

# SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT

## **Draft Socioeconomic Impact Assessment For: Proposed Amended Rule 463 – Organic Liquid Storage**

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## EXECUTIVE SUMMARY

On March 17, 1989, the South Coast Air Quality Management District (South Coast AQMD) Governing Board adopted a resolution which requires an analysis of the economic impacts associated with adopting and amending rules and regulations. In addition, Health and Safety Code Section 40440.8 requires a socioeconomic impact assessment for any proposed rule, rule amendment, or rule repeal which “will significantly affect air quality or emissions limitations.” Lastly, Health and Safety Code Section 40920.6 requires an incremental cost-effectiveness analysis for a proposed rule or amendment which imposes Best Available Retrofit Control Technology (BARCT) or “all feasible measures” requirements relating to emissions of ozone, carbon monoxide (CO), sulfur oxides (SO<sub>x</sub>), nitrogen oxides (NO<sub>x</sub>), volatile organic compounds (VOC), and their precursors.

Proposed Amended Rule 463 (PAR 463) has been developed to reduce VOC emissions from the storage of organic liquids in above-ground tanks and establish contingency measures for applicable ozone standards in order to have a backstop for achieving the VOC emission reductions. A socioeconomic impact assessment has been conducted accordingly, and the following presents a summary of the analysis and findings.

**Key Elements of PAR 463** PAR 463 would reduce VOC emissions from storage tanks by requiring periodic optical gas imaging (OGI) inspections at affected facilities, doming for external floating roof (EFR) storage tanks, installation of secondary seals on internal floating roof (IFR) storage tanks, and increased control efficiency and performance testing for fixed-roof tank vapor recovery units (VRUs).

**Affected Facilities and Industries** PAR 463 is applicable to approximately 1,600 tanks located at 429 facilities, with 320 located in Los Angeles County, 94 located in Orange County, 10 located in San Bernardino County, and five located in Riverside County. The 429 facilities are distributed according to their applicable North American Industrial Classification System (NAICS) codes as follows: 336 facilities are classified under the Oil and Gas Extraction industry (NAICS 211); 30 facilities are classified under the Wholesale Trade industry (NAICS 42); 18 facilities are Petroleum and Coal Products Manufacturers (NAICS 324); and the remaining facilities are spread over various industry sectors.

A small business analysis was conducted for the facilities affected by PAR 463. The following table presents the number of affected facilities that qualify as a small business which is dependent on the specific applicable definition used in the analysis:

Definition	Number of Facilities
South Coast AQMD Rule 102	63
South Coast AQMD's Small Business Assistance Office	262
U.S. Small Business Administration	282

### Assumptions for the Analysis

The key requirements of PAR 463 that would have cost impacts for the affected facilities include: 1) periodic OGI inspections; 2) doming of EFR storage tanks; 3) installation of secondary seals on IFR storage tanks; and 4) periodic performance testing on fixed-roof storage tank VRUs.

Approximately 1,600 storage tanks would be subject to PAR 463. However, only the following would be subject to PAR 463 OGI requirements: 1) stationary above-ground tanks with a capacity > 19,815 gallons storing organic liquid with a true vapor pressure (TVP)  $\geq$  1.5 psi; 2) above-ground stationary tanks with a capacity  $\geq$  39,630 gallons storing organic liquid with TVP  $\geq$  0.5 psi; 3) above-ground tanks used to store gasoline with capacity between 251 gallons and 19,815 gallons; and 4) stationary tanks with a potential for VOC emissions of six tons per year or greater used in Crude Oil And Natural Gas Production Operations. Given these thresholds, approximately 679 storage tanks located at 429 facilities, which are owned by 91 companies will be subject to the OGI requirements.

PAR 463 would require the doming of EFR tanks storing organic liquid with a TVP of 3 psia or greater at the next internal API 653 inspection or the next time a tank is cleaned and degassed, but not to exceed 23 years after a test verifies that an organic liquid stored has a TVP of 3 psia or greater. Staff identified approximately 89 EFR storage tanks and estimated that 20 out of the 89 EFR tanks will need to install domes.

PAR 463 would require the installation of secondary seals on IFR storage tanks. Staff identified approximately 98 IFR storage tanks within the PAR 463 universe and estimated 22 out of the 98 IFR tanks would need to install secondary seals. Installation would be required the next time the tanks are cleaned and degassed, but no later than 22 years after the date of adoption of PAR 463.

Lastly, PAR 463 would require performance testing on fixed-roof tank VRUs to ensure they meet the 98 percent efficiency standard. Staff identified approximately 479 storage tanks that will need VRU performance testing.

The cost analysis uses a forecast period from 2024-2080 in order to annualize all the costs associated with doming and secondary seal installation within equipment lifetime. The cost estimates of complying with

PAR 463 over the period from 2024-2080 take into account: 1) the payment of permit fees pertaining to secondary seal and VRU performance testing requirement in 2024; 2) the purchase of OGI cameras in 2025; 3) payment of permit fees pertaining to doming requirement in 2025; 4) the purchase and installation of secondary seals in 2026; 5) the purchase and installation of domes and fire suppression systems in 2027; and 6) performance testing every 10 years for fixed-roof tank VRUs beginning with an initial performance test in 2025.

### Compliance Costs

The total present value of the compliance costs of PAR 463 is estimated at \$147.60 million and \$71.77 million with a 1 percent and 4 percent discount rate, respectively. The average annual compliance costs of PAR 463 are estimated to range from \$2.95 million to \$3.47 million, for a 1 percent to 4 percent real interest rate, respectively. The following table presents a summary of the average annual cost of PAR 463 by cost category.

Cost Categories	Annual Average Cost of PAR 463 (2024 – 2080)	
	1% Real Interest Rate	4% Real Interest Rate
<b>Capital/One-time Costs</b>		
Domed EFR - Materials	\$212,052	\$375,747
Domed EFR - Installation	\$212,052	\$375,747
Domed EFR - Permitting	\$2,824	\$5,004
Domed EFR - Title V Fee (Permit Revision)	\$749	\$1,327
Domed EFR - Fire Suppression System	\$40,483	\$71,733
Secondary Seal - Installation and Materials	\$17,820	\$22,979
Secondary Seal - Title V Fee (Permit Revision)	\$1,180	\$1,521
Secondary Seal - Permitting	\$4,538	\$5,852
OGI Camera	\$1,121,514	\$1,271,843
VRU - Title V Revision and Permitting	\$1,403	\$1,403
<b>Recurring Costs</b>		
Domed EFR - Operating and Maintenance	\$48,421	\$48,421
Secondary Seal - Operating and Maintenance	\$5,118	\$5,118
OGI - Operating and Maintenance	\$134,105	\$134,105
OGI - Inspection Labor	\$929,796	\$929,796
VRU Testing	\$218,491	\$218,491
<b>Total</b>	<b>\$2,950,547</b>	<b>\$3,469,089</b>

Using a 4 percent real interest rate, this analysis indicates roughly 67 percent of the annual average compliance cost would result from OGI inspections, followed by doming (25 percent), VRU testing (6 percent), and secondary seals (1 percent).

**Job Impacts**

Direct costs and corresponding revenues of PAR 463 are used as inputs to the Regional Economic Models, Inc (REMI PI+) model to assess job impacts and secondary/induced impacts for all the industries in the four-county economy on an annual basis from 2024 to 2080.

When the compliance cost is annualized using a 4 percent real interest rate, the REMI analysis forecasted 25 net jobs foregone annually in the 4-county economy on average over the forecast period, relative to the baseline forecast. The 25 annual jobs forgone represent approximately 0.0002 percent of total annual jobs in the four-county area.

The largest job loss is projected to occur in 2056, when most of the PAR 463 requirements that have cost impacts are fully implemented. In 2056, PAR 463 is projected to result in 43 jobs foregone relative to the baseline scenario according to the REMI model simulation.

**Competitiveness and Price Impacts**

The overall impact of PAR 463 on production cost and delivered prices in the region is not expected to be substantial. According to the REMI Model, PAR 463 is projected to increase the relative delivered price of products produced by the Oil and Gas Extraction industry by a maximum of 0.016 percent in 2025, relative to the baseline. The relative cost of production for the Oil and Gas Extraction industry is forecasted to increase by a maximum of 0.488 percent relative to the baseline scenario, which is expected to occur in 2025.

## **INTRODUCTION**

Rule 463 – Organic Liquid Storage, limits VOC emissions from tanks storing organic liquids. This rule applies to any above-ground stationary tank with a capacity of 19,815 gallons or greater used for storage of organic liquids, and any above-ground tank with a capacity between 251 gallons and 19,815 gallons used for storage of gasoline. Rule 463 also applies to stationary tanks with a potential for VOC emissions of six tons per year (tpy) or more used in crude oil and natural gas production operations. Rule 463 requires tanks that meet the capacity and vapor pressure requirements to install control equipment based on tank type. Control requirements include specifications for tank roofs, seals, emission control systems, and covers for roof openings. For some specific types of tanks, inspection and monitoring is also required. Rule 463 tank types include fixed roof, internal floating roof (IFR), and external floating roof (EFR). Rule 463 was adopted in August 1977 and last amended in 2023.

PAR 463 was developed to further limit VOC emissions from tanks storing organic liquids by establishing more stringent leak detection and control requirements. Specifically, PAR 463 seeks to establish requirements for: 1) periodic OGI inspections with contingency measures to fulfill ozone attainment plan requirements; 2) doming EFR storage tanks; 3) installing secondary seals on IFR storage tanks; and 4) increasing the control efficiency on fixed-roof storage tank VRUs.<sup>1</sup>

PAR 463 would affect approximately 1,600 storage tanks at 429 facilities in the South Coast AQMD jurisdiction.

## **LEGISLATIVE MANDATES**

The legal mandates directly related to the socioeconomic impact assessment of PAR 463 include South Coast AQMD Governing Board resolutions and various sections of the Health and Safety Code.

### **South Coast AQMD Governing Board Resolution**

On March 17, 1989, the South Coast AQMD Governing Board adopted a resolution that requires an analysis of the economic impacts associated with adopting and amending rules and regulations that considers all of the following elements:

- Affected industries;
- Range of probable costs;
- Cost-effectiveness of control alternatives; and
- Public health benefits.

### **Health and Safety Code Requirements**

The state legislature adopted legislation which reinforces and expands the South Coast AQMD Governing Board resolution requiring socioeconomic impact assessments for rule development projects. Health and Safety Code Section 40440.8, which went into effect on January 1, 1991, requires a socioeconomic impact assessment for any proposed rule, rule amendment, or rule repeal which "will significantly affect air quality or emissions limitations."

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<sup>1</sup> For more information and background on the Coachella Valley Contingency Measure State Implementation Plan (SIP) please see Chapter 1 Background Section of Draft Staff Report for PAR 463, <https://www.aqmd.gov/home/rules-compliance/rules/scaqmd-rule-book/proposed-rules/rule-463>.



To satisfy the requirements in Health and Safety Code Section 40440.8, the scope of the socioeconomic impact assessment should include all of the following information:

- Type of affected industries;
- Impact on employment and the regional economy;
- Range of probable costs, including those to industry;
- Availability and cost-effectiveness of alternatives to the rule;
- Emission reduction potential; and
- Necessity of adopting, amending, or repealing the rule in order to attain state and federal ambient air quality standards.

Health and Safety Code Section 40728.5, which went into effect on January 1, 1992, requires the South Coast AQMD Governing Board to: 1) actively consider the socioeconomic impacts of regulations; 2) make a good faith effort to minimize adverse socioeconomic impacts; and 3) include small business impacts. To satisfy the requirements in Health and Safety Code Section 40728.5, the socioeconomic impact assessment should include the following information:

- Type of industries or business affected, including small businesses; and
- Range of probable costs, including costs to industry or business, including small business.

Finally, Health and Safety Code Section 40920.6, which went into effect on January 1, 1996, requires an incremental cost-effectiveness analysis for a proposed rule or amendment which imposes Best Available Retrofit Control Technology (BARCT) or “all feasible measures” requirements relating to emissions of ozone, carbon monoxide (CO), sulfur oxides (SO<sub>x</sub>), nitrogen oxides (NO<sub>x</sub>), VOC, and their precursors. A cost-effectiveness analysis was conducted for PAR 463 and can be found in Chapter 4 of the PAR 463 Draft Staff Report.<sup>2</sup>

### **AFFECTED FACILITIES**

PAR 463 would affect 1,600 storage tanks at 429 facilities in the four-county area. Out of the 429 affected facilities, 320 are located in Los Angeles County, 94 are located in Orange County, 10 are located in San Bernardino County, and five are located in Riverside County. Table 1 presents the number of affected facilities by industry. The majority of the affected facilities are in the Oil and Gas extraction sector (78.3 percent), followed by the Wholesale Trade sector (7.0 percent) and the Petroleum and Coal Products Manufacturing sector (4.2 percent).

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<sup>2</sup> South Coast AQMD, Draft Staff Report for Proposed Amended Rule 463 – Organic Storage Liquid, <https://www.aqmd.gov/home/rules-compliance/rules/scaqmd-rule-book/proposed-rules/rule-463>, accessed May 2024.

**Table 1**  
**Affected Facilities by Industry**

NAICS	Industry Name	Number of Facilities	Percentage of Facilities
211	Oil and gas extraction	336	78.3%
42	Wholesale trade	30	7.0%
324	Petroleum and coal products manufacturing	18	4.2%
325	Chemical manufacturing	9	2.1%
493	Warehousing and storage	7	1.6%
562	Waste management and remediation services	6	1.4%
486	Pipeline transportation	5	1.2%
213	Support activities for mining	3	0.7%
327	Nonmetallic mineral product manufacturing	2	0.5%
339	Miscellaneous manufacturing	2	0.5%
312	Beverage and tobacco product manufacturing	2	0.5%
92	State and Local Government	1	0.2%
22	Utilities	1	0.2%
811	Repair and maintenance	1	0.2%
54	Professional, scientific, and technical services	1	0.2%
332	Fabricated metal product manufacturing	1	0.2%
311	Food manufacturing	1	0.2%
326	Plastics and rubber product manufacturing	1	0.2%
481	Air transportation	1	0.2%
622	Hospitals	1	0.2%
<b>Total</b>		<b>429</b>	<b>100%</b>

### SMALL BUSINESS

The South Coast AQMD defines a “small business” in Rule 102 for purposes of fees as one which employs 10 or fewer persons and which earns less than \$500,000 in gross annual receipts. The South Coast AQMD also defines “small business” for the purpose of qualifying for access to services from the South Coast AQMD’s Small Business Assistance Office as a business with an annual receipt of \$5 million or less, or with 100 or fewer employees. In addition to the South Coast AQMD’s definition of a small business, the United States (U.S.) Small Business Administration and the federal 1990 Clean Air Act Amendments (1990 CAAA) each have their own definition of a small business.

The 1990 CAAA classifies a business as a “small business stationary source” if it: 1) employs 100 or fewer employees; 2) does not emit more than 10 tons per year of either VOC or NOx; and 3) is a small business as defined by the U.S. Small Business Administration. Based on firm revenue and employee count, the U.S. Small Business Administration definition of a small business varies by six-digit NAICS codes.<sup>3</sup> For example, according to the U.S. Small Business Administration definition, a business with less than 1,250 employees in the sector of Crude Petroleum Extraction (NAICS 211120) is classified as a small business, while a business in the Petroleum Bulk Stations

<sup>3</sup> U.S. Small Business Administration, 2023 Small Business Size Standards, <https://www.sba.gov/document/support-table-size-standards>, accessed March 29, 2024.

and Terminals (NAICS 424710) sector is considered a small business with only 225 employees.

South Coast AQMD mostly relies on Dun & Bradstreet data to conduct small business analyses for private companies. In cases where the Dun & Bradstreet data are unavailable or unreliable, other external data sources such as Manta, Hoover, LinkedIn, and company website data will be used. The determination of data reliability is based on data quality confidence codes in the Dun & Bradstreet data as well as staff’s discretion. Revenue and employee data for publicly owned companies are gathered from Securities and Exchange Commission (SEC) filings. Since subsidiaries under the same parent company are interest-dependent, the revenue and employee data of a facility’s parent company will be used for the determination of its small business status. Staff excluded government owned facilities from the small business analysis, which left 423 of the 429 affected facilities. Employment and revenue estimates from 2024 Dun and Bradstreet data as well as other external sources are available for only 378 facilities. Note that although the employment and revenue data for some facilities are unknown or missing, the current data used for this small business analysis represent the most thorough and accurate information obtainable as of the date of this draft report. The number of affected facilities that are small businesses based on each of the three definitions is presented in Table 2.:

**Table 2**  
**Number of Affected Small Business Facilities Based on Various Definitions**

Definition	Number of Facilities
South Coast AQMD Rule 102	63
South Coast AQMD's Small Business Assistance Office	262
U.S. Small Business Administration	282

Note that staff was unable to conduct a small business analysis for the 1990 CAAA definition of a small business as most of the facilities are not required to submit annual emission reports pursuant to South Coast AQMD Rule 222.<sup>4</sup>

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<sup>4</sup> South Coast AQMD, Rule 222 – Filing Requirements for Specific Emission Sources Not Requiring a Written Permit Pursuant to Regulation II, <https://www.aqmd.gov/docs/default-source/rule-book/reg-ii/Rule-222.pdf>, accessed April 11, 2024.

## COMPLIANCE COST

The key requirements of PAR 463 that would have cost impacts for the affected facilities include: 1) periodic OGI inspections for leak detection; 2) doming of EFR storage tanks; 3) installation of secondary seals on IFR storage tanks; and 4) periodic performance testing on fixed-roof storage tank VRUs.

PAR 463 would require one-time investments in: 1) OGI cameras; 2) doming materials and installation; 3) fire suppression systems for EFR tanks that will be domed; 4) secondary seal materials and installation; and 5) permit and Title V revision fees. In addition, the affected facilities would also incur recurring O&M costs for domes, secondary seals, and OGI cameras, bi-weekly labor costs for OGI inspections, and performance testing costs on fixed-roof tank VRUs every 10 years. The compliance cost for PAR 463 is forecasted for a 57-year period from 2024 to 2080.

Costs assumptions for PAR 463 were obtained from a variety of sources including the 2023 rule amendments for Rule 1178 and the ongoing rule development for Proposed Amended Rule 1148.1.<sup>5,6</sup> All the costs discussed in this Socioeconomic Impact Assessment are presented in 2023 dollars. The estimation procedure and assumptions for each cost category are discussed in the following sections.

### Capital or One-Time Costs

#### Doming

PAR 463 requires facilities to install a dome on each EFR tank storing organic liquid with a TVP of 3 psia or greater. A domed roof is defined as a self-supporting fixed roof attached to the top of an EFR tank to reduce evaporative losses.<sup>7</sup> Staff identified 89 EFR tanks that would potentially be affected by PAR 463 doming requirements. According to the PAR 463 Draft Staff Report, a random sample of 35 EFR tanks from the total affected universe of 89 tanks indicated that eight tanks (23%) already have domes installed, 20 tanks (57%) are below the TVP threshold, and seven tanks (20%) would be required to install domes. In addition, in response to stakeholders' comments, the number of tanks relied upon to conduct a cost analysis for doming was increased from seven to nine to include two additional tanks with diameters of 253 and 299 feet, respectively. Staff estimated that 20 tanks would be required to have domes installed in accordance with PAR 463 requirements. The timing of when the domes would be installed on EFR tanks is expected to occur during the next internal API 653 inspection or the next time a tank is cleaned and degassed, but not to exceed 23 years after a test verifies that the organic liquid stored in a tank has a TVP of 3 psia or greater.<sup>8</sup> Based on this provision, installations of domes on the estimated 20 EFR tanks would occur as early as 2027 but no later than 2048, based on an anticipated equipment life of 50

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<sup>5</sup> South Coast AQMD, September 2023, Governing Board Meeting Agenda No. 34, Rule 1178 - Further Reductions of VOC Emissions from Storage Tanks at Petroleum Facilities Amendment Process, <http://www.aqmd.gov/docs/default-source/Agendas/Governing-Board/2023/2023-Sep1-034.pdf>, accessed April 9, 2024.

<sup>6</sup> South Coast AQMD, Proposed Amended Rule 1148.1 – Oil and Gas Production Wells Development Process, <https://www.aqmd.gov/home/rules-compliance/rules/scaqmd-rule-book/proposed-rules/rule-1148-1>, accessed April 9, 2024.

<sup>7</sup> South Coast AQMD, Draft Rule Language for Proposed Amended Rule 463 – Organic Liquid Storage, <https://www.aqmd.gov/home/rules-compliance/rules/scaqmd-rule-book/proposed-rules/rule-463>, accessed May 2024.

<sup>8</sup> Please note that the effective date of this provision is June 7, 2027, to allow for planning and budgetary considerations. For more information see Draft Rule Language for PAR 463, <https://www.aqmd.gov/home/rules-compliance/rules/scaqmd-rule-book/proposed-rules/rule-463>.

years. This analysis assumes that an equal portion of the 20 EFR tanks will be domed in each year over the period from 2027 to 2048.

The cost of doming varies substantially depending on the diameter of the tank. During the 2023 amendments to Rule 1178, cost estimates from vendors and facilities were analyzed for tanks across a range of diameters and doming costs were found to increase exponentially with diameter.<sup>5</sup> Cost curves created from best fit equations that relied on this data were then relied upon in this analysis to estimate doming costs.

In addition, the diameters of the seven tanks from the initial 35-tank sample as well as the two additional, larger tanks noted by stakeholders were included as inputs to the cost curves. The total estimated cost to dome nine tanks was then used to proportionally extrapolate the total doming costs of the universe of 20 tanks that would need to have domes installed in accordance with the requirements of PAR 463. Specifically, the cost to dome the nine sample tanks (45% of the estimated number of tanks required to dome) was multiplied by 1/.45 to estimate the total costs to dome all 20 tanks. The total capital cost to purchase and install domes under this method is estimated to be \$22,000,000 for the 20 EFR tanks.

### **Fire Suppression Systems**

The analysis assumed that for each EFR tank needing a dome installed, a fire suppression system would also be required. The fire suppression system is expected to cost \$105,000 per EFR tank according to quotes provided by vendors. The installation of the fire suppression system is assumed to occur in the same year as the dome installation and is anticipated to have a 50-year useful life. The total capital cost across all affected facilities attributed to fire suppression systems for the 20 EFR tanks is estimated to be \$2,100,000.

### **Secondary Seals**

PAR 463 requires facilities to install secondary seals on IFR tanks. A secondary seal is a seal mounted above the primary seal of a rim seal system that consists of two seals and 98 IFR tanks were identified that would potentially require the installation of secondary seals. However, according to permit data, approximately 22 of the 98 IFR tanks have not already installed secondary seals. PAR 463 would require secondary seals to be installed the next time an IFR tank is cleaned and degassed, but no later than 22 years after the date of adoption. Based on this provision, secondary seal installations would take place as early as 2026 and no later than 2046, with an anticipated equipment life of 20 years. This analysis assumes that the number of EFR tanks that have secondary seals installed is evenly distributed over the 2026-2046 period.

Secondary seal costs are based on the linear footage of the IFR's circumference. Installing each secondary seal would involve the following costs: equipment, installation, and permit application fees. Costs were obtained from the Final Staff Report for Rule 1178 and estimated to be \$220 per foot.<sup>9</sup>

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<sup>9</sup> South Coast AQMD, September 2023, Governing Board Meeting Agenda No. 34, Proposed Amended Rule 1178 - Further Reductions of VOC Emissions from Storage Tanks at Petroleum Facilities, Attachment G - Final Staff Report, pg. 94, <http://www.aqmd.gov/docs/default-source/Agendas/Governing-Board/2023/2023-Sep1-034.pdf>.

The analysis estimated the average cost of secondary seal materials and installation to be approximately \$18,700 per tank, based on the average tank diameter of 85 feet of the 22 IFR tanks that do not already have secondary seals installed. The total capital cost across all affected facilities attributed to secondary seal materials and installation is estimated to be \$411,400.

### **OGI Cameras**

PAR 463 requires facilities to monitor storage tanks for leaks by conducting inspections with an OGI device every other calendar week (biweekly) for all tanks as well as semi-annual component inspections. An OGI device as defined as an infrared camera with a detector capable of visualizing gases in the 3.2-3.4 micrometer waveband.<sup>7</sup> Approximately 1,600 tanks would be subject to PAR 463; however, only above-ground stationary tanks with a capacity > 19,815 gallons storing organic liquid with TVP  $\geq$  1.5 psi, above-ground stationary tanks with a capacity  $\geq$  39,630 gallons storing organic liquid with TVP  $\geq$  0.5 psi, above-ground tanks used to store gasoline with a capacity between 251 gallons and 19,815 gallons, and stationary tanks with a potential for VOC emissions of 6 tons per year or greater year used in crude oil and natural gas production operations will be subject to OGI inspections. Approximately 679 tanks located at 429 facilities would be subject to the OGI monitoring requirement and this analysis assumes that each parent company that operates an affected facility will purchase one OGI camera. Estimates indicate that there are 91 parent companies which own the 429 facilities that may be subject to PAR 463, and that these companies would purchase OGI cameras in 2025.<sup>10</sup>

Costs for OGI cameras were previously obtained from the 2023 amendments to Rule 1178 as well as from the ongoing development of PAR 1148.1 and OGI camera costs are estimated at \$120,000 per device, with an anticipated equipment lifetime of 10 years. The total capital cost across all affected facilities attributed to OGI cameras is estimated to be \$10,920,000.<sup>11</sup>

### **Title V Revisions and Permitting**

Facilities with tanks subject to the doming and secondary seal requirements in PAR 463 will need to revise their Title V facility permits. In addition, there are 24 Title V facilities that will be subject to the VRU performance testing requirement and their Title V facility permits will need to be revised accordingly. The Title V permit revisions are estimated to cost \$1,857 per revision.

PAR 463 would require affected facilities to submit a permit application for dome and secondary seal installations with a permit application fee of approximately \$7,002 and \$7,143 for installing a dome and secondary seal, respectively. Considering the timing between the submittal date of a permit application and the issuance of the permit, the permit application and Title V facility permit revision fees are expected to be paid up to two years prior to doming and secondary seal installation.

For the anticipated permits needed for the 24 Title V facilities that will be subject to the VRU performance test requirement in PAR 463, the estimated costs will include: 1) \$1,857, to update the permit conditions of the vapor recovery systems to reflect the new control efficiency

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<sup>10</sup> For more information on cost effectiveness analysis for OGI cameras see Chapter 4 Cost and Cost Effectiveness Analysis Section of the Draft Staff Report for PAR 463, <https://www.aqmd.gov/home/rules-compliance/rules/scaqmd-rule-book/proposed-rules/rule-463>.

<sup>11</sup> Please note that affected facilities would need to repurchase OGI cameras at the end of the camera's useful life (every ten years), which is about five times during the analysis period (2024-2080).

standard of 98%; and 2) \$1,476, to incorporate a schedule D modification. The total cost of both Title V permit revisions (\$3,333 per facility) is expected to be paid one year prior to the initial 3-run test scheduled to occur in 2025.

## **Recurring Costs**

### **Doming Operation and Maintenance**

According to feedback from industry stakeholders, domes require minor and infrequent maintenance activities, such as resealing of seams. During the 2023 amendments to Rule 1178, staff estimated the lifetime cost of doming maintenance to increase linearly with tank diameter based on quotes from manufacturers and affected facilities.<sup>12</sup> Based on the average tank diameter of 123 feet of the 20 applicable EFR tanks, staff estimates the average lifetime O&M cost to be \$138,000 per tank. The total cost of these recurring expenses for all 20 EFR tanks is approximately \$2,760,000 over the analysis period. Maintenance activities are not expected to take place immediately and will depend on weather conditions and other variables. For the purpose of this analysis, these costs were assumed to be incurred 20 years into each tank's useful life.

### **Secondary Seals Operation and Maintenance**

Secondary seals would require the replacement of the rubber components of the seal 10 years after installation. The cost to replace the rubber component of the secondary seal depends on the diameter of the IFR tank and is estimated to cost approximately \$42 per foot. Using the average tank diameter of 85 feet, the estimated secondary seal maintenance cost is \$3,570 every 10 years per tank.

### **OGI Operation and Maintenance**

OGI cameras would require annual maintenance and calibration to ensure equipment performance. The annual maintenance cost per camera is approximately \$1,500. OGI camera maintenance costs are anticipated to begin in 2025, which is the year when affected facilities would purchase OGI cameras and would recur on an annual basis throughout the forecast period. The total annual cost of OGI camera maintenance is estimated to be \$136,500 for all the 91 companies.

### **Labor for OGI Inspections**

PAR 463 requires biweekly OGI inspections at each affected facility to detect potential leaks. This analysis assumes that inspections will be conducted by employees of the parent companies which own these facilities, and that inspections can be performed in one day for all the facilities under each parent company's ownership, on average. With an assumed pay rate of \$50 per hour and eight hours required to conduct the inspection, the total annual labor cost of OGI inspection is estimated at \$10,400 per parent company (\$50/hour x 8 hours per day x 26 inspection days/year). The total annual labor cost for OGI inspections is estimated to be \$946,400 for all 91 parent companies.

### **Vapor Recovery Unit (VRU) Performance Tests**

PAR 463 requires facilities to conduct performance tests on fixed-roof tank VRUs to ensure they meet the 98 percent efficiency standard. Approximately 479 fixed-roof storage tanks were

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<sup>12</sup> South Coast AQMD, September 2023, Governing Board Meeting Agenda No. 34, Proposed Amended Rule 1178 - Further Reductions of VOC Emissions from Storage Tanks at Petroleum Facilities, Attachment G - Final Staff Report, p. 89, <http://www.aqmd.gov/docs/default-source/Agendas/Governing-Board/2023/2023-Sep1-034.pdf>.

identified as needing VRU performance testing. Tests are required to be performed within one year of rule adoption, and every 10 years thereafter. The first test is expected to cost \$6,000 per tank for a more robust 3-run test, while the recurring tests every 10 years are estimated to cost \$4,000 per tank for a single-run test. The initial 3-run test is expected to occur in 2025 and the recurring test will occur in 10-year intervals following the initial test. The total costs for VRU performance tests are estimated to be \$2,874,000 for the initial 3-run tests and \$1,916,000 every 10 years for the single-run tests for the 479 affected fixed-roof tanks.

**Total Compliance Cost**

The total compliance cost includes all the estimated costs over a 57-year period, from 2024 to 2080. The total present value of compliance cost is estimated at \$147.60 million and \$71.77 million for a 1 percent and 4 percent discount rate, respectively. The average annual compliance costs of PAR 463 is estimated to range from \$2.95 million to \$3.47 million for a 1 percent to 4 percent real interest rate, respectively. Table 3 presents the estimated present value and average annual compliance cost of PAR 463 by expense categories.

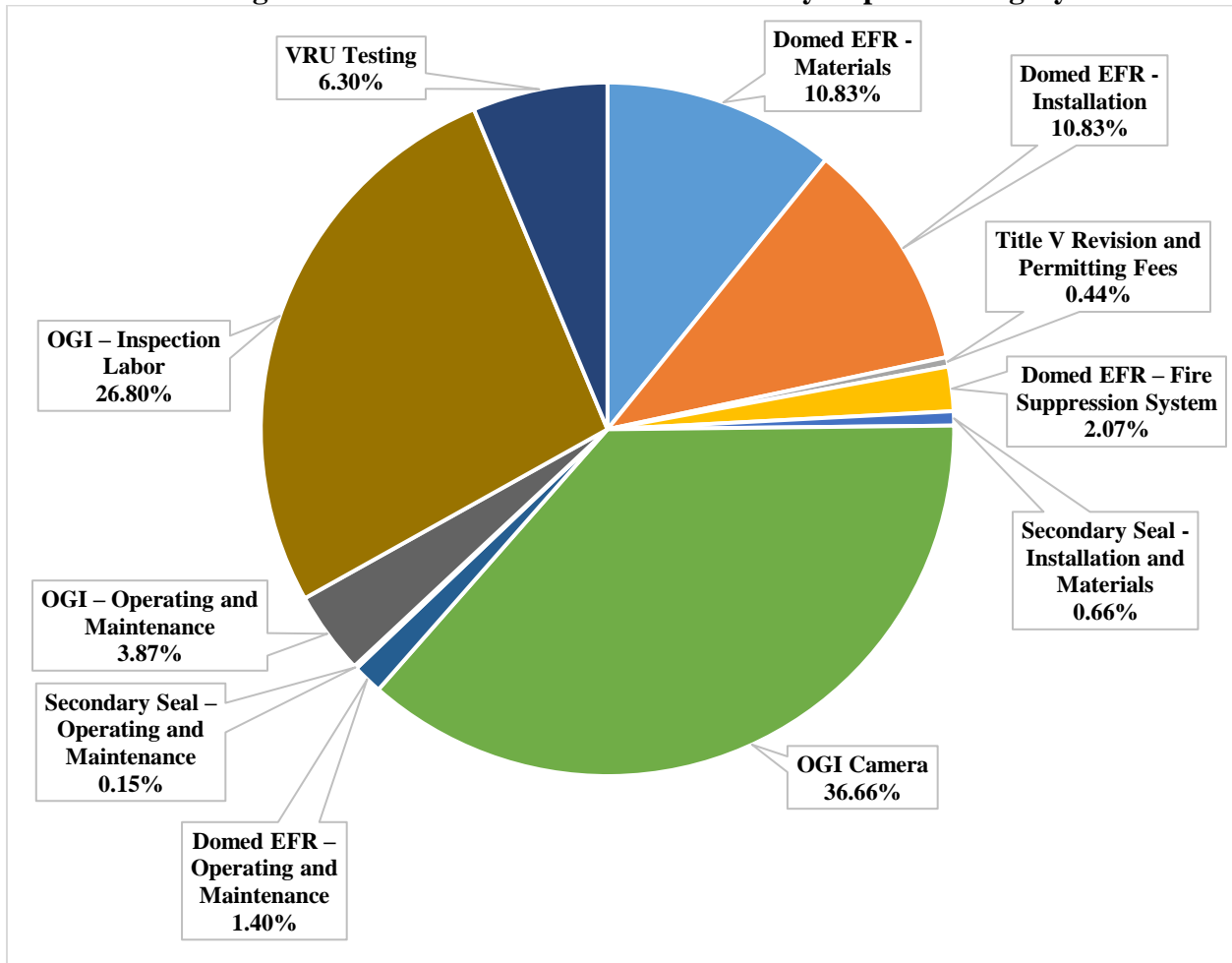


**Table 3  
Total Present Value and Average Annual Estimated Costs of PAR 463**

Cost Categories	Present Worth Value (2024)		Annual Average (2024-2080)	
	1% Discount Rate	4% Discount Rate	1% Real Interest Rate	4% Real Interest Rate
<b>Capital Costs</b>				
Domed EFR - Materials	\$15,209,738	\$6,159,178	\$212,052	\$375,747
Domed EFR - Installation	\$15,209,738	\$6,159,178	\$212,052	\$375,747
Domed EFR - Permitting	\$204,671	\$86,178	\$2,824	\$5,004
Domed EFR -Title V Fee (Permit Revision)	\$54,281	\$22,855	\$749	\$1,327
Domed EFR - Fire Suppression System	\$2,903,677	\$1,175,843	\$40,483	\$71,733
Secondary Seal - Installation and Materials	\$937,056	\$389,623	\$17,820	\$22,979
Secondary Seal - Title V Fee (Permit Revision)	\$68,144	\$35,292	\$1,180	\$1,521
Secondary Seal - Permitting	\$262,120	\$135,753	\$4,538	\$5,852
OGI Camera	\$54,755,818	\$27,658,439	\$1,121,514	\$1,271,843
VRU - Title V Revision and Permitting	\$159,192	\$156,907	\$1,403	\$1,403
<b>Recurring Costs</b>				
Domed EFR - Operating and Maintenance	\$1,980,878	\$760,926	\$48,421	\$48,421
Secondary Seal - Operating and Maintenance	\$199,621	\$70,147	\$5,118	\$5,118
OGI - Operating and Maintenance	\$5,773,544	\$2,916,351	\$134,105	\$134,105
OGI - Inspection Labor	\$40,029,902	\$20,220,036	\$929,796	\$929,796
VRU Testing	\$9,854,123	\$5,826,779	\$218,491	\$218,491
<b>Total</b>	<b>\$147,602,503</b>	<b>\$71,773,485</b>	<b>\$2,950,547</b>	<b>\$3,469,089</b>

Figure 1 presents the estimated average annual compliance costs of PAR 463 by expense category. The expense for OGI camera purchase accounts for 37 percent – the largest share of the average annual compliance cost, followed by OGI inspection labor (27%), doming materials (11%), and doming installation (11%).

**Figure 1**  
**Average Annual Estimated Costs of PAR 463 by Expense Category**



## MACROECONOMIC IMPACTS ON THE REGIONAL ECONOMY

The Regional Economic Models, Inc (REMI) PI+ v3 model was used to assess the socioeconomic impacts of PAR 463.<sup>13</sup> The model links the economic activities in the counties of Los Angeles, Orange, Riverside, and San Bernardino, and it is comprised of five interrelated blocks: 1) output and demand; 2) labor and capital; 3) population and labor force; 4) wages, prices, and costs; and 5) market shares.<sup>14</sup>

It should be noted that the REMI model is not designed to assess impacts on individual operations. The model was used to assess the impacts of the proposed amended rule on various industries that make up the local economy. Cost impacts on individual operations were assessed outside of the REMI model and were aggregated to the 70-sector NAICS code level to be used as inputs into the REMI model.

### Impact of PAR 463

This assessment is performed relative to a baseline (“business as usual”) forecast where PAR 463 would not be implemented. The analysis assumed that the affected facilities would finance the capital and one-time costs described above at a 4 percent interest rate, and that these one-time costs are amortized over the useful life of each piece of equipment.

Direct costs of PAR 463 are used as inputs to the REMI model which uses this information to assess secondary and induced impacts for all the industries in the four-county economy on an annual basis over the 2024-2080 period. Direct effects of PAR 463 include the purchase of domed roofs, secondary seals, OGI cameras, and contracting for installation, labor, and other costs discussed in the compliance cost section above. The total cost of each item is allocated to the four counties based on the location of affected equipment. For example, since 69 of the 89 identified EFR tanks are located in Los Angeles County, 77.5 percent of the total doming costs will be allocated to Los Angeles County in the REMI Model.

While the compliance expenditures that are incurred by affected facilities would increase their cost of doing business, the purchase of required equipment and services would increase the sales and subsequent spending of businesses in various sectors, some of which may be located in South Coast AQMD’s jurisdiction. Table 4 lists the 70-sector NAICS codes modeled in REMI that would either incur direct cost or directly benefit from the compliance spending.

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<sup>13</sup> Regional Economic Modeling Inc. (REMI). Policy Insight® for the South Coast Area (70-sector model). Version 3. 2023.

<sup>14</sup> Within each county, producers are made up of 156 private non-farm industries and sectors, three government sectors, and a farm sector. Trade flows are captured between sectors as well as across the four counties and the rest of U.S. Market shares of industries are dependent upon their product prices, access to production inputs, and local infrastructure. The demographic/migration component has 160 ages/gender/race/ethnicity cohorts and captures population changes in births, deaths, and migration. (For details, please refer to REMI online documentation at <http://www.remi.com/products/pi>.)

**Table 4  
Industries Incurring and Benefitting from Compliance Costs/Spending**

<b>Source of Compliance Cost</b>	<b>REMI Industries Incurring Compliance Cost (NAICS)</b>	<b>REMI Industries Benefitting from Compliance Spending (NAICS)</b>
Doming Installation		Construction (23)
Doming Materials	Oil and gas extraction (211) Wholesale trade (42) Petroleum and coal products manufacturing (324)	Fabricated metal product manufacturing (332)
Permitting and Title V Fees	Chemical manufacturing (325) Warehousing and storage (493)	State and Local Government (92)
Doming Fire Suppression System	Waste management and remediation services (562)	Construction (23)
Secondary Seals Installation and Materials	Pipeline transportation (486)	Construction (23)
OGI Camera	Support activities for mining (213) Nonmetallic mineral product manufacturing (327)	Computer and Electronic Product Manufacturing (334)
Doming O&M	Miscellaneous manufacturing (339) Beverage and tobacco product manufacturing (312)	Fabricated metal product manufacturing (332)
Secondary Seals O&M	State and Local Government (92) Utilities (22)	Construction (23)
OGI O&M	Repair and maintenance (811) Professional, scientific, and technical services (54)	Computer and Electronic Product Manufacturing (334)
OGI Labor Costs	Fabricated metal product manufacturing (332) Food manufacturing (311) Plastics and rubber product manufacturing (326)	All Industries Benefitting from OGI Labor*
VRU Performance Tests	Air transportation (481) Hospitals (622)	Professional, scientific, and technical services (54)

\*Labor for OGI inspections is modeled as additional compensation in each affected industry, reflecting the assumption that these inspections would be performed by existing employees of affected facilities working overtime.

**Regional Job Impacts**

When the compliance cost is annualized using a 4 percent real interest rate, the REMI model projects that there will be 25 foregone jobs annually on average over the 2024 – 2080 period relative to the baseline forecast. The sectors of Professional, Scientific, and Technical Services, Construction, and State and Local Government are expected to forego four, three, and three jobs annually, respectively, on average relative to the baseline forecast, while the Computer and Electronic Product Manufacturing industry is anticipated to gain one job annually on average. Table 4 presents the forecasted jobs foregone or added for selected years in the sectors with the largest magnitude of average annual job impacts. The “Other Industries” row in Table 5 shows the sum of job impacts for all the other industries excluding the 10 selected industries presented

in the table.

**Table 5**  
**Projected Job Impacts of PAR 463 for Selected Industries and Years**

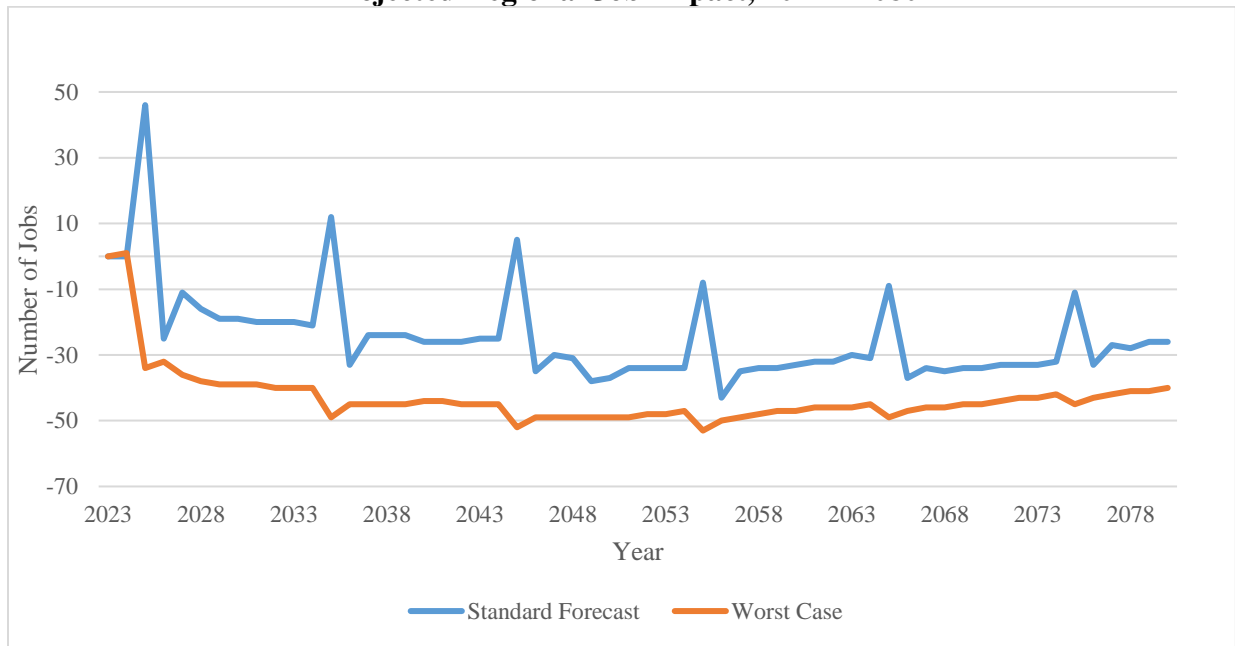
<b>Industry</b>	<b>2025</b>	<b>2030</b>	<b>2050</b>	<b>2070</b>	<b>Annual Average (2024-2080)</b>	<b>Baseline Number of Jobs</b>	<b>% Of Baseline</b>
Professional, scientific, and technical services (54)	17	-3	-6	-6	-4	1,103,469	-0.0004%
Construction (23)	0	-4	-6	-3	-3	564,165	-0.0006%
State and Local Government (NA)	2	-2	-4	-4	-3	988,219	-0.0003%
Oil and gas extraction (211)	-2	-3	-3	-2	-3	2,394	-0.1077%
Retail trade (44-45)	1	-2	-3	-3	-2	850,353	-0.0003%
Administrative and support services (561)	3	-2	-3	-3	-2	920,724	-0.0002%
Real estate (531)	1	-1	-2	-2	-2	581,801	-0.0003%
Wholesale trade (42)	2	-1	-2	-2	-2	734,489	-0.0002%
Food services and drinking places (722)	0	-1	-2	-1	-1	420,839	-0.0003%
Computer and electronic product manufacturing (334)	12	0	0	0	1	138,827	0.0006%
Other Industries	10	0	-6	-8	-4	6,026,573	-0.0001%
<b>All Industries</b>	<b>46</b>	<b>-19</b>	<b>-37</b>	<b>-34</b>	<b>-25</b>	<b>12,331,853</b>	<b>-0.0002%</b>

In addition, in 2013, South Coast AQMD contracted with Abt Associates Inc. to review the South Coast AQMD socioeconomic assessments for Air Quality Management Plans and individual rules with the goal of providing recommendations that could enhance South Coast AQMD's socioeconomic analyses. In 2014, Abt Associates Inc. published a report which included a recommendation for South Coast AQMD to enhance socioeconomic analyses by testing major assumptions through conducting a scenario analysis. As such, South Coast AQMD generally includes an alternative worst-case scenario in Socioeconomic Impact Assessments which analyzes a scenario that assumes the affected facilities would purchase all feasible monitoring equipment and services from providers located outside of the South Coast AQMD's jurisdiction.<sup>15</sup> Permitting

<sup>15</sup> Abt Associates Inc., August 2014, Review of the SCAQMD Socioeconomic Assessments, Chapter 6, Section 3, <https://www.aqmd.gov/docs/default-source/Agendas/aqmp/scaqmd-report---review-socioeconomic-assessments.pdf>, accessed April 2, 2024.

fee revenues were included in this scenario, as these permits are for equipment operating within the Basin and must be obtained from South Coast AQMD. In simple terms, this alternative worst-case scenario only models the impacts of the costs of compliance with PAR 463 while excluding the majority of revenues which would benefit equipment and service providers. This hypothetical scenario is designed to test the sensitivity of the embedded assumptions in the REMI model about how compliance costs and revenues would be distributed inside and outside of South Coast AQMD’s jurisdiction. In practice, construction is likely to be provided by local companies and OGI inspections are likely to be performed by company employees. This worst-case scenario would result in an annual average of approximately 39 jobs foregone relative to the baseline scenario. The 39 jobs foregone represent a negligible portion of the average forecasted baseline jobs in the regional economy at an estimated 0.0003 percent. Figure 2 presents the projected regional job impacts over the 2024 – 2080 period for both the standard and the worst-case forecasts.

**Figure 2**  
**Projected Regional Job Impact, 2024 – 2080**



**Price Impact and Competitiveness**

The impact of PAR 463 on production costs and delivered prices in the region is not expected to be substantial. In the Oil and Gas Extraction industry, which bears the majority of compliance costs associated with PAR 463, the REMI model projects an average increase in relative delivered prices of 0.007 percent over the forecast period, with a maximum increase of 0.016 percent forecasted in the year 2025. The relative cost of production for the Oil and Gas Extraction industry is forecasted to increase by 0.223 percent on average relative to the baseline scenario, with a maximum increase of 0.488 percent expected to occur in 2025. The larger percentage increase in the cost of production relative to delivered prices suggests companies in the Oil and Gas Extraction industry are largely unable to pass on additional costs to consumers. However, the small magnitude of the production cost increase implies that firms in the Oil and Gas Extraction industry should be able to absorb these costs.

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