

## MEMORANDUM

**DATE:** April 2, 2026  
**TO:** EPA-HQ-OAR-2024-0358  
**SUBJECT:** Economic Impact Analysis for 2026 Oil and Natural Gas NSPS & EG Reconsideration

### 1. Overview

The 2024 Standards of Performance for New, Reconstructed, and Modified Sources and Emissions Guidelines for Existing Sources: Oil and Natural Gas Sector Climate Review was published in the *Federal Register* on March 8, 2024 (March 2024 Final Rule).<sup>1</sup> The U.S. Environmental Protection Agency (EPA) received multiple petitions for reconsideration of the final rule. On May 6, 2024, EPA notified petitioners and the public via letter that EPA granted reconsideration on two aspects of the new source performance standards (NSPS) OOOOb of the final rule: (1) the temporary flaring provisions for associated gas in certain situations; and (2) the vent gas net heating value (NHV) continuous monitoring requirements and alternative performance test (sampling demonstration) option for flares and enclosed combustion devices (ECDs).<sup>2</sup>

The March 2024 Final Rule allowed for temporary flaring of associated gas, or routing to a control device, to achieve 95 percent reduction for up to 24 hours during: a malfunction, including for reasons of safety, and/or repair or maintenance. The March 2024 Final Rule also included compliance requirements for continuous monitoring and initial and periodic performance testing for flares and ECDs. As relevant to this reconsideration rulemaking, for each flare and ECD used to control gases other than associated gas from a well site affected facility, the owner or operator must conduct continuous monitoring using a calorimeter, gas chromatograph (GC), or mass spectrometer (MS) to determine the NHV of the vent stream. As an alternative to continuous monitoring of NHV, the owner or operator may conduct a performance test to demonstrate the NHV of the vent stream consistently exceeds the applicable NHV operating limit in one of two ways: continuous sampling for 14 consecutive days plus ongoing sampling, or manual sampling (twice daily for 14 consecutive days) plus ongoing sampling (three samples every five years). The minimum collection time for each individual manually collected sample must be at least one hour. If inlet gas flow is intermittent such that collecting 28 samples in 14 days is infeasible, an owner or operator

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<sup>1</sup> 89 FR 16820; see <https://www.federalregister.gov/documents/2024/03/08/2024-00366/standards-of-performance-for-new-reconstructed-and-modified-sources-and-emissions-guidelines-for>.

<sup>2</sup> See <https://www.regulations.gov/document/EPA-HQ-OAR-2024-0358-0008>.

must continue to collect samples beyond 14 days to collect a minimum of 28 samples. The Regulatory Impact Analysis (RIA) for the March 2024 Final Rule (“Final RIA”) did not include quantified estimates or qualitative discussions of the potential compliance costs, emissions reductions, or benefits associated with either of the two requirements being amended in this final reconsideration rule.<sup>3</sup>

This regulatory action finalizes two changes to the March 2024 Final Rule. First, the EPA is extending the allowable time for temporary flaring in certain situations from 24 hours to up to 72 hours. This final rule also allows additional time for exigent circumstance until the circumstance causing temporary flaring is no longer present. Second, the EPA is revising numerous aspects of the NHV monitoring and testing provisions in the March 2024 Final Rule. The EPA is expanding the streams that are exempt from monitoring due to high NHV content to include all flare and ECDs for both new and existing sources. EPA is also requiring that NHV monitoring be performed (via either continuous monitoring or the alternative performance test (sampling demonstration) option currently prescribed in the NSPS OOOOb and EG OOOOc regulations) in cases where inert gases are added, or for other miscellaneous scenarios which decrease the NHV content of the inlet stream gas to all flares and ECDs for both new and existing sources.

The EPA is also providing additional flexibility for conducting alternative sampling demonstration by finalizing the clarification that sampling may be conducted upstream of the inlet to the control device, provided that the sample is representative of the gas inlet to the control device. Other changes in this final rule include specifying that the 14-day period for the performance test (sampling demonstration) option shall be consecutive operating days and that for the purposes of determining the hourly average for continuous samples, the average shall be a block hourly average. The EPA is not amending the sampling frequency (*i.e.*, two samples per day for 14 days with an ongoing demonstration of three samples every five years) for the performance test (sampling demonstration) option for neither NSPS OOOOb nor EG OOOOc. However, the EPA is allowing breaks for weekends and holidays which may occur during the 14-day sampling period, such that the 14 days do not have to be consecutive calendar days.

The EPA is also retaining the one-hour minimum sampling time for the twice daily samples, except in cases where low or intermittent flow makes one-hour sampling infeasible on both NSPS OOOOb and EG OOOOc sources. In such a case, the EPA is allowing less than one-hour sampling times, provided that the sampling time used and the reason for the reduced sampling time is documented and reported.

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<sup>3</sup> See Regulatory Impact Analysis of the Standards of Performance for New, Reconstructed, and Modified Sources and Emissions Guidelines for Existing Sources: Oil and Natural Gas Sector Climate Review: [https://www.epa.gov/system/files/documents/2023-12/eo12866\\_oil-and-gas-nsps-eg-climate-review-2060-av16-ria-20231130.pdf](https://www.epa.gov/system/files/documents/2023-12/eo12866_oil-and-gas-nsps-eg-climate-review-2060-av16-ria-20231130.pdf).

Because the Final RIA for the March 2024 Final Rule did not analyze the impacts of either requirement being amended in this action, this memorandum (memo) summarizes the potential impacts of these final changes relative to two baselines: one baseline that includes the finalized NSPS OOOOb (the primary baseline), and a second baseline that does not include the March 2024 Final Rule (the pre-2024 rule baseline). In other words, the analysis presented below first assesses the incremental impacts of changes to the temporary flaring and NHV sampling demonstration alternative provisions of the NSPS OOOOb in the reconsideration relative to the requirements of the March 2024 Final Rule, and then assesses the impacts of those provisions relative to a scenario in which the March 2024 Final Rule was not promulgated altogether. Compared to the analysis for the proposal, the estimated impacts for this final action reflect dollar-year updates, as no new evidence on the costs of these provisions emerged following the proposal. Again, cost analysis of the provisions addressed in this action was omitted from the Final RIA and does not overlap with any of the cost analysis from that effort.

In summary, relative to the primary baseline of the post-March 2024 Final Rule, the EPA estimates that the final changes to the NHV sampling demonstration alternative will result in a net present value of compliance cost savings to the industry in 2024 dollars from 2024 to 2038 of about \$2.5 billion when discounted (to 2023) at three percent, and \$1.9 billion when discounted at seven percent, where the analysis horizon was chosen to match what was used for the Final RIA. The equivalent annualized value (EAV) in 2024 dollars of the compliance cost savings over the 2024 through 2038 timeframe is about \$208 million per year when discounting at three percent and \$209 million per year when discounting at seven percent. When comparing to the pre-2024 final rule baseline, the EPA estimates that the final changes to the NHV sampling demonstration alternative will result in a net present value of compliance costs in 2024 dollars from 2024 to 2038 of about \$25 million when discounted at three percent, and \$19 million when discounted at seven percent. The EAV in 2024 dollars of the compliance costs over the 2024 through 2038 timeframe is about \$2.1 million per year when discounting at three percent and \$1.9 million per year when discounting at seven percent. One caveat with respect to the NHV sampling costs is that the EPA does not have information on whether operators will choose the testing alternative or continuous monitoring. The EPA does not expect significant cost impacts associated with the temporary flaring provisions because we expect that operators will already have the flaring equipment installed irrespective of the flaring duration (the amendments in the final reconsideration rule do not speak to whether flaring can occur, just to the duration of each flaring event, except with respect to exigent circumstances), and will not need to make any capital investments or incur any additional ongoing operating costs. While we were not able to quantify or monetize the impacts, due to the significant cost savings for the oil and natural gas sector, we expect this will put downward pressure on oil and natural gas prices that would then result in putting downward pressure on gasoline, diesel, and energy prices which would result in decreased costs for American households.

The Final RIA included estimates of the impacts of not allowing routine flaring for oil wells with associated gas. Due to data limitations, the Final RIA did not examine a scenario where 100 percent of flaring emissions were eliminated. Thus, there were no quantified emissions or environmental or health benefits for the temporary flaring in the Final RIA for NSPS OOOOb; qualitatively, however, the temporary flaring provisions as finalized in this final reconsideration rule could result in a reduction in emissions and increase in costs relative to the pre-2024 rule baseline. Likewise, the EPA acknowledges that the finalized extension of the timeline for temporary flaring in the reconsideration rule could lead to higher emissions and cost savings relative to the March 2024 Final Rule. The EPA is not able to quantify the emissions from temporary flaring events due to data limitations; see Section 2.2 for more information. For the NHV provisions, the EPA is unable to quantify any emissions or environmental or health benefits impacts, but we do not expect a change to normal operations or to the NHV content of vent gas because of the finalized changes.

The remainder of this memo is structured as follows: in Section 2, we discuss the finalized changes to the associated gas and NHV provisions. In Section 3 we explain how the number of affected sources is estimated for the NHV provision and present the cost analysis. In Section 4 we discuss the qualitative health impacts from flaring. Section 5 contains a discussion of the uncertainty of this analysis. Finally, we present the small entity screening analysis in Section 6.

## **2. Baselines, Emissions Sources, and Regulatory Requirements**

In this section, we first explain the baselines for this reconsideration. We then discuss the regulatory requirements for two provisions of the March 2024 Final Rule: temporary flaring of associated gas, and vent gas NHV monitoring and alternate sampling demonstration alternative for flares and ECDs. The EPA granted reconsideration on these two aspects of the March 2024 Final Rule. We present a discussion of the final changes to these two provisions.

### **2.1. Baselines**

The impacts of regulatory actions are evaluated relative to a baseline that represents the existing requirements in the world as it is today without the regulatory action. The primary baseline for this reconsideration is the post-March 2024 Final Rule. We present results for the reconsideration of two provisions of the March 2024 Final Rule: temporary associated gas flaring in emergency situations and maintenance activities and continuous monitoring or an alternative sampling demonstration for NHV compliance for certain control devices. Since the Final RIA did not include an assessment of the temporary flaring or NHV provisions, we also discuss a secondary baseline, the pre-March 2024 Final Rule. Throughout this document we first discuss the two provisions as finalized in the March 2024 Final Rule compared to the primary baseline. We then discuss the two changes in the reconsideration compared to the secondary baseline of the pre-March 2024 Final Rule.

### **2.2. Associated Gas**

The March 2024 Final Rule NSPS OOOOb effectively phases out the routine flaring of natural gas that is produced at oil wells, requiring instead that the gas be captured and routed to a sales line or equivalent alternative. However, the rule allows sites that are not routinely flaring to route associated gas to a flare or control device temporarily in certain situations. During situations where a malfunction or incident endangers the safety of operator personnel or the public, and during repair, maintenance (including blow downs), a production test, or commissioning, owners and operators were allowed to route to a flare or control device for 24 hours or less per incident. Petitions for reconsideration suggested that 24 hours for temporary flaring may not be sufficient time in these situations to troubleshoot and repair equipment.

The final change to the temporary flaring provision in the reconsideration is to increase this duration from 24 hours to 72 hours. The EPA does not have sufficient data to estimate cost or emissions changes resulting from the final amendment. Specifically, while commenters have submitted data regarding the frequency and duration of temporary flaring events for a few operators,<sup>4</sup> we lack the information on the magnitude of the associated gas being flared during those events that we would need to credibly estimate emissions across all affected entities. Moreover, we did not receive, and do not possess, data on how increased temporary flaring duration could result in potential cost savings from, e.g., more efficient maintenance scheduling at the operator level that might result from having additional time to address episodes that necessitate temporary flaring. Section 4 presents a discussion of the qualitative impacts from a possible increase in flaring, relative to the March 2024 Final Rule requirements, because of this change. Included in this discussion is the potential impact of state regulations.

The Final RIA included estimates of the impacts of not allowing routine flaring but did not assess the impacts of the duration limit on temporary flaring. It is possible that the limit would have some cost to operators by requiring changes to labor/maintenance scheduling and inventory changes, but we lack the detailed industry data that would be required to estimate such costs. Likewise, the finalized change in the reconsideration to a 72-hour limit may reduce these costs to some extent relative to the March 2024 Final Rule.

### **2.3. Net Heating Value**

The March 2024 Final Rule requires continuous monitoring of the NHV of vent gas sent to flares and ECDs, or, as an alternative, an initial compliance demonstration, consisting of an initial performance test utilizing one of the following options: continuous NHV sampling for 14 consecutive days, plus ongoing sampling (three samples every five years), or a 14-day grab sample NHV demonstration, followed by a three-sample demonstration at five-year intervals, wherein the minimum collection time for each grab sample must be at least one hour.<sup>5</sup> The purpose of this requirement is to ensure that all flares and ECDs maintain the NHV of the gas

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<sup>4</sup> See docket item “07/31/2024 API Temp Flaring Scrubbed Final - Attachment 3” at <https://www.regulations.gov/document/EPA-HQ-OAR-2024-0358-0038>

<sup>5</sup> See 40 C.F.R. § 60.5417b(d)(8)(iii).

sent to the device above a minimum NHV level if the ECD is assisted (by pressure, air, or steam) or uses no assist gas (i.e., is unassisted). The testing ensures that a proper combustion efficiency is being met and to confirm that the vent gas sent to the control device complies with the prescribed NHV floor. In the March 2024 Final Rule, there were some exemptions from NHV monitoring based on the type of control device.

In this reconsideration, all streams entering control devices are exempted from NHV monitoring provisions so long as no inert gases are added, or no other miscellaneous scenarios exist which decreases the NHV content of the inlet stream gas to all flare and ECDs for both new and existing sources. The exemption was informed by data provided to the EPA by industry (after the close of the public comment period and after the final rule was signed). The dataset which included over 22,000 data points from 18 operators and approximately 4,200 sites showed that the minimum NHV requirement is achieved greater than 99 percent of the time.<sup>6</sup> For the other less than one percent of the time, the NHV of streams falls below the prescribed values from the March 2024 Final Rule. These events are attributed to operational processes that involve the dilution of streams with inert gases. For this reason, the finalized amendments to the NHV provisions reduce the incidence of NHV testing to only the streams that are known to have lower NHV. We expect that these changes will reduce overall testing volumes, will provide relief and cost savings to owners and operators, and will better reflect the data provided. As explained above, the Final RIA did not assess the impacts of the NHV compliance demonstration. We expect that, relative to the pre-March 2024 Final Rule baseline, the NHV provisions could result in reduced emissions in cases where the testing identifies issues with the composition of the gas going into the flare or ECD, though we are unable to quantify the emissions or environmental or health benefits due to data limitations. The finalized changes to the testing alternative do not otherwise require a change to the operations and there are no emissions changes expected, so this analysis focuses on estimating the cost of the final changes. Relative to the March 2024 Final Rule requirements, the finalized changes to the NHV testing alternative in the reconsideration would reduce the regulatory burden for affected entities to demonstrate compliance by limiting testing to the situations where assisted flares are operated and when inert gases are used in the production process to unassisted flares, thereby reducing the number of tests required. The estimated number of tests avoided due to the finalized changes range from about 119,000 to 141,000 per year, and about 1.9 million total over the analysis period.<sup>7</sup> These values should be interpreted with caution due to the limitations on the estimated number of sources as explained in the next section. However, we do not anticipate foregone emissions reductions from the changes

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<sup>6</sup> API/AXPC-EPA 3/18/24 Meeting Follow-Up. *Operator Survey: Net Heating Value*. API-AXPC Meeting Slide Presentation to the EPA. (Attachment Summarizing NHV Data Included as an Attachment. Excel Sheet Provided of *Analysis of NHV Data Provided by Operators: Supporting Data* (Prepared by John Beath Environmental, LLC for API/AXPC)).

<sup>7</sup> The number of tests is calculated by taking the difference in count of sites with storage vessel flares and the count of incrementally affected sites, then multiplying by 28.

in the testing alternative as the data suggest that the demonstration is superfluous, except in limited situations.

### **3. Cost Impacts for NHV Changes**

In this section, we present estimates of the compliance costs of this final reconsideration rule. These estimates are generated by combining a testing cost estimate provided in a comment to the 2022 supplemental proposal<sup>8</sup> with activity data projections generated for the Final RIA, based on a combination of historical trends and third-party projections. The methods and assumptions used to construct the activity data projections are also documented in this section. We first describe the estimates relative to the primary baseline before discussing the estimates relative to the pre-final rule baseline.

#### **3.1. Estimates of the Number of Affected Sources**

To construct the activity data projections used in this analysis, we rely on historical data from the Greenhouse Gas Inventory (GHGI),<sup>9</sup> industry data collected by the EPA through an information collection request (ICR) distributed in 2016 ( “2016 ICR”), information from the private firm Enverus that provides energy sector data and analytical services,<sup>10</sup> and projections from the U.S. Energy Information Administration’s (EIA) Annual Energy Outlook (AEO).<sup>11</sup> Our projections follow a two-step procedure. First, we construct projected counts of oil and natural gas production sites that contain emissions sources affected by the regulations. Second, using per-site factors, we build upon the site projections to estimate the counts of these affected facilities. In addition to affected sites and facilities, we calculate a subset of affected facilities that are assumed to take action to comply with new or changes to existing regulatory requirements; we refer to these facilities as “incrementally impacted facilities.”

The number of NSPS OOOOb-affected sources that use ECDs or exposed flares are determined by estimating the number of storage vessel (or “tank”) batteries that would require control under the storage vessel provision of the NSPS OOOOb.<sup>12</sup> In summary, storage vessel facilities are subject to the rule if the potential to emit (PTE) for the tank battery exceeds six tons per year of volatile organic compounds (VOC), with the standard of performance being to achieve 95 percent control. Storage vessel-affected facility projections are generated for well sites only; projections of tanks at centralized production facilities and in the gathering and boosting segment have been omitted due to a lack of data. As described in Section 2.2.1.2(a) of the March 2024

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<sup>8</sup> See the Final Rule Preamble, page: 16,965, <https://www.federalregister.gov/documents/2024/03/08/2024-00366/standards-of-performance-for-new-reconstructed-and-modified-sources-and-emissions-guidelines-for>

<sup>9</sup> See Methodology Annexes 3.5 and 3.6 at <https://www.epa.gov/ghgemissions/natural-gas-and-petroleum-systems-ghg-inventory-additional-information-1990-2019-ghg>. Activity data is presented in Tables 3.5-5 and 3.6-7, respectively.

<sup>10</sup> Enverus: <https://www.enverus.com/>.

<sup>11</sup> EIA AEO: <https://www.eia.gov/outlooks/aeo/>.

<sup>12</sup> In the March 2024 final rule RIA, the storage vessel requirements are summarized in Table 2-1.

Final Rule RIA **Error! Reference source not found.**, proportions of sites with tanks and tank counts per oil and natural gas well are generated from the 2016 ICR data and merged into our well site projections. For each site assumed to have tanks, the total count of tanks is assumed to comprise a single tank battery. All liquids production at those sites (crude at oil sites, condensate at gas sites) is assumed to be throughput to the tank battery. The PTE for each site is calculated by multiplying crude or condensate throughput by an average emissions factor derived from the BSER analysis for the March 2024 Final Rule; see Section 2.2.2(b) of the Final RIA for more details.

In the first columns of Table 1 and Table 2 (below), we provide the number of incrementally impacted facility counts for this final reconsideration rule. The estimates leverage the same underlying estimates presented in the “Fugitive Emissions | Flares” column of Table 2-6 in the Final RIA, though the values in Table 1 and Table 2 here reflect only NSPS OOOOb-affected facilities, while the final rule RIA values reflect both NSPS OOOOb and EG OOOOc.<sup>13</sup>

### 3.2. Cost Analysis

The finalized amendments require affected sources to test the NHV of natural gas fed to flares in situations where the operator is using inert gas in the production process. As discussed in Section 2.3, industry provided the EPA with data that shows that about one percent of flaring instances would have NHV below the NHV floor in the March 2024 Final Rule. We use the one percent of flaring instances to estimate the incremental cost changes because the EPA does not have information of the number of assisted versus unassisted flares. Because the final change involves exempting unassisted flares from the testing alternative, the number of assisted flares is relevant to the costs of this reconsideration. The EPA is unable to accurately estimate the number of assisted flares and thus, relies on the one percent of flaring instances that would be required to demonstrate initial and ongoing compliance by this proposal to estimate the incremental cost of this finalized change. This may result in an overestimate of the impacts of this provision to the extent that some of the flaring instances identified in the industry data occurred at unassisted flares.

For the primary baseline, the number of affected facilities not required to demonstrate NHV compliance are presented in Table 1. The finalized option would reduce the regulatory burden for affected facilities to demonstrate compliance relative to the 2024 March Final Rule by limiting testing to the situations where assisted flares are operated and when inert gases are used in the production process, thereby reducing the number of tests required. Column 3 of Table 1

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<sup>13</sup> Note that Table 2-6 from the final rule RIA includes facility counts for the storage vessel emissions source requirements. These values reflect estimates of the incrementally impacted affected facilities resulting from moving from the NSPS OOOOa baseline of requiring control for facilities with a PTE of 6 TPY VOC per *tank* to the NSPS OOOOb requirement of requiring control for facilities with a PTE of 6 TPY VOC per *tank battery*. For the purposes of this memo, we want to apply the NHV testing cost to an estimated fraction of *all* tank batteries assumed to route to flares or enclosed combustors, not just the batteries that are incrementally impacted by the difference in requirements between NSPS OOOOa and OOOOb.

presents the number of affected facilities that are expected to be exempt from the NHV testing requirement under these final changes. Based on the one percent assumption described above, column 3 is 99 percent of the estimated number of affected facilities from column 2.

Total costs include the initial demonstration of 28 samples taken over 14 days and ongoing testing of three samples every five years. The relevant costs of testing include collecting the sample, shipping, and analysis. We also assume that the samples are sent to independent laboratories and the cost of testing includes other costs such as capital costs. The EPA assumes a per sample testing cost of \$1,500 based on a comment on the 2022 supplemental proposal.<sup>14</sup>

Since the number of tests required to demonstrate compliance under the final changes is less than the number of tests required under the March 2024 Final Rule, Table 1 shows the undiscounted stream of cost savings (negative costs) per year, as well as their present values in 2024 dollars. The total undiscounted cost savings from 2024 to 2038 are about \$3.1 billion. When discounting at three percent, total cost savings are about to \$2.5 billion and \$1.9 billion when discounting at seven percent.<sup>15</sup> The equivalent annualized values (EAVs) for the total costs over the 15-year timeframe are presented in Table 3. The EAV is the annualized present value of the costs.

We next consider the finalized changes relative to the pre-March 2024 Final Rule baseline. For those instances, where the affected facilities would be required to demonstrate NHV compliance under the final changes, or one percent of the facilities with storage vessel flares, the estimated costs are presented in Table 2. The total undiscounted costs from 2024 to 2038 are \$32 million. When discounting at three percent, we have total costs about \$25 million and \$19 million when discounting at seven percent. The EAVs for the total costs over the 15-year timeframe are presented in Table 3. Because the NHV testing costs were not included in the Final RIA, these costs represent an addition to the total compliance costs for the March 2024 Final Rule.

**Table 1. Estimates of Incrementally Affected Sites, Undiscounted Annual Costs, and Discounted Annual Costs for Post-March 2024 Final Rule Baseline (thousands 2024\$)**

<b>Year</b>	<b>Count of Sites with Storage Vessel Flares<sup>a</sup></b>	<b>Count of Incrementally Affected Sites Not Subject to NHV Testing Alternative</b>	<b>Undiscounted Annual Costs<sup>b,c</sup></b>	<b>Discounted Annual Costs<sup>c</sup> (3%)</b>	<b>Discounted Annual Costs<sup>c</sup> (7%)</b>
2024	4,700	4,600	(195,200)	(189,500)	(182,500)
2025	5,100	5,100	(212,400)	(200,100)	(185,400)
2026	5,100	5,100	(214,000)	(195,900)	(174,700)

<sup>14</sup> See the Final Rule Preamble, page: 16,965, <https://www.federalregister.gov/documents/2024/03/08/2024-00366/standards-of-performance-for-new-reconstructed-and-modified-sources-and-emissions-guidelines-for>

<sup>15</sup> This action is considered an Executive Order 14192 deregulatory action. For regulatory accounting purposes, the estimated present value and annualized value of the cost savings of this rule are \$2,925 million and \$204.75 million, respectively (7% discount rate, 2024\$, 2024 present value year, perpetuity time horizon). We assume that the count of affected sites in 2039 and beyond is 4,300 sites per year and that the undiscounted annual cost savings are \$198.6 million per year.

2027	5,000	5,000	(209,400)	(186,100)	(159,800)
2028	4,900	4,800	(203,000)	(175,200)	(144,800)
2029	4,800	4,800	(220,900)	(185,000)	(147,200)
2030	4,700	4,600	(217,700)	(177,000)	(135,500)
2031	4,600	4,500	(213,700)	(168,700)	(124,400)
2032	4,600	4,600	(214,200)	(164,200)	(116,500)
2033	4,500	4,500	(209,800)	(156,100)	(106,600)
2034	4,500	4,400	(206,500)	(149,200)	(98,100)
2035	4,300	4,300	(201,400)	(141,200)	(89,400)
2036	4,300	4,200	(197,800)	(134,700)	(82,100)
2037	4,300	4,200	(199,000)	(131,500)	(77,200)
2038	4,300	4,300	(198,600)	(127,500)	(72,000)
<b>Total<sup>c</sup></b>	<b>69,700</b>	<b>69,000</b>	<b>(3,110,000)</b>	<b>(2,480,000)</b>	<b>(1,900,000)</b>

<sup>a</sup> These values are the number of projected sites estimated to be affected under the final NSPS OOOOb.

<sup>b</sup> The estimated annual costs includes the cost for the initial demonstration: 28 samples over 14 days at \$1,500 per sample per source, plus the ongoing tests costs of three samples every five years at \$1,500 per sample per source. This value assumes 99 percent of the incrementally affected sites that will not be required to perform the NHV testing to demonstrate compliance, based on industry data showing that showed that the minimum NHV requirement is achieved greater than 99 percent of the time.

<sup>c</sup> Parentheses denote negative numbers (cost savings).

<sup>c</sup> Total represents the estimated cost savings for the finalized testing option for NHV compliance demonstration. Totals may not sum correctly due to rounding.

**Table 2. Estimates of Incrementally Affected Sites, Undiscounted Annual Costs, and Discounted Annual Costs for Pre-March 2024 Final Rule Baseline (thousands 2024\$)**

<b>Year</b>	<b>Count of Sites with Storage Vessel Flares<sup>a</sup></b>	<b>Count of Incrementally Affected Sites Subject to NHV Testing Alternative</b>	<b>Undiscounted Annual Costs<sup>b</sup></b>	<b>Discounted Annual Costs (3%)</b>	<b>Discounted Annual Costs (7%)</b>
2024	4,700	47	2,000	1,900	1,800
2025	5,100	51	2,100	2,000	1,900
2026	5,100	51	2,200	2,000	1,800
2027	5,000	50	2,100	1,900	1,600
2028	4,900	49	2,100	1,800	1,500
2029	4,800	48	2,200	1,900	1,500
2030	4,700	47	2,200	1,800	1,400
2031	4,600	46	2,200	1,700	1,300
2032	4,600	46	2,200	1,700	1,200
2033	4,500	45	2,100	1,600	1,100
2034	4,500	45	2,100	1,500	1,000
2035	4,300	43	2,000	1,400	900
2036	4,300	43	2,000	1,400	800
2037	4,300	43	2,000	1,300	800
2038	4,300	43	2,000	1,300	700
<b>Total<sup>c</sup></b>	<b>70,000</b>	<b>700</b>	<b>32,000</b>	<b>25,000</b>	<b>19,000</b>

<sup>a</sup> These values are the number of projected sites estimated to be affected under the final NSPS OOOOb.

<sup>b</sup> The estimated annual costs includes the cost for the initial demonstration: 28 samples over 14 days at \$1,500 per sample per source, plus the ongoing tests costs of three samples every five years at \$1,500 per sample per source. This value assumes one percent of the incrementally affected sites will require the NHV testing to demonstrate compliance.

<sup>c</sup> Total cost represents the estimated cost for the finalized testing option for NHV compliance demonstration. Totals may not sum correctly due to rounding.

**Table 3. Present Value and Equivalent Annualized Value of Cost Estimates of the Final Action from 2024-2038 (thousands of 2024\$)**

<b>Post-March 2024 Final Rule Baseline (Primary)<sup>a</sup></b>		
	<b>2024 Present Values of Costs</b>	<b>Equivalent Annualized Costs</b>
<b>3% Discount Rate</b>	(2,480,000)	(\$208,000)
<b>7% Discount Rate</b>	(1,900,000)	(\$209,000)
<b>Pre-March 2024 Final Rule Baseline</b>		
	<b>2024 Present Values of Costs</b>	<b>Equivalent Annualized Costs</b>
<b>3% Discount Rate</b>	\$25,000	\$2,100
<b>7% Discount Rate</b>	\$19,000	\$1,700

<sup>a</sup> Parentheses denote negative numbers.

### **3.3. Information Collection Request**

The EPA has revised the approved ICR to include small changes to incorporate the EPA’s finalized recordkeeping and reporting to indicate whether the flare or ECD receives inert gases or other streams which may lower the NHV of the combined stream as finalized in this reconsideration. The EPA estimates an average of 48 respondents will be affected by the final requirements over the three-year period (2023–2025). The average annual burden for the recordkeeping and reporting requirements for these owners and operators is estimated at 83 person-hours, with an average annual cost of \$4,374 over the three-year period. This represents about 0.02 percent of the compliance costs of this proposal.

## **4. Benefit Impacts**

As discussed in Section 2.2, we are unable to estimate any emissions impacts that may result from this finalized reconsideration rule, though we acknowledge that the changes to the temporary flaring limitation could result in increases to emissions relative to the primary baseline. However, the temporary flaring limitation and NHV testing compliance demonstration alternative for NSPS OOOOb finalized in the March 2024 Final Rule, compared to a baseline without the final rule and reconsideration, may result in additional emissions reductions beyond what was estimated in the Final RIA since the pre-March 2024 Final Rule baseline includes no such requirements. Due to a lack of comprehensive data on the emissions profiles and total number of flares industry-wide and the types of flares covered by the NHV testing alternative, as well as firm behavior regarding emergency and routine maintenance events, we are unable to estimate the size of those reductions. We do not, however, expect any emissions changes to result from the changes to the NHV testing compliance demonstration.

### **4.1. Qualitative Discussion of the Potential Impacts from Flaring-Related Emissions**

While the Final RIA included estimates of the impacts of not allowing routine flaring of associated gas at oil wells, data limitations prevented the inclusion of an assessment of temporary flaring. Thus, the Final RIA did not examine the scenario where 100 percent of flaring emissions were eliminated. This rulemaking is finalizing an extension allowing temporary flaring

for up to 72 hours which may increase volatile organic compounds (VOC) and methane emissions relative to the March 2024 Final Rule. However, as data presented by American Petroleum Institute and Hess suggest, owners and operators are already making efforts to reduce the duration of temporary flaring events; see section IV.A of the Preamble for more information on the EPA's assessment of this data. Depending on the situation, there may be costs to the owners and operators associated with flaring that drive them to reduce flaring time as much as possible, thus resulting in lower potential VOC emissions. Additionally, Colorado has state regulations that may continue to limit temporary flaring to 24 hours or less, thus flaring at facilities in that state would not have increased emissions under the reconsideration as compared to their emissions under the March 2024 Final Rule.<sup>16</sup>

The temporary flaring limitation of 72 hours in this reconsideration final rule compared to a baseline without the March 2024 Final Rule may reduce VOC from flaring. Ozone is not generally emitted directly into the atmosphere but is created when its two primary precursors, VOC and oxides of nitrogen (NO<sub>x</sub>), react in the atmosphere in the presence of sunlight. In urban areas, compounds representing all classes of VOC can be important for ozone formation, but biogenic VOC emitted from vegetation tend to be more important compounds in some non-urban vegetated areas.<sup>17</sup> Recent observational and modeling studies have found that VOC emissions from oil and natural gas operations can impact ozone levels.<sup>18</sup> Flaring will generally have a

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<sup>16</sup> See Colorado Energy & Carbon Management Commission Rule 903 (<https://ecmc.colorado.gov/regulation/rules>). Other states have regulatory text discouraging waste while allowing for temporary flaring during emergency situations without specific temporal limits, pending regulatory body review; see New Mexico Administrative Code Title 19.015.0027 (<https://www.srca.nm.gov/nmac-home/nmac-titles/>) and Utah Administrative Code Rule 649-3-20 (<https://adminrules.utah.gov/public/rule/R649-3/Current%20Rules>). A list of states with relevant regulations was generated with assistance from EPA's GenAI Tool; the results were verified and corrected by Agency staff.

<sup>17</sup> U.S. Environmental Protection Agency. (2013). Integrated Science Assessment of Ozone and Related Photochemical Oxidants (Final Report) (EPA-600-R-10-076F): <https://cfpub.epa.gov/ncea/isa/recordisplay.cfm?deid=247492>

<sup>18</sup> Helmig, D. (2020). Air quality impacts from oil and natural gas development in Colorado. *Elementa: Science of the Anthropocene*, 8. <https://doi.org/10.1525/elementa.398>; Kembell-Cook, S., et al. (2010). Ozone Impacts of Natural Gas Development in the Haynesville Shale. *Environmental Science & Technology*, 44(24), 9357-9363. <https://doi.org/10.1021/es1021137>; Lindaas, J., et al. (2019). Acyl Peroxy Nitrates Link Oil and Natural Gas Emissions to High Ozone Abundances in the Colorado Front Range During Summer 2015. *Journal of Geophysical Research: Atmospheres*, 124(4), 2336-2350. <https://doi.org/10.1029/2018JD028825>; Lyu, C., et al. (2021). Evaluating oil and gas contributions to ambient nonmethane hydrocarbon mixing ratios and ozone-related metrics in the Colorado Front Range. *Atmospheric Environment*, 246, 118113. <https://doi.org/10.1016/j.atmosenv.2020.118113>; McDuffie, E. E., et al. (2016). Influence of oil and gas emissions on summertime ozone in the Colorado Northern Front Range. *Journal of Geophysical Research: Atmospheres*, 121(14), 8712-8729. <https://doi.org/10.1002/2016JD025265>; Pozzer, A., et al. (2020). Impact of U.S. Oil and Natural Gas Emission Increases on Surface Ozone Is Most Pronounced in the Central United States. *Environmental Science & Technology*, 54(19), 12423-12433. <https://doi.org/10.1021/acs.est.9b06983>; Reddy, P. J. (2023). Synthesis of Satellite and Surface Measurements, Model Results, and FRAPPÉ Study Findings to Assess the Impacts of Oil and Gas Emissions Reductions on Maximum Ozone in the Denver Metro and Northern Front Range Region in Colorado. *Earth and Space Science*, 10(5), e2023EA002917. <https://doi.org/10.1029/2023EA002917>; Tzompa-Sosa, Z. A., & Fischer, E. V. (2021). Impacts of Emissions of C2-C5 Alkanes From the U.S. Oil and Gas

destruction efficiency above 95 percent of the compounds being emitted. However, during emergency use of flaring, the volume of emissions may cause higher levels of NO<sub>x</sub>, carbon monoxide (CO), carbon dioxide (CO<sub>2</sub>), and VOC. The longer the flare is operated under such conditions, the potential for more VOC emissions exists until the process unit is back to normal operations and is no longer flaring, or the process unit has safely shut down. Emissions increases may increase ozone formation, human exposure to ozone, and the incidence of ozone-related health effects.

Human exposure to ambient ozone concentrations is associated with adverse health effects, including premature respiratory mortality and cases of respiratory morbidity.<sup>19</sup> Researchers have associated short-term and long-term ozone exposure with adverse health effects in numerous toxicological, clinical, and epidemiological studies of ozone.<sup>20</sup> When adequate data and resources are available, the EPA has generally quantified several health effects associated with exposure to ozone. These health effects include respiratory morbidity, such as asthma attacks, hospital and emergency department visits, lost school days, and premature respiratory mortality. The scientific literature also suggests that exposure to ozone is associated with chronic respiratory damage and premature aging of the lungs.

## 5. Uncertainty

There are several sources of uncertainty, both quantitatively and qualitatively, for this final action. We summarize the key elements of our discussions of uncertainty below.

***Projection methods and assumptions:*** As discussed in Section 2.2.1 of the March 2024 Final Rule RIA, the second component in estimating national impacts is the projection of affected facilities. The estimated number of sources for NHV provision is expected to be a lower bound on the total number of affected sites. We make a few key assumptions and simplifications specific to the estimates of storage vessels routing to flares or ECDs. The first is assuming that the characteristics, including production profiles, of future well sites will be the same as the characteristics of sites completed in a recent year, and that those future sites can be adequately represented by groups of “model sites” that reflect the average characteristics of sites within the group with similar observable characteristics. The second assumption is the emissions factors applied to storage vessel throughput are accurate on average. The third is using the NSPS OOOOb control requirement for storage vessels by applying the six ton per year (TPY) VOC per tank battery threshold to the PTE of the well sites according to the estimation technique described in Section 2.2 of the Final RIA yields a reasonable estimate of the number of tank batteries that will route to flares or ECDs. For these three assumptions, any change that increases

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Sector on Ozone and Other Secondary Species. *Journal of Geophysical Research: Atmospheres*, 126(1), e2019JD031935. <https://doi.org/10.1029/2019JD031935>

<sup>19</sup> U.S. Environmental Protection Agency. (2020). Integrated Science Assessment (ISA) for Ozone and Related Photochemical Oxidants (Final Report): <https://cfpub.epa.gov/ncea/isa/recordisplay.cfm?deid=348522>.

<sup>20</sup> *Id.*

the projected number of storage vessels with combustion control (e.g., an increase in average site production levels or tank emissions factors) would increase our estimated costs/cost savings. The last assumption is that the NSPS OOOOb control requirement for storage vessels will be met by routing to flares or ECDs as opposed to vapor recovery units (VRUs). This last assumption will almost certainly result in an overestimate of the actual impacts since tank batteries at some well sites will probably route to VRUs. In this sense, our estimates of the cost impacts of the NHV testing compliance demonstration would reflect an upper bound, all else equal.

**2016 ICR Data:** As discussed in the Final RIA, the 2016 ICR was withdrawn in 2017. Therefore, the data represent an incomplete, and possibly unrepresentative, survey of operators and well sites. Even so, we believe that it represents the best available data to use for this analysis, as it includes additional variables beyond, and many more well site observations than, other equipment surveys that we are aware of (e.g., the American Petroleum Institute well site survey discussed in Section 2.2.1.2 of the Final RIA). To date, we have not formally analyzed the representativeness of the data collected. Informal benchmarks, such as the proportions of single-well versus multi-well sites and low production versus non-low production sites and average equipment counts, when compared to outside data sources that attempt to capture the universe of well sites (such as Enverus and GHGI), did not suggest significant issues with the representativeness of the 2016 ICR data.

**Testing costs:** This analysis uses a testing cost provided by a commenter to the 2022 supplemental proposal.<sup>21</sup> The commenter provided a range of values from \$1,500 to \$2,000 per sample. We assumed a cost of \$1,500 for this analysis but there could be variation across the laboratories that process the test samples. We also assume that testing costs are held constant across time. We believe this is a reasonable assumption given the imperfect nature of forecasting such quantities. There is also uncertainty in the percentage of operators who would be affected by the finalized NHV testing change. Data submitted by industry showed that more than 99 percent of samples were above the NHV floor. However these data did not include all basins, there are variables in the testing procedures that could impact the results, and the percentage of operators affected might change from year to year. Furthermore, the EPA does not have information on how many operators will choose the testing alternative instead of the continuous monitoring, or how many assisted and unassisted flares are in operation. The EPA also assumes that there is one flare per site and acknowledges that this assumption may undercount the number of flares, and, therefore, undercount the amount of testing that is required or avoided.

**Flaring:** The total amount of flaring associated gas due to emergencies or temporary maintenance across the industry is difficult to quantify due to data limitations; we do not attempt it in this analysis. This change is not expected to have an important impact on the level of quantifiable emissions from flaring because the flaring under emergency and maintenance

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<sup>21</sup> See the Final Rule Preamble, page: 16,965, <https://www.federalregister.gov/documents/2024/03/08/2024-00366/standards-of-performance-for-new-reconstructed-and-modified-sources-and-emissions-guidelines-for>.

scenarios is directly related to the time of repair. Additionally, operators affected by this final change could alter the way they schedule their labor and maintenance in response to the time extension. This could lead to a slowdown in repairs that otherwise would have been completed during the 24 hours allowed in the March 2024 Final Rule. However, the flexibility with scheduling repairs allotted by the extension could reduce labor or other costs associated with a shorter timeframe for repairs. It is also possible that the extension would reduce enforcement related costs by allowing more time for operators to return to compliance. We do not have sufficient data to predict the behavior of the operators affected by this rule and we acknowledge the possibility of an increase in emissions relative to the March 2024 Final Rule.

## **6. Small Entity Screening Analysis**

Compared to the March 2024 Final Rule, the finalized reconsideration rule will not adversely affect any small businesses. These amendments provide reductions in the testing burden to industry by revising the requirements under the March 2024 Final Rule related to the NHV testing alternative for demonstrating compliance. Specifically, the finalized changes in the reconsideration reduce the regulatory burden on affected sources relative to the March 2024 Final Rule. The finalized changes to the NHV alternative would reduce the regulatory burden by reducing the amount of testing a source would be required to complete for initial and ongoing compliance demonstrations for all entities, including small entities. An agency may certify that a rule will not have a significant economic impact on a substantial number of small entities (SISNOSE) if the rule relieves regulatory burden, has no net burden, or otherwise has a positive economic effect on the small entities subject to the rule. As this rule reduces the regulatory burden associated with the existing rule with the finalized changes, there is no significant impact on a substantial number of small entities.

We acknowledge, however, that estimates of the cost impacts of the NHV testing compliance demonstration was omitted from the small business compliance cost impact analysis presented in the Final Regulatory Flexibility Analysis (FRFA), which is Section 4.4.6 of the Final RIA. Taking the finalized reconsideration into account, the impact of that omission is very small. For the Final RIA, we estimate a per-well-site cost in March 2024 of the NSPS OOOOb of \$140,000. Using the information described in Section 3 above and applying the estimate of total new well sites in March 2024 from the final rule RIA, we estimate the compliance costs of the NHV testing provision to be \$190 per site, or less than 0.2 percent of the average cost from the other provisions assessed in the Final RIA. Therefore, including the costs of the NHV testing provision does not materially change the conclusions of the small business compliance cost analysis presented in the FRFA.