The facility VOC and NOx emissions both exceed 50 tpy.

In developing RACT requirements in Regulation Number 7, Part E, Section IV., Colorado reviewed EPA's RBLC for volatile organic liquid storage and alcohol fuel production, EPA's NSPS, EPA's Menu of Control Measures, information provided by owners and operators in the DMNFR, and RACT requirements applicable in other state ozone nonattainment areas.¹² For the volatile organic liquid storage and alcohol fuel production category, EPA's RBLC listed internal floating roof tanks and vapor combustor for benzene storage, wet scrubbers for ethanol fermentation, fixed roof tanks and submerged fill for methanol storage, proper design and operation of tanks for NGL fractionation, vapor recovery system and submerged fill for coal/biomass to liquids loading rack, and internal floating roof tanks and NSPS VV LDAR for ethanol storage as control measures. The RBLC listed also listed vapor recovery system and enclosed flare for load-out, CO2 and wet scrubbers for fermentation, thermal oxidizer for distillation, enclosed flare and NSPS Kb for storage tanks, best practices and LDAR for equipment leaks as control measures, and in certain cases did not require any controls. These listed practices are not all appropriate for Front Range's operations.

¹¹ See Colorado's Moderate Ozone SIP TSD for RACT for major sources (2016) and for boilers, turbines, engines, glass melt furnaces, and aggregate kilns (2018).

¹² See Colorado's Moderate Ozone SIP TSD for RACT for major sources (2016).

In developing the combustion equipment requirements in Regulation Number 7, Part D, Section II., Colorado reviewed EPA's RBLC for boilers > 100 MMBtu/hr, EPA's NSPS, EPA's NESHAP, EPA's Menu of Control Measures, EPA's ACTs, information provided by owners and operators in the DMNFR, and RACT requirements applicable in other state ozone nonattainment areas.¹³ EPA's RBLC listed low NOx burners, flue gas recirculation, SCR, over-fire air, operating techniques, process fuel gas, water or steam injection, and low NOx fuel combustion as control measures, and in certain cases did not require any controls.

The storage tanks are subject to NSPS Kb and/or Regulation Number 7, Part B, Section IV. The boiler is subject to NSPS Db and the combustion equipment requirements in Regulation Number 7, Part E, Section II. Colorado incorporated the requirements of 40 CFR Part 60, Subpart VV Standards of Performance for Equipment Leaks for Front Range Energy's facility. Therefore, Front Range Energy is subject to RACT requirements in Colorado's SIP.

II.n. Golden Aluminum (123-0089)

Golden Aluminum is an aluminum sheet manufacturing facility. Facility equipment and operations include three rigid can stock shredders, delacquing kiln and thermal oxidizer, three furnaces, degassing boxes, hot mill press and coiling, two annealing furnaces, cold mill and spray, recoiling, coil coating line and thermal oxidizer, packaging, and diesel fuel fired 1,310 hp emergency generator subject to NESHAP ZZZZ. The facility VOC and NOx emissions both exceed 50 tpy. Golden Aluminum's delacquing kiln and furnaces are subject to NESHAP RRR. Golden Aluminum's coil coating line is subject to NSPS TT and Regulation Number 7, Part C, Section I.D. (Coil Coating Operations).

The Division reviewed EPA's RBLC for metal coil surface coating and miscellaneous boilers, furnaces, and heaters. The RBLC did not list any control measures for metal coil surface coating. For miscellaneous boilers, furnaces, and heaters, the RBLC listed low NOx combustion technology, natural gas as fuel, selective catalytic reduction, efficient boiler design, low NOx burners, and good combustion practices as control measures. Specifically concerning annealing furnaces, the RBLC listed low NOx burners, combustion of clean fuel, and good combustion practices as control measures.

EPA's Menu of Control Measures lists incineration, enclosures, and process modification as control measures for metal coil surface coating.

¹³ See Colorado's Moderate Ozone SIP TSD for RACT for major sources (2016) and for boilers, turbines, engines, glass melt furnaces, and aggregate kilns (2018).

EPA's CTG Control of Volatile Organic Emissions from Existing Stationary Sources Volume: Surface Coating of Cans, Coils, Paper, Fabric, Automobiles, and Light-Duty Trucks (1977) applies to the coating of any flat metal sheet or strip that comes in rolls or coils (i.e., coil coating). The Regulation Number 7 coil coating requirements are based on EPA's CTG.

EPA's NSPS TT (Standards of Performance for Metal Coil Surface Coating) applies to metal coil surface coating operations and specifies coating VOC contents. EPA's NESHAP SSS (National Emission Standards for Hazardous Air Pollutants: Surface Coating of Metal Coil) applies to coil coating lines at a major source of HAP emissions and specifies organic HAP emission limits. EPA's NESHAP RRR (National Emission Standards for Hazardous Air Pollutants for Secondary Aluminum Production) applies to secondary aluminum production and dioxin and furan emission limits.

Golden Aluminum's coil coating, an EPA CTG VOC source category, is subject to Regulation Number 7, Part C, Section I.D., therefore subject to sufficient SIP RACT for the VOC related coil coating operations. Golden Aluminum also submitted a RACT analysis for emission points equal to or greater than 5 tpy NOx to the Division by July 1, 2020, to inform potential, additional emission reduction measures for Golden Aluminum's combustion equipment.

Golden Aluminum's three natural gas-fired melters have emissions greater than 5 tpy and are, therefore, subject to the combustion process adjustment requirements in Regulation Number 7, Part E, Section II. The melter burners were installed in 2006 and, therefore, have an expected equipment life, conservatively, of 20 years. The melters air/oxygen fuel burners function as low NOx burners when operating with 100% oxygen participation. At 0% oxygen participation the burners are fired with ambient air as the combustion air supply. The cost of natural gas, as provided in August 2020, is \$2.00 per MMBtu whereas the cost of oxygen is \$0.35 per 100 scf. At these prices, the cost per ton NOx reduction under 100% oxygen participation is \$61,516. In addition, the technical concerns when operating in a natural gas/oxygen/air mixture mode include damage to the interior of the furnaces due to the high heat produced, more frequent melter equipment replacement due to the destructive effects of the higher temperature, and difficulty in setting the burner melter flame at the correct setpoint for optimal melting.

	0% oxygen participation	100% oxygen participation	Difference between 0% and 100%
Melters NOx emissions, combined (tpy)	25.1	6.3	18.8
Natural gas consumption (MMBtu/month)	13,684	6,822	
Oxygen consumption, per melter (MMscf/month)	0	13.10	
Total fuel, including oxygen costs per year	\$328,406	\$713,904	\$385,498

Fuel costs for all three melters	\$985,218	\$2,141,712	\$1,156,495
\$/ton NOx reduction for all three melters			\$61,516

Similarly, the cost per ton of NOx potentially reduced are \$29,000 or \$51,000 to replace the melter burners with regenerative or ambient air low NOx burner systems, respectively. Colorado determined that these costs are not representative of RACT. Therefore, Colorado determined that compliance with the combustion adjustment requirements for Golden Aluminum’s combustion equipment and the coil coating requirements for Golden Aluminum’s coil coating operations represents RACT in Colorado’s SIP.

II.o. Insulfoam (001-0560)

Insulfoam manufactures expanded polystyrene blocks. Facility equipment and operations include an expanded polystyrene pre-expander and aging bags, an insulation block mold, and one natural gas fired 11.7 MMBtu/hr boiler subject to NSPS Dc. VOC emissions from the pre-expander are routed to the boiler. Facility VOC emissions exceed 50 tpy. Insulfoam is considering requesting a permit limit < 50 tpy to more accurately reflect facility emissions.

The Division reviewed EPA’s RBLC for polystyrene production and polystyrene foam products manufacturing. The RBLC listed thermal oxidizers, enclosures, capture of released pentane followed by destruction in boilers, throughput limit as control measures for polystyrene foam products manufacturing, and in certain cases did not require any controls.

EPA’s Menu of Control Measures identifies EPA’s CTG for the control of VOC Emissions from Polystyrene Foam Manufacturing (9/1990). As described in the CTG, polystyrene foam manufacturing consists of processes for producing foam sheet, foam board, and expandable beads. Polystyrene foam products are manufactured through extrusion or expandable bead blowing. The CTG does not include a specific RACT recommendation.

EPA’s NESHAP III (National Emission Standards for Hazardous Air Pollutants for Flexible Polyurethane Foam Production), MMMMM (National Emission Standards for Hazardous Air Pollutants: Flexible Polyurethane Foam Fabrication Operations), and OOOOOO (National Emission Standards for Hazardous Air Pollutants for Flexible Polyurethane Foam Production and Fabrication Area Sources) apply to flexible polyurethane foam fabrication operations and are not applicable to Insulfoam.

Insulfoam is not subject to current Regulation Number 7, NSPS, or NESHAP expanded polystyrene manufacturing requirements. Therefore, Colorado required Insulfoam to submit a RACT analysis for emission points equal to or greater than 2 tpy VOC to the Division by July 1, 2020, to inform potential, additional emission reduction measures related to the manufacturing of expanded polystyrene blocks. Colorado has adopted

VOC reduction requirements for foam manufacturing in a new Part E, Section V., as discussed further below in this TSD in Section III.e. Therefore, Insulfoam is subject to RACT requirements in Colorado's SIP.

II.p. Leprino Foods (123-0002)

Leprino manufactures mozzarella cheese. Facility equipment and operations include three 50.4 MMBtu/hr natural gas fired boilers with low NOx burners and flue gas recirculation subject to NSPS Dc, one 16 MMBtu/hr natural gas fired milk products dryer with low NOx burners, two diesel fuel fired generators subject to NSPS IIII, two process dryers, one 10.5 MMBtu/hr process dryer with low NOx burners, one 5.5 MMBtu/hr 4SLB turbocharged biogas fired generator, one flare that operates during biogas engine downtime, and two 84.3 MMBtu/hr natural gas fired turbines subject to NSPS KKKK. Facility NOx emissions exceed 50 tpy.

In developing the combustion equipment requirements in Regulation Number 7, Part D, Section II., Colorado reviewed EPA's RBLC, EPA's NSPS, EPA's NESHAP, EPA's Menu of Control Measures, EPA's ACTs, information provided by owners and operators in the DMNFR, and RACT requirements applicable in other state ozone nonattainment areas.¹⁴

The Division reviewed EPA's RBLC for NOx control strategies from other food and agricultural products and processes. The RBLC contained no such entries. Similarly, EPA's Menu of Control Measures did not list any control measures for cheese manufacturing.

Leprino's engines, boilers, and turbines are subject to the combustion equipment requirements in Regulation Number 7, Part E, Section II. However, Colorado also required Leprino Foods to submit a RACT analysis for their engines and boilers to the Division by July 1, 2020, to inform potential, additional emission reduction measures related to engines and boilers. Leprino's engines are subject to the requirements in Regulation Number 7, Part E. Colorado has adopted additional NOx emission reduction requirements for boilers and biogas fired engines in Part E, Section II., as discussed further in this TSD in Sections III.a. and III.c. Therefore, Leprino is subject to RACT requirements in Colorado's SIP.

II.q. Nestle Purina (031-0042)

Nestle Purina manufactures pet food. Facility equipment and operations include grain receiving and handling, product extruders, natural gas fired dryers, product storage, packaging, one 37.4 MMBtu/ht natural gas fired boiler, one 24.3 MMBtu/hr natural gas fired boiler subject to NSPS Dc, and two diesel fuel fired emergency generators.

¹⁴ See Colorado's Moderate Ozone SIP TSD for RACT for major sources (2016) and for boilers, turbines, engines, glass melt furnaces, and aggregate kilns (2018).

Facility NO_x emissions exceed 50 tpy. However, Nestle has requested a permit limit < 50 tpy to more accurately reflect facility emissions.

In developing the combustion equipment requirements in Regulation Number 7, Part D, Section II., Colorado reviewed EPA's RBLC, EPA's NSPS, EPA's NESHAP, EPA's Menu of Control Measures, EPA's ACTs, information provided by owners and operators in the DMNFR, and RACT requirements applicable in other state ozone nonattainment areas.¹⁵

The Division reviewed EPA's RBLC for other miscellaneous combustion, which did not include entries for dryers. The Division also reviewed EPA's RBLC for grain dryers, which listed low NO_x burners, flue gas recirculation, and steam injection for germ dryers as control measures.

EPA's Menu of Control Measures did not include control measures for pet food manufacturing.

EPA's NESHAP DDDDDDD (National Emission Standards for Hazardous Air Pollutants for Area Sources: Prepared Feeds Manufacturing) applies to a prepared feeds manufacturing facility that uses a material containing chromium or a material containing manganese, which does not apply to Nestle Purina.

Nestle Purina's engines, dryers, and boilers are subject to the combustion equipment requirements in Regulation Number 7, Part E, Section II. Therefore, Nestle Purina is subject to RACT requirements in Colorado's SIP. However, Nestle is modifying their permit limits below 50 tpy, which would exempt the combustion equipment from Section II.

II.r. Northern Priming and Prestain (123-0140)

Northern Priming and Prestain surface coats decorative lumber accents for homes and offices. Facility equipment includes ten spray coating operations. Facility VOC emissions exceed 50 tpy. Northern Priming is considering requesting a permit limit < 50 tpy to more accurately reflect facility emissions.

The Division reviewed EPA's RBLC for wood products/furniture surface coating. The RBLC listed solvent VOC content, thermal oxidizer, sealer and topcoat VOC content, application methods, and work practices as control measures.

EPA's Menu of Control Measures listed add-on controls and EPA's CTG as control measures for wood furniture surface coating; incineration and reformulation as

¹⁵ See Colorado's Moderate Ozone SIP TSD for RACT for major sources (2016) and for boilers, turbines, engines, glass melt furnaces, and aggregate kilns (2018).

control measures for wood product surface coating; and low-VOC materials coatings as a control measure for flat wood paneling coatings.

EPA's has published several CTGs related to wood products. EPA's Control of Volatile Organic Emissions from Existing Stationary Sources - Volume VII: Factory Surface Coating of Flat Wood Paneling (1978) was updated in 2006, Control Techniques Guidelines for Flat Wood Paneling Coatings, and applies to the surface coating of interior, exterior, or tileboard wood paneling products. EPA's CTG Control of Volatile Organic Compound Emissions from Wood Furniture Manufacturing Operations (1996) facilities that manufacture wood furniture including residential furniture (e.g., upholstered furniture and casegoods such as bookcases), cabinets, wood office furniture (e.g., bookcases, chairs, desks), public building and related furniture (e.g., benches, bleachers); and wood office and store fixtures. EPA also published a Preliminary Industry Characterization: Wood Building Products Surface Coating (1998) that described potential emission control techniques such as the use of low-VOC or low-HAP coatings, add-on controls such as incinerators, and pollution prevention techniques, but did not recommend a specific control technique.

EPA's NESHAP JJ (National Emission Standards for Wood Furniture Manufacturing Operations) applies to the manufacturing of wood furniture and includes coating VHAP limits and work practices. EPA's NESHAP DDDD (National Emission Standards for Hazardous Air Pollutants: Plywood and Composite Wood Products) applies to facilities that manufacture plywood and/or composite wood products by bonding wood material to form a structural panel or engineered wood product. EPA's NESHAP QQQQ (National Emission Standards for Hazardous Air Pollutants: Surface Coating of Wood Building Products) applies to the surface coating of wood building products, including doors and door components, at a major source of HAP emissions. NESHAP QQQQ includes organic HAP emission limits and work practices. However, these NESHAP do not apply to Northern Priming and Prestain.

Northern Priming is not subject to current Regulation Number 7, NSPS, or NESHAP wood coating requirements. Therefore, Colorado required Northern Priming to submit a RACT analysis for emission points equal to or greater than 2 tpy VOC to the Division by July 1, 2020, to inform potential, additional emission reduction measures related to wood coating. Colorado has expanded VOC reduction requirements for wood furniture surface coating to other wood coating operations in Part C, Section I., as discussed further below in this TSD in Section III.d. Therefore, Northern Priming is subject to RACT requirements in Colorado's SIP.

II.s. Owens Corning Denver Roofing Plant (001-0009)

Owens Corning manufactures roofing products, including shingles and rolled roofing sheet material. Facility equipment and operations include one natural gas fired 4.2 MMBtu/hr boiler, two asphalt heaters rated at 2.0 MMBtu/hr and 4.5 MMBtu/hr, two hot oil heating systems rated at 1.2 MMBtu/hr and 2.0 MMBtu/hr, storage tanks, material storage and handling, five injet printers, and sealant and laminator system.

The facility is subject to NSPS UU and NESHAP AAAAAAA. Facility VOC emissions exceed 50 tpy. However, Owens Corning has requested a permit limit < 50 tpy to more accurately reflect facility emissions.

The Division reviewed EPA's RBLC for asphalt roofing products manufacturing, which listed thermal oxidizer and coalescing filter as control measures.

EPA's CTG Control of Volatile Organic Compounds from Use of Cutback Asphalt (1977) applies to paving asphalts liquefied with petroleum distillate, which does not apply to Owens Corning.

EPA's Menu of Control Measures lists low NOx burner and flue gas recirculation as control measures for asphalt plant manufacturing sources; low NOx burners as a control measure for asphaltic concrete rotary dryer; reformulation and process modification as control measures for cutback asphalt; and increased particulate monitoring and fabric filters as control measures for asphalt manufacturing.

EPA's NSPS I (Standards of Performance for Hot Mix Asphalt Facilities) does not apply to Owens Corning. EPA's NSPS UU (Standards of Performance for Asphalt Processing and Asphalt Roofing Manufacture) applies to asphalt roofing plants and includes standards for particulate matter emissions. EPA's NESHAP LLLLL (National Emission Standards for Hazardous Air Pollutants: Asphalt Processing and Asphalt Roofing Manufacturing) applies to asphalt processing facilities or asphalt roofing manufacturing facilities that are major sources of HAP emissions, and does not apply to Owens Corning. EPA's NESHAP AAAAAAA (National Emission Standards for Hazardous Air Pollutants for Area Sources: Asphalt Processing and Asphalt Roofing Manufacturer) applies to asphalt processing operations and/or asphalt roofing manufacturing operations and includes standards for particulate matter and polyaromatic hydrocarbon emissions.

Owens Corning is not subject to current Regulation Number 7, NSPS, or NESHAP expanded roofing manufacturing requirements. Therefore, Colorado required Owens Corning to submit a RACT analysis for emission points equal to or greater than 2 tpy VOC to the Division by July 1, 2020, to inform potential, additional emission reduction measures related to roofing manufacturing operations. However, Owens Corning is modifying their permit limits below 50 tpy, which exempts them from these SIP RACT efforts.

II.t. Public Service Company - Blue Spruce (001-1354)

The Blue Spruce Energy Center operates two simple cycle turbines used to generate electric power and one diesel fuel fired emergency generator that is exempt from APEN requirements. The turbines have dry low NOx combustion and water injection systems. The turbines are subject to NSPS GG and more stringent permit limits. Facility NOx emissions exceed 50 tpy.

In developing the combustion equipment requirements in Regulation Number 7, Part D, Section II., Colorado reviewed EPA's RBLC, EPA's NSPS, EPA's NESHAP, EPA's Menu of Control Measures, EPA's ACTs, information provided by owners and operators in the DMNFR, and RACT requirements applicable in other state ozone nonattainment areas.¹⁶

Blue Spruce's turbines are subject to the combustion equipment requirements in Regulation Number 7, Part E, Section II. Therefore, Blue Spruce is subject to RACT requirements in Colorado's SIP.

II.u. Public Service Company - Lookout Center (059-0059)

The Lookout Center has operated three diesel-fired engines for emergency power generation. Facility NOx emissions exceed 50 tpy. However, Lookout Center modified its permit to reflect the current facility engine configuration and now has a NOx permit limit < 50 tpy.

II.v. Public Service Company - Valmont Station (013-1460)

The Valmont Station operates two simple cycle natural gas fired combustion turbines with water injection systems, rated at 347 MMBtu/hr and 343 MMBtu/hr. These turbines were purchased by PSCo June 2020. The turbines are subject to NSPS GG and more stringent permit limits. Facility NOx emissions exceed 50 tpy.

In developing the combustion equipment requirements in Regulation Number 7, Part D, Section II., Colorado reviewed EPA's RBLC, EPA's NSPS, EPA's NESHAP, EPA's Menu of Control Measures, EPA's ACTs, information provided by owners and operators in the DMNFR, and RACT requirements applicable in other state ozone nonattainment areas.¹⁷

SWG Valmont's turbines are subject to the combustion equipment requirements in Regulation Number 7, Part E, Section II. Therefore, SWG Valmont is subject to RACT requirements in Colorado's SIP.

II.w. Rocky Mountain Prestain (001-1336)

Rocky Mountain Prestain prefinishes lumber and construction materials. Facility equipment and operations include two surface coating lines, three spray booths, cleaning solvents, and one natural gas-fired 1 MMBtu/hr curing oven. Facility VOC

¹⁶ See Colorado's Moderate Ozone SIP TSD for RACT for major sources (2016) and for boilers, turbines, engines, glass melt furnaces, and aggregate kilns (2018).

¹⁷ See Colorado's Moderate Ozone SIP TSD for RACT for major sources (2016) and for boilers, turbines, engines, glass melt furnaces, and aggregate kilns (2018).

emissions exceed 50 tpy. However, Rocky Mountain modified its permit and now has a VOC permit limit < 50 tpy.

II.x. Sun Mountain (123-0533)

Sun Mountain manufactures and surface coats doors and door casings. Facility equipment and operations include three spray booths. Facility VOC emissions exceed 50 tpy. However, Sun Mountain has requested a permit limit < 50 tpy to more accurately reflect facility emissions.

II.y. SWG Colorado - Arapahoe Station (031-0008)

The Arapahoe Combustion Turbine Facility operates two natural gas fired combustion turbines used to generate electric power, rated at 328.6 MMBtu/hr. The turbines can operate in simple cycle or combined cycle. When operating in combined cycle, the turbines use selective catalytic reduction (SCR) and catalytic oxidation to control emissions. When operating in simple cycle, the turbines use water injection to control emissions. The turbines are subject to NSPS GG and more stringent permit limits. Facility NOx emissions exceed 50 tpy.

In developing the combustion equipment requirements in Regulation Number 7, Part D, Section II., Colorado reviewed EPA's RBLC, EPA's NSPS, EPA's NESHAP, EPA's Menu of Control Measures, EPA's ACTs, information provided by owners and operators in the DMNFR, and RACT requirements applicable in other state ozone nonattainment areas.¹⁸

SWG Arapahoe's turbines are subject to the combustion equipment requirements in Regulation Number 7, Part E, Section II. Therefore, SWG Arapahoe is subject to RACT requirements in Colorado's SIP.

II.z. Swift Beef Company (123-0018)

Swift Beef is a beef and lamb slaughter and meat processing facility. Facility equipment and operations include five boilers used in the slaughter and rendering processes, blood dryer, rendering cookers, rendering presses, bone dryer, salt crystallization system and evaporator, and scrubber. Facility NOx emissions exceed 50 tpy.

In developing the combustion equipment requirements in Regulation Number 7, Part D, Section II., Colorado reviewed EPA's RBLC, EPA's NSPS, EPA's NESHAP, EPA's Menu of Control Measures, EPA's ACTs, information provided by owners and operators in the

¹⁸ See Colorado's Moderate Ozone SIP TSD for RACT for major sources (2016) and for boilers, turbines, engines, glass melt furnaces, and aggregate kilns (2018).

DMNFR, and RACT requirements applicable in other state ozone nonattainment areas.¹⁹

EPA's RBLC, Menu of Control Measures, NSPS, and NESHAP do not include control measures or requirements for meat processing.

The Division reviewed EPA's RBLC for boilers < 100 MMBtu/hr that combust biomass, other liquid fuel or liquid fuel mixtures, natural gas, and other fuels and combinations. Concerning biomass boilers, the RBLC listed good combustion practices, selective non-catalytic reduction, and low NOx burners and staged combustion as control measures. Concerning liquid fuel fired boilers, the RBLC listed low NOx burners, selective catalytic reduction, combustion of clean fuel, combustion of natural gas, and good combustion practices as control measures. Concerning natural gas fired boilers, the RBLC listed low NOx burners, combustion of clean fuel, good combustion practices, selective catalytic reduction, air preheater, ultra-low NOx burners and flue gas recirculation, automated combustion management systems as control measures, and good design, and in some cases no controls. Concerning other fuel fired boilers, the RBLC listed low NOx burners, flue gas recirculation, effluent gas recirculation, and good combustion practices as control measures.

Swift Beef's dryers and boilers are subject to the combustion equipment requirements in Regulation Number 7, Part E, Section II. However, Colorado required Swift Beef to submit a RACT analysis for their boilers (006, 013, 017, 018) to the Division by July 1, 2020, to inform potential, additional emission reduction measures related to boilers. Swift Beef's dryers and boilers are subject to the combustion equipment requirements in Regulation Number 7, Part E, Section II. Colorado has adopted additional NOx emission reduction requirements for boilers between 50 and 100 MMBtu/hr in Part E, Section II., as discussed further in this TSD in Section III.a. Therefore, Swift Beef is subject to RACT requirements in Colorado's SIP.

II.aa. TruStile Doors (001-1295)

TruStile manufactures wood doors. Facility equipment and operations include a wood waste shredder and combustor, woodworking machinery, an automated spray booth for primer coating, and cleaning solvents. Facility VOC emissions exceed 50 tpy. However, TruStile moved its operations to a new facility with facility emissions < 50 tpy.

II.bb. University of Colorado Denver Anschutz (001-0106)

The University of Colorado Denver Anschutz Medical Campus is a large academic health center. Facility equipment and operations include six boilers and diesel fuel

¹⁹ See Colorado's Moderate Ozone SIP TSD for RACT for major sources (2016) and for boilers, turbines, engines, glass melt furnaces, and aggregate kilns (2018).

fired emergency generators. The emergency generators are subject to NESHAP ZZZZ and/or NSPS IIII. Four boilers, one rated at 71.46 MMBtu/hr and three rated at 73.2 MMBtu/hr, have low NOx burners and flue-gas recirculation and are subject to NSPS Dc (pt 008). One boiler rated at 109.8 MMBtu/hr has low NOx burners and flue-gas recirculation and is subject to NSPS Db (pt 022). And, one boiler rated at 150 MMBtu/hr has low NOx burners and flue-gas recirculation and is subject to NSPS Db (pt 023). Facility NOx emissions exceed 50 tpy.

In developing the combustion equipment requirements in Regulation Number 7, Part D, Section II., Colorado reviewed EPA's RBLC, EPA's NSPS, EPA's NESHAP, EPA's Menu of Control Measures, EPA's ACTs, information provided by owners and operators in the DMNFR, and RACT requirements applicable in other state ozone nonattainment areas.²⁰

The University of Colorado's Denver boilers are subject to the combustion equipment requirements in Regulation Number 7, Part E, Section II. Colorado also incorporated the requirements of 40 CFR Part 60, Subpart IIII for the University of Colorado's engines (011, 012, 013, 014, 015, 016, 017, 018, 020, 021). However, Colorado required the University of Colorado Denver to submit a RACT analysis for their boilers to the Division by July 1, 2020, to inform potential, additional emission reduction measures related to boilers. University of Colorado Denver's engines and boilers are subject to the requirements in Regulation Number 7, Part E. Colorado has adopted additional NOx emission reduction requirements for boilers between 50 and 100 MMBtu/hr in Part E, Section II., as discussed further in this TSD in Section III.a. Therefore, University of Colorado Denver is subject to RACT requirements in Colorado's SIP.

II.cc. Waste Management - Denver Arapahoe Disposal Site (005-1291)

Waste Management's Denver Arapahoe Disposal Site is a municipal solid waste landfill. Facility equipment and operations include a landfill gas collection system, four 4SLB landfill gas fired engines subject to NESHAP ZZZZ, and landfill gas flares. Landfill operations are subject to NSPS Cc and NESHAP AAAA. Facility NOx emissions exceed 50 tpy.

In considering RACT for landfill gas flares and engines, Colorado reviewed EPA's RBLC, EPA's NSPS, EPA's NESHAP, EPA's Menu of Control Measures.²¹

Waste Management's engines are subject to the combustion equipment requirements in Regulation Number 7, Part E, Section II. Colorado also incorporated the requirements of 40 CFR Part 60, Section 60.18 for Waste Management's flare.

²⁰ See Colorado's Moderate Ozone SIP TSD for RACT for major sources (2016) and for boilers, turbines, engines, glass melt furnaces, and aggregate kilns (2018).

²¹ See Colorado's Moderate Ozone SIP TSD for RACT for major sources (2016).

However, Colorado required Waste Management to submit a RACT analysis for their engines to the Division by July 1, 2020, to inform potential, additional emission reduction measures related to landfill gas fired engines. Waste Management's engines are subject to the requirements in Regulation Number 7, Part E. Colorado has adopted additional NO_x emission reduction requirements for landfill gas fired engines in Part E, Section II., as discussed further in this TSD in Section III.c. Therefore, Waste Management is subject to RACT requirements in Colorado's SIP.

III. Categorical RACT

III.a. Boilers

The Division reviewed technical information submitted by the operators of 14 industrial, commercial, and institutional boilers located at four major stationary sources of VOC and/or NO_x located in the DMNFR ozone nonattainment area. Based on a review of operator provided information, other states RACT regulations, EPA NSPS regulations and EPA guidance including the RACT/BACT/LAER Clearinghouse (RBLC), the Division proposes to establish a boiler categorical RACT standard of 0.1 lb/MMBtu (for gaseous and liquid fuel-fired) based on a 30-day rolling average that applies to boilers with a design heat input ≥ 50 MMBtu/hr and < 100 MMBtu/hr. Low utilization boilers that operate below a 20% capacity factor (based on a 3-year rolling average) are exempt from the categorical RACT standard and the associated monitoring and compliance demonstration. Presently, the Division estimates that none of these boilers have low utilization that is below the 20% capacity factor exemption threshold.

If any of these boilers have low utilization below the 20% capacity factor and were to increase operations to the extent that the calculated 3-year annual average capacity factor is equal to or greater than 20%, then compliance with the RACT NO_x standard would be triggered and the source would have three years to comply. The three year compliance period allows sufficient time for the operator to install additional controls (if necessary). During the three year compliance period, a boiler could potentially operate at a lower capacity and thereby regain the 20% capacity factor exemption because the capacity factor is calculated using a 3-year rolling average of fuel burned.

These 14 units are currently subject to Regulation Number 7 combustion process adjustment requirements. The Division does not anticipate additional RACT compliance costs for complying with the combustion process adjustment requirements. Boilers subject to a NO_x emission limitation that are not equipped with NO_x CEMS or CERMS are subject to Regulation 7 performance testing requirements. The Division anticipates RACT compliance costs of \$4,000 to \$8,000 per unit for initial testing and subsequent tests every 2 years.

A boiler operating below the 20% capacity factor would be subject to a source test provision within 180 days from the date when the capacity factor exceeds the 20%

threshold, unless the source has a CEMS. The purpose of the source test provision is to accurately determine the boiler NOx emissions rate and ascertain compliance with the standard.

If the source test shows the emission unit may not be able to meet compliance with the standard the source has three potential options available and would have three years to demonstrate compliance: (1) decrease boiler operations in future years to meet the capacity factor exemption, (2) consider the installation of upgraded combustion controls on the boiler or (3) consider boiler retirement. The cost of meeting the capacity factor exemption is considered negligible, but could involve costs associated with lost boiler steam production opportunities that are impossible to quantify. The cost of maintaining a capacity factor exemption is likely less than the cost of the second option of installing upgraded combustion controls that may be necessary to comply with the categorical RACT standard. The third option - boiler retirement, is not considered RACT.

Thirteen of the affected boilers currently operate with some combination of low NOx burners and/or flue gas recirculation. Nine of the boilers report NOx emissions below the RACT standard and two report emissions that meet the RACT standard. The remaining three boilers are expected to meet the RACT standard.

III.b. Turbines

In 2016 the Division reviewed technical information submitted by the operators of stationary combustion turbines located at 14 major stationary sources of NOx and/or VOC located in the DMNFR ozone nonattainment area. In 2018, the Division reviewed a number of these turbines again. The evaluations included technical information submitted by the operators of stationary combustion turbines located at eight major stationary sources. The two rounds of reviews included a total of 22 stationary combustion turbines that commenced construction, modification, or reconstruction on or before February 18, 2005. After the classification to serious, four additional sources including seven turbines constructed on or before February 18, 2005, became major sources of NOx and/or VOC.

Based on a review of operator provided information, other states RACT regulations, EPA NSPS regulations and EPA guidance including the RBLC, the Colorado adopted a stationary combustion turbine categorical RACT standard consistent with existing NSPS requirements for stationary combustion turbines, specifically the applicable steady-state NOx emission limits in Table 1 of 40 CFR Part 60, Subpart KKKK and the monitoring requirements of 40 CFR Part, Subpart GG. Colorado utilized applicability criteria consistent with NSPS Subpart KKKK for heat input thresholds. Three of these turbines analyzed do not currently meet the proposed NOx emission limit and could theoretically require emission controls and CEMS in the future, if their three-year rolling average capacity factors were to exceed 10%. Additionally, three grandfathered turbines that were analyzed for this proposal predate NSPS GG, and could theoretically require emission controls and CEMS in the future, if their three

year rolling average capacity factors were to exceed 10%. Colorado analyzed the cost of CEMS and testing for the three grandfathered units in 2016 and again in 2018²². These six turbines, however, have historically operated at very low capacities (some as low as 0%).

Turbines Constructed before February 18, 2005

Facility	Operations	Facility AIRS ID	Unit AIRS ID	Turbine + duct heater rating (MMBtu/hr)	Average actual emissions 2016-2018 (tpy)
Wattenberg	Oil and gas	001-0025	021	14.5 + 10.0	13.5
Metro Wastewater - Engie (Formerly Suez)	Wastewater treatment - digester gas to energy	001-0097	001	42.78	60.5
				42.78	
Tri-State - Frank Knutson	Electric generation	001-1349	001	840.3	8.7
			003	840.3	2.2
PSCo - Blue Spruce	Electric generation	001-1354	001	1,495	51.2
			002	1,495	
PSCo - Valmont	Electric generation	013-0001	002	661	4.8
CU Boulder	Electric generation	013-0553	003	189 + 66.6	0
			005	189 + 66.6	2.1
PSCo (SWG) - Valmont	Electric generation	013-1460	002	347	0
			003	343	0.2
SWG Arapahoe	Electric generation	031-0008	014	328.6 + 124.7	18.6
				328.6 + 124.7	
PSCo - Fort Lupton	Electric generation	123-0014	001	662.6	2.9
			002	662.6	3.1
PSCo - Fort St. Vrain	Electric generation	123-0023	004	1,323 + 450	118.5
			005	1,373 + 450	109.9
			008	1,531 + 422	55.2
Kerr-McGee - Platte Valley	Oil and gas	123-0057	052	37.9	43.1
Tri-State - JM Shafer	Electric generation	123-0250	001 - 005	400 + 240	212.1
				400 + 180	
				400 + 180	
				400 + 180	
				400 + 180	
				400	
Greeley Energy	Electric generation	123-0412	001	275 + 100	0

²² See Colorado's Moderate Ozone SIP TSD for RACT for major sources (2016) and for boilers, turbines, engines, glass melt furnaces, and aggregate kilns (2018).

Facility	Operations	Facility AIRS ID	Unit AIRS ID	Turbine + duct heater rating (MMBtu/hr)	Average actual emissions 2016-2018 (tpy)
PSCo - Rocky Mountain Energy	Electric generation	123-1342	001	1,785 + 675	125.8
			002	1,785 + 675	

The proposed categorical RACT standard averaging period is a 30-day rolling average for turbines equipped with CEMS. For turbines not equipped with CEMS but already subject to NSPS KKKK, owners and operators are allowed to demonstrate continued compliance consistent with the applicable NSPS by utilizing source testing. Low utilization turbines that operate below a 10% capacity factor (based on a 3-year rolling average of annual heat input) are exempt from the emission limitation requirements.

These requirements did not revise the provisions previously adopted for stationary combustion turbines constructed after February 18, 2005, which include the NOx emission limits and associated monitoring in NSPS KKKK.

In summary, Colorado incorporated NSPS KKKK requirements in Colorado's SIP for NSPS KKKK subject turbines, with associated NSPS KKKK monitoring requirements. And, Colorado incorporated NSPS KKKK NOx emission limits in Colorado's SIP for NSPS GG or pre-NSPS GG turbines, with associated NSPS GG monitoring requirements. Therefore, Colorado's SIP includes NOx emission reduction requirements for both sets of turbines, those subject to or predating NSPS GG and those subject to NSPS KKKK.

III.c. Engines

The Division reviewed technical information submitted by the operators of five landfill or biogas-fired spark ignition, four stroke, lean-burn reciprocating internal combustion engines at two major stationary sources of NOx located in the DMNFR.

One unit burns digester gas created by treating facility wastewater and is subject to EPA's NSPS JJJJ. The engine is not equipped with post-manufacturer add-on emission controls. Available control technologies include adjustments to air fuel (A/F) ratio operating ranges, low-emission combustion, selective catalytic reduction (SCR), selective non-catalytic reduction (SNCR), and good combustion practices. Based on the engine's average emissions from 2018 and 2019 (1.33 tpy NOx, 1.26 tpy VOC), costs of add-on emission controls, and potential reductions, Colorado determined that add-on emission controls are not RACT.

Control type	Total capital investment	Total additional annualized cost	NOx emissions reductions (tpy)	Cost effectiveness (\$/ton NOx removed)
A/F operating range + low	\$0	\$0		

emission combustion				
SCR + A/F operating range + low emission combustion	\$279,192	\$94,051	1.14	\$82,204
Control type	Total capital investment	Total additional annualized cost	VOC emissions reductions (tpy)	Cost effectiveness (\$/ton VOC removed)
Good combustion practices	\$0	\$0		
SCR + good combustion practices	\$279,192	\$94,051	0.94	\$99,741

Four units burn landfill gas to generate a renewable source of electricity and are not subject to NSPS JJJJ. Operational controls and systems including adjustments to air fuel (A/F) ratio control/turbochargers, electronic ignition systems (EIS), and good operation and maintenance practices are used to optimize engine performance and reduce NOx emissions. Available control technologies include adjustments to air fuel (A/F) ratio control, electronic ignition system, SCR, and oxidation catalyst. Based on the engine's emissions, costs of add-on emission controls, and potential reductions, Colorado determined that add-on emission controls are not RACT.

Control type	Total capital investment	Total annualized cost	NOx emissions reductions (tpy)	Cost effectiveness (\$/ton NOx removed)
A/F operating range + EIS + good combustion practices	\$0	\$0		
SCR	\$4,440,180	\$1,355,554	49.93	\$27,149
Control type	Total capital investment	Total annualized cost	VOC emissions reductions (tpy)	Cost effectiveness (\$/ton VOC removed)
Good combustion practices	\$0	\$0		
Oxidation catalyst	\$3,543,405	\$1,114,741	3.32	\$335,361

Therefore, based on a review of operator provided information, other states RACT regulations, EPA NSPS regulations, and EPA guidance including the RBLC, Colorado established a limit of 2.0 grams per brake horsepower hour (g/bhp-hr) based on a 30-day rolling average for landfill or biogas-fired engines with a design power output greater than or equal to 500 hp and less than 1,350 hp. This emission limit is comparable to EPA's NSPS JJJJ, as shown in the table below. As with NSPS JJJJ, this emission limit recognizes that landfill and digester gases have a different composition than natural gas and that combustion of siloxanes forms compounds that have been

known to foul fuel systems, combustion chambers, and post-combustion catalysts.²³ These engines are also currently subject to the combustion process adjustment and performance testing requirements in Regulation Number 7.

NSPS JJJJ (Table 1)

Engine type and fuel	Maximum engine power	Manufacture date	NOx emission standard (g/hp-hr)
landfill/digester gas (except lean burn 500≤hp<1350)	hp < 500	7/1/2008	3
		1/1/2011	2
	hp ≥ 500	7/1/2007	3
		7/1/2010	2
landfill/digester gas lean burn	500≤hp<1350	1/1/2008	3
		7/1/2010	2

Therefore, landfill and biogas fired engines at major sources of NOx in the DMNFR are subject to RACT requirements in Colorado's SIP.

III.d. Wood coating

EPA's has published several CTGs related to wood products. States may use the CTGs to establish their own regulations based on EPA's recommendations for RACT. EPA's Control of Volatile Organic Emissions from Existing Stationary Sources - Volume VII: Factory Surface Coating of Flat Wood Paneling (1978) was updated in 2006, Control Techniques Guidelines for Flat Wood Paneling Coatings, and applies to the surface coating of interior, exterior, or tileboard wood paneling products. EPA's CTG Control of Volatile Organic Compound Emissions from Wood Furniture Manufacturing Operations (1996) facilities that manufacture wood furniture including residential furniture (e.g., upholstered furniture and casegoods such as bookcases), cabinets, wood office furniture (e.g., bookcases, chairs, desks), public building and related furniture (e.g., benches, bleachers); and wood office and store fixtures.

EPA published a NESHAP for wood furniture surface coating (40 CFR Part 63, Subpart JJ) in 1995. Subpart JJ applies to facilities that manufacture wood furniture or wood furniture components and requires that sources limits VHAP emissions from finishing operations, contact adhesives, foam adhesives, and strippable spray booth coatings. Wood furniture means any product made of wood, a wood product such as rattan or wicker, or an engineered wood product such as particleboard that is manufactured at any facility that is engaged, either in part or in whole, in the manufacture of wood furniture or wood furniture components, including, but not limited to, facilities under

²³ See Standards of Performance for Stationary Spark Ignition Internal Combustion Engines and National Emission Standards for Hazardous Air Pollutants for Reciprocating Internal Combustion Engines, 73 FR 3568 (January 18, 2008) at 3,570-3,571.

any of the following standard industrial classification codes: 2434, 2511, 2512, 2517, 2519, 2521, 2531, 2541, 2599, or 5712. Wood furniture component means any part that is used in the manufacture of wood furniture. Examples include, but are not limited to, drawer sides, cabinet doors, seat cushions, and laminated tops. However, foam seat cushions manufactured and fabricated at a facility that does not engage in any other wood furniture or wood furniture component manufacturing operation are excluded from this definition. Wood furniture manufacturing operations means the finishing, gluing, cleaning, and washoff operations associated with the production of wood furniture or wood furniture components.

EPA also published a NESHAP for the surface coating of wood building products (40 CFR Part 63, Subpart QQQQ) in 2003. Subpart QQQQ applies to wood building products surface coating sources that use 1,100 gallons or more of coatings per year and that is a major source of HAPs. Wood building products include doors and windows, flooring, interior wall paneling, and exterior siding. Subpart QQQQ requires sources to limit organic HAP emissions. EPA published a Preliminary Industry Characterization: Wood Building Products Surface Coating (1998) during the development of Subpart QQQQ that described the wood building products coating source category to include SIC 2426 (e.g., hardwood and parquet flooring), 2429 (e.g., wood shingles), 2431 (e.g., awnings, doors, shutters, mouldings), 2435 (e.g., hardwood plywood panels), 2436 (e.g., softwood plywood panels), 2439 (e.g., mobile buildings), 2452 (e.g., prefabricated floors, panels for prefabricated buildings), and 2493 (e.g., hardboard, particleboard, wall tile, wallboard).

These CTGs and NESHAP do not apply to TruStile Doors, Rocky Mountain Prestain, Sun Mountain, and Northern Priming and Prestain because these facilities do not coat wood furniture or flat wood paneling, as defined in the CTGs, and are not major sources of HAPs.

However, EPA also published a Guide to the Wood Furniture CTG and NESHAP (1997) and stated that states may choose to extend their CTG-related rules to other wood coating operations such as musical instruments or doors.²⁴ Colorado's Regulation Number 7 includes wood furniture surface coating requirements based on EPA's Control of Volatile Organic Compound Emissions from Wood Furniture Manufacturing Operations, including VOC content limits on topcoats and sealers, work practices, and recordkeeping. Therefore, Colorado has expanded these CTG based requirements to other wood coating operations, such as the operations conducted by TruStile Doors, Rocky Mountain Prestain, Sun Mountain, and Northern Priming and Prestain, where VOC emissions are equal to or greater than 50 tpy.

²⁴ A Guide to the Wood Furniture CTG and NESHAP (September 1997) (pg 2-3) - "While these SIC codes represent the majority of facilities that EPA considers wood furniture manufacturers, States may choose to extend their rules to other operations. For example, some States have developed rules for manufacturers of wood products so they may include limitations for manufacturers of items such as musical instruments or doors."

III.e. Foam manufacturing

The Division reviewed the technical RACT analysis information submitted by foam manufacturing operations at major stationary sources of VOCs located in the DMNFR ozone nonattainment area. The table below provides basic emission information for each foam manufacturing operation potentially subject to the RACT review process.

Facility	Facility AIRS ID	Unit AIRS ID	Permitted VOC emissions (tpy)	Average actual VOC emissions (tpy)
Atlas Molded Products	001-0576	001	91.5	71.7
		007	6.3	
Atlas Roofing Corporation	001-0505	001	5.7	40.0
		002	54.1	
		003	17.2	
		004	14.7	
Insulfoam, LLC.	001-0560	Facility-wide	99.0	82.0

Atlas Molded Products (001-0576)

Atlas Molded Products manufactures expanded polystyrene (EPS) blocks for use in insulation and other products. Polystyrene beads are pneumatically conveyed into a pre-expander, which starts the expansion process, and then into a bed dryer, which dries the pre-puff material. After further expansion, the pre-puff material is loaded into a block mold to form the polystyrene foam into blocks. The blocks are cured and cut into appropriate sizes. VOC emissions from the expansion process, pre-puff storage, and molding process are controlled by a natural gas fired boiler. Facility VOC emissions exceed 50 tpy.

In 2019, testing was conducted to measure the capture efficiency and destruction efficiency of the boiler in order to quantify the VOC emissions from the process after the new control technology was installed. Test results showed an overall control efficiency of 77.5%.

Atlas Molded Products did not provide any cost estimates for other control technologies in the RACT analysis submitted to the Division.

Atlas Roofing Corporation (001-0505)

Atlas Roofing manufactures foam roofing insulation by combining MDI (methylene diisocyanate) with polyester resin (polyol) with hardeners, thickeners, and pentane. The facility equipment consists of holding and mixing storage tanks and one production line with a hydraulic mixer, conveyor belt, foam laminating machine, and trim saws. Atlas Roofing maintains and operates the facility and control equipment in a manner consistent with good air pollution control practices for minimizing

emissions, including work practices to reduce fugitive emissions (e.g., covered containers). The facility VOC emissions exceed 50 tpy.

The Division reviewed EPA's RBLC for polyester resins production, which did not include sources manufacturing foam roofing insulation with polyester resin. EPA's Menu of Control Measures did not include controls for manufacturing with polyester resin.

Atlas Roofing Corporation evaluated three control options: thermal oxidation, carbon adsorption, and operational controls. Atlas determined that carbon adsorption would be technically infeasible for their operations. The table below summarizes the economic feasibility for thermal oxidation of non-fugitive emission points (001, 002, and 003). Emission point 004 consists of fugitive emissions from incidental glue and solvent usage throughout the facility and VOC off-gassing during storage of the finished product in the warehouse.

Control Option	VOC Removed (tpy)	Total Annual Cost	Cost per ton of VOC Reduced
Thermal Oxidizer (points 001-003)	73.3	\$339,140	\$4,626

Atlas determined that controlling the facility-wide fugitive emissions would not be cost effective at over \$4,000 per ton on VOC reduced.

Insulfoam (001-0560)

Insulfoam manufactures EPS blocks. Facility equipment and operations include an expanded polystyrene pre-expander and aging bags, an insulation block mold, and one natural gas fired 11.7 MMBtu/hr boiler subject to NSPS Dc. VOC emissions from both the pre-expander and the aging room where the aging bags hang are routed to the boiler. Facility VOC emissions exceed 50 tpy.

The Division reviewed EPA's RBLC for polystyrene production and polystyrene foam products manufacturing. The RBLC listed thermal oxidizers, enclosures, capture of released pentane followed by destruction in boilers, throughput limit as control measures for polystyrene foam products manufacturing, and in certain cases did not require any controls.

EPA's Menu of Control Measures identifies EPA's CTG for the control of VOC Emissions from Polystyrene Foam Manufacturing (9/1990). As described in the CTG, polystyrene foam manufacturing consists of processes for producing foam sheet, foam board, and expandable beads. Polystyrene foam products are manufactured through extrusion or expandable bead blowing. The CTG does not include a specific RACT recommendation.

Insulfoam evaluated the use of a regenerative thermal oxidizer (RTO) at various capture efficiencies, as well as the use of the boiler that they already operate to control VOC emissions. These various scenarios and associated costs are included in the table below.

Control Option	Overall Capture Efficiency	Emission Reductions (tpy)	Annualized Costs	Cost per ton of VOC Reduced
RTO	90%	57.2	\$283,312	\$4,950
RTO	83%	53.0	\$241,675	\$4,561
RTO	50%	31.8	\$198,617	\$6,246
RTO	33%	21.2	\$166,283	\$7,844
Boiler	20%	13.3	\$40,731	\$2,683

Insulfoam also noted that siting an RTO may be problematic at their facility. According to their analysis, the only feasible location for an RTO would require a setback variance from the local municipality. The City of Aurora requires a 25-foot setback from a public street and the site can only accommodate a 17-foot setback. It is unclear whether the City of Aurora would grant this variance.

Categorical RACT

In response to the RACT analyses received, RBLC determinations, and other state SIPs²⁵, the Division has implemented new categorical RACT requirements for foam manufacturing. Operators must limit VOC emissions to 4.0 lbs of VOC per every 100 lbs. of total material process or they must control VOC emission emissions by 90% using a control device with a control efficiency of at least 95%.

The Division's analysis of the two EPS facility's lb. of VOC per 100 lbs. of material processed in summarized in the table below.

EPS Facility	AIRS ID	Lbs. of VOC per 100 lbs. of material processed
Atlas Molded Products	001-0576	2.65
Insulfoam, LLC.	001-0560	2.93

The Division expects the two EPS facilities (Atlas Molded Products and Insulfoam) to be able to meet the new categorical RACT limits as currently configured through the lb. of VOC per 100 lbs. of material processed limit. Atlas Roofing may have to install a thermal oxidizer to meet the control requirements. However, the cost per ton

²⁵ See San Joaquin Valley Air Pollution Control District, Rule 4682; South Coast Air Quality Management District, Rule 1175; and Maricopa County Air Quality Department, Rule 358.

(\$4,626) reflected in their RACT analysis shows that this control method is cost effective.

IV. Summary

As discussed above, many of Colorado's major sources (≥ 50 tpy NO_x and/or VOC) are currently subject to requirements in Regulation Number 7. For some sources, Colorado is expanding requirements in Regulation Number 7, including additional requirements in Regulation Number 7, or incorporating requirements from EPA's NSPS and NESHAP so as to include provisions in Colorado's SIP that require the implementation of RACT.

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