REGULATORY IMPACT ANALYSIS FOR THE FINAL PREVENTION OF SIGNIFICANT DETERIORIATION AND TITLE V GREENHOUSE GAS TAILORING RULE

Final Report

May 2010

Linda M. Chappell, PhD
U.S. Environmental Protection Agency
Office of Air Quality Planning and Standards
Air Benefits and Cost Group
109 TW Alexander Drive
Research Triangle Park, NC 27711

RTI International
3040 Cornwallis Road
Research Triangle Park, NC 27709

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U.S. Environmental Protection Agency
Office of Air Quality Planning and Standards
Health and Environmental Impacts Division
Research Triangle Park, NC

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1.0 Summary

This Regulatory Impact Analysis (RIA) examines the benefits, costs, and economic impacts of the Final Prevention of Significant Deterioration and Title V Greenhouse Gas Tailoring Rule for affected entities and society as a whole. The tailoring rule lifts, for a period of beginning January 2, 2011 through April 30, 2016 (referred to as phase-in period), the burden to obtain a title V operating permit required by the Clean Air Act (CAA or Act) for many small existing sources of greenhouse gas (GHG) and the burden of Prevention of Significant Deterioration (PSD) requirements for small new or modifying sources of GHG. Thus, this rule may be viewed as providing regulatory relief rather than regulatory requirements for these smaller GHG sources for a period of at least the phase-in period. For larger sources of GHG, there are no direct economic burdens or costs as a result of this rule, because requirements to obtain a title V operating permit or to adhere to PSD requirements of the CAA are already mandated by the Act and by existing rules and are not imposed as a result of this rulemaking.

In this final rule, the Environmental Protection Agency (EPA) is relieving overwhelming permitting burdens that would, in the absence of this rule, fall on permitting authorities and sources. We accomplish this by tailoring the applicability criteria that determine which GHG emission sources become subject to the PSD and title V programs of the CAA. In particular, EPA is establishing with this rulemaking a phase-in approach for PSD and title V applicability, and is establishing the first two steps of the phase-in for the large emitters of GHGs. We also commit to certain follow-up actions regarding future steps beyond the first two, discussed in more detail later.

For the first step of this Tailoring Rule, which will begin on January 2, 2011, PSD or title V requirements will apply to sources' GHG emissions only if the sources are subject to PSD or title V anyway due to their non-GHG conventional pollutants. Therefore, EPA will not require sources or modifications to evaluate whether they are subject to PSD or title V requirements solely on account of their GHG emissions. Specifically, for PSD, Step 1 requires that as of January 2, 2011, the applicable requirements of PSD, most notably, the best available control technology (BACT) requirement, will apply to projects that increase net GHG emissions by at least 75,000 tons per year (tpy) carbon dioxide equivalent (CO_2e), but only if the project also

significantly increases emissions of at least one non-GHG pollutant. For the title V program, only existing sources with, or new sources obtaining, title V permits for non-GHG pollutants will be required to address GHGs during this first step. This first step of the tailoring rule is referred to as Step 1 or 'anyway' threshold throughout this RIA.

The second step of the tailoring rule, that begins on July 1, 2011, will phase-in additional large sources of GHG emissions. New sources as well as existing sources not already subject to title V that emit, or have the potential to emit, at least 100,000 tpy CO_2e will become subject to the PSD and title V requirements. In addition, sources that emit or have the potential to emit at least 100,000 tpy CO_2e and that undertake a modification that increases net emissions of GHGs by at least 75,000 tpy CO_2e will also be subject to PSD requirements. For both steps, we also note that if sources or modifications exceed these CO_2e-adjusted GHG triggers, they are not covered by permitting requirements unless their GHG emissions also exceed the corresponding mass-based triggers (i.e., unadjusted for CO_2e.) This second step of the phase-in period is referred to as Step 2 or 100,000 tpy CO_2e threshold throughout this report. Although the thresholds established by the tailoring rule are levels set that apply to sources at or above the threshold, this RIA examine the sources obtaining regulatory relief. By definition the sources obtaining regulatory relief are those sources with GHG potential to emit emissions below a particular threshold

EPA believes that the costs to the sources and the administrative burdens to the permitting authorities of PSD and title V permitting will be manageable at the levels in these initial two steps, and that it would be administratively infeasible to subject additional sources to PSD and title V requirements at those times. However, we also intend to issue a supplemental notice of proposed rulemaking (SNPR) in 2011, in which we will propose or solicit comment on a third step of the phase-in that would include more sources, beginning by July 1, 2013. In the same rulemaking, we may propose or solicit comment on a permanent exclusion from permitting for some category of sources. We are establishing an enforceable commitment that we will complete this rulemaking by July 1, 2012, which will allow for 1 year's notice before step 3 would take effect. In addition, we commit to explore streamlining techniques that may well make the permitting programs much more efficient to administer for GHGs, and that therefore may allow their expansion to smaller sources. We expect that the initial streamlining techniques will take several years to develop and implement.

We are also including in this action a rule that no source with emissions below 50,000 tpy CO_2e, and no modification resulting in net GHG increases of less than 50,000 tpy CO_2e, will be subject to PSD or title V permitting before at least, April 30, 2016. This is because we are able to conclude at the present time that the administrative burdens that would accompany permitting sources below this level will be so great that even the streamlining actions that EPA may be able to develop and implement in the next several years, and even with the increases in permitting resources that we can reasonably expect the permitting authorities to acquire, it will be impossible to administer the permit programs for these sources until at least 2016.

Further, we are establishing an enforceable commitment that we will (i) complete a study by April 30, 2015, to evaluate the status of PSD and title V permitting for GHG-emitting sources, including progress in developing streamlining techniques; and (ii) complete further rulemaking based on that study by April 30, 2016, to address the permitting of smaller sources. That rulemaking may also consider additional permanent exclusions based on the "absurd results" doctrine, where applicable.

This tailoring rulemaking is necessary because without it, PSD and title V would apply to all stationary sources that emit or have the potential to emit more than 100 or 250 tpy of GHGs beginning on January 2, 2011. This is the date when EPA's recently promulgated Light Duty Vehicle Rule (LDVR)[1] takes effect, imposing control requirements for the first time on carbon dioxide (CO_2) and other GHGs. If this January 2, 2011 date were to pass without this tailoring rule being in effect, PSD and title V requirements would apply at the 100/250 tpy CO_2e potential to emit (PTE) applicability levels provided under a literal reading of the CAA as of that date. From that point forward, a source owner proposing to construct any new major source that emits at or higher than the applicability levels (and which therefore may be referred to as a "major" source) or modify any existing major source in a way that would increase GHG emissions would need to obtain a permit under the PSD program that addresses these emissions before construction or modification could begin. Similarly, title V would apply to a new or existing source exceeding the 100 tpy applicability level in the Act, if the source did not already have a title V permit.

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[1] EPA–HQ–OAR–2009–0472; NHTSA-2010-0059 RIN 2060-AP58; RIN 2127-AK50. April 1, 2010 Light-Duty Vehicle Greenhouse Gas Emission Standards and Corporate Average Fuel Economy Standards; Final Rule http://www.epa.gov/otaq/climate/regulations/ldv-ghg-final-rule.pdf

Under these circumstances, many small sources would be burdened by the costs of the individualized PSD control technology requirements and permit applications that the PSD provisions, absent streamlining, require. Additionally, state and local permitting authorities would be burdened by the extraordinary number of these permit applications, which are orders of magnitude greater than the current inventory of permits and would vastly exceed the current administrative resources of the permitting authorities. Permit gridlock would result with the permitting authorities able to issue only a tiny fraction of the permits requested.

This rulemaking provides permitting thresholds for sources of GHG exceeding levels contained in the CAA, and these levels are phased in steps based on legal considerations of absurd results and administrative necessity discussed in the preamble to this rule. In the phase-in period following promulgation of this rule, we estimate that, compared to baseline estimates that do not include the effects of this rule, over six million sources of GHG emissions will be allowed to operate without a title V operating permit and tens of thousands of new sources or modifying sources per year will not be subject to PSD requirements for GHG. The emissions from these sources amount to approximately 11 percent of all GHG emissions from stationary sources (100,000 CO_2e tpy threshold) equating to approximately 630 million short tons CO_2e, but represent 95 percent of the total number of stationary sources. For this large number of smaller GHG sources, this rule alleviates the regulatory burden associated with obtaining an operating or PSD permit or complying with PSD BACT requirements. Therefore, this final action may be considered beneficial to these small sources as it provides relief from regulation that would otherwise be required.

Within this RIA we are providing an illustrative monetary estimate of statutory permitting requirements to show the magnitude of the savings that hypothetically result from this rulemaking. While we believe it is impossible to implement these permit requirements by January 2, 2011 for the reasons laid out in the preamble, it is useful to understand the scale of what the burden may have been. For sake of simplicity, within this document we refer to this illustrative monetary estimate as the monetized benefits of the regulatory relief presented by this rulemaking or regulatory relief benefits for brevity. We estimate that the regulatory relief benefits from this rule amount to $193.6 billion for the final rule Steps 1 and 2 of the phase-in period (January 2, 2011 through July 1, 2013). There will be some costs to society during this time from the potential loss of GHG emission reductions from small sources that could occur

during the Steps 1 and 2 phase-in period. We are not able to quantify or monetize these potential foregone emission reductions resulting from this final rule.

1.1 Summary of Analytical Approach for the Analysis

Our analysis of the GHG tailoring rule includes several key elements including:

- specification of the baseline that requires title V and PSD permitting statutory thresholds of 100/250 tpy CO_2e potential to emit (PTE),
- development of alternative regulatory relief thresholds including those authorized by this final rule,
- estimation of sources affected by alternative regulatory relief thresholds,
- estimation of the benefits of this rule in terms of permitting burden costs avoided,
- qualitative discussion of social costs or potential GHG emission reductions foregone due to this rule, and
- estimation of the economic impacts of this final rule.

A brief synopsis of these analytical aspects of the final rule follows.

Analytical Baseline

The baseline for this rulemaking is a state of regulation in which the statutory thresholds of 100/250 tpy CO_2e apply for title V sources and new or modifying PSD sources beginning January 2, 2011 absent actions taken in the final tailoring rule. Figure 1.0 below depicts this analytical baseline in which GHG permitting is statutorily required by the CAA. Within this framework, there are two general possibilities – 'no action' or 'regulatory relief action' taken by EPA. Under the 'no action' case baseline, statutory limits become effective and permitting authorities are overwhelmed with permit applications. Millions of new sources in total many of which have not been regulated under the Act would be required to obtain title V sources and tens of thousands of these sources will face PSD permitting annually. In contrast, the EPA may take action as it has in this final rule to provide 'regulatory relief'. As described, the 'no action' case is the analytical baseline for this RIA. All alternatives analyzed in this RIA show the level of regulatory relief in comparison to a baseline in which statutory CAA thresholds of 100/250 tpy CO_2e are required.

Regulatory Alternatives, Affected Sources, and Avoided Permitting Cost Estimates

All regulatory alternatives evaluated in this RIA, except the 'no action' alternative, represent regulatory relief possibilities that establish title V permitting thresholds and PSD

permitting thresholds and significance levels above the statutory 100/250 tpy CO_2e requirements. Due to the phase-in nature of this rule, EPA analyzes the benefits and costs of the tailoring rule for three different time periods. We analyze the net benefits of the rule annually to allow for a comparison of the final rule Steps 1 and 2 to be made with regulatory alternatives. We also evaluate the net benefits of the rule for the 2½ years period of Steps 1 and 2 of the phase-in period (January 2, 2011 through July 1, 2013) , and for the approximate five year period of Step 1, 2, and 3 of the phase-in period January 2, 2011 through April 30, 2016. Table 1.0 shows the final rule and regulatory alternatives analyzed in this RIA for these differing time periods of the phase-in.

The benefits of this rule are the regulatory relief in the form of avoided permitting burdened cost for smaller sources of GHG and permitting authorities. Avoided permitting costs to these smaller GHG sources and permitting authorities are calculated by estimating the number of sources and related permits avoided as a result of this rule. We then place a dollar value on these avoided permits by estimating the burden cost per permit. The product of the avoided permits and the per permit costs represents the regulatory relief for this rule. Thus the annual regulatory relief for the rule is equal to the number of annual sources (number of permits) above statutory thresholds of 100/250 tpy and below final rule thresholds multiplied by per permit costs for sources and permitting authorities, respectively. We use these annual estimates to calculate multiple year regulatory relief for Steps 1 and 2 of the phase-in and for the five years beginning January 2, 2011. Estimates of sources afforded regulatory relief under the alternative regulatory thresholds are based upon an analysis completed by EPA that is included as Attachment B *Technical Support Document for Greenhouse Gas Emissions Threshold Evaluation* of this report. This analysis supports EPA's assessment of the administrative burden created by adding GHGs to the PSD and title V programs. It was necessary to develop information on the number of affected facilities at both the current permitting major source thresholds (100 tons per year for title V and 100 or 250 tons per year for PSD depending on the source category classification) and at alternative higher thresholds in existing PSD and title V permitting programs. An affected facility would be one who's annual emissions of GHG equal or exceed the major source threshold being evaluated. The number of sources allowed regulatory relief by this rule represents the difference in the number of sources at the baseline 100/250 tpy CO_2e PTE threshold and at the higher regulatory alternative thresholds.

Figure 1.0. Alternative States of Regulation Relating to the GHG Tailoring Rule

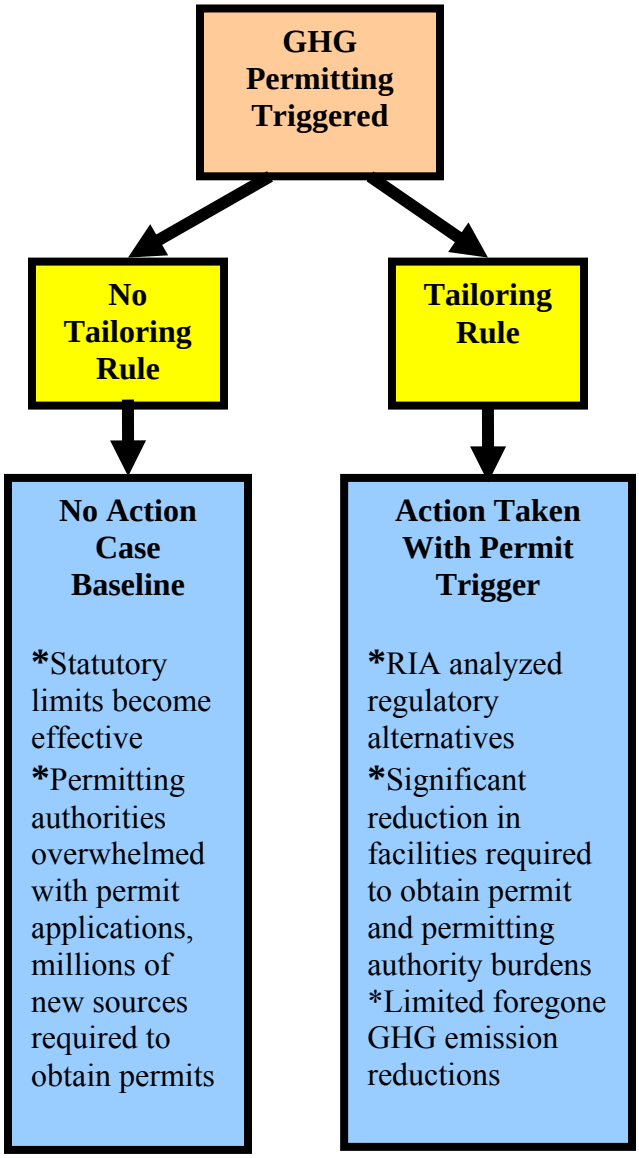

Table 1.0 Time Periods and Regulatory Alternatives Analyzed in the RIA

Time Period of Analysis	Regulatory Alternatives Thresholds Analyzed for Each Time Period[1]
Annual	1. Anyway 2. 100,000 tpy CO_2e 3. 50,000 tpy CO_2e 4. 25,000 tpy CO_2e
2.5-Year (Jan. 2, 2011- July 1, 2013) Corresponds to Steps 1 and 2 of the Phase-In	Alternatives assuming threshold remain in effect for the entire 2½ years of the Step 1 and 2 phase-in period): 1. 25,000 tpy CO_2e (25,000 tpy CO_2e significance level) 2. 50,000 tpy CO_2e (50,000 tpy CO_2e significance level) 3. 100,000 tpy CO_2e 4. Anyway Other alternatives involving thresholds that change during the phase-in period are: 5. Step 1 Anyway for 6 months/ Step 2 100,000 tpy CO_2e for 2 years 6. Step 1 Anyway threshold for 6 months / Step 2 50,000 tpy CO_2e for 2 years 7. Step1 Anyway threshold for 6 months/ Step 2 25,000 tpy CO_2e for 2 years
5-year (Five years beginning January 2, 2011) Corresponds to Steps 1-3 of the Phase-In	1. Step 1 Anyway for 6 months/ Step2 100,000 tpy CO_2e for 2 years/ Step 3 100,000 tpy CO_2e for 2½ years 2. Step 1 Anyway for 6 months/ Step 2 100,000 tpy CO_2e for 2 years/ Step 3 50,000 tpy CO_2e for 2½ years

1 Regulatory relief relates to those sources with the potential to emit annual emissions below the threshold levels. Threshold 100,000 tpy CO_2e has significance level of 75,000 tpy CO_2e. Threshold 50,000 tpy CO_2e has significance level of 50,000 tpy CO_2e, and threshold 25,000 tpy CO_2e has significance level of 25,000 tpy CO_2e

Regulatory relief or avoided permit burden estimates are based upon permitting cost estimates developed by EPA and discussed extensively in Attachment C *Summary of Methodology and Data Used to Estimate Burden Relief and Evaluate Resource Requirements at Alternative Greenhouse Gas Permitting Thresholds.*. EPA conducted an assessment of the estimated resource requirements for sources to obtain title V operating permits, for new and modifying sources to obtain PSD permits, and for permitting authorities to include GHG in permit actions at several possible major source permitting thresholds. EPA developed the burden reduction and costs savings for permitting authorities and sources as a result of requiring the inclusion of GHG in the title V and PSD permitting programs at thresholds greater than the current statutory requirements. Time and costs associated with permit activities are derived from existing Information Collection Requests (ICRs) for the title V and PSD programs. Regulatory

relief avoided cost estimates do not include the costs for new and modifying PSD sources to comply with BACT requirements due to lack of sufficient data to estimate the BACT requirements and associated costs.

We discuss the costs of this rule in terms of foregone environmental benefits qualitatively in this report. There will be some costs to society during this phase-in period from the potential loss of GHG emission reductions from small sources that could occur during the Steps 1, 2, and 3. We are not able to quantify or monetize these potential foregone emission reductions resulting from this final rule. We also provide in this RIA an estimate of the economic impact of the regulatory relief to affected sources by developing avoided-cost-to-sales ratios for the affected sources by comparing avoided permitting costs to average industry sales revenue or average revenue by firm size.

Limitations and Uncertainties of the Analysis

The benefits, costs and economic impacts estimated in this RIA are subject to limitations and uncertainties. The benefits of this rule are the regulatory relief provided to small sources of GHG and permitting authorities. Regulatory relief estimates are provided for the final rule Steps 1, 2 and 3 on an annual basis as well as for the full phase-in period. The benefits or avoided permitting costs are based upon the best data available currently regarding sources affected and burden cost estimates but are subject to uncertainties.

Benefit Estimate Limitations and Uncertainties

Uncertainties exist in the affected source counts at different thresholds used to estimate regulatory relief due to the absence of a comprehensive data set of facility-level GHG emissions across all sectors on which to base the number of facilities subject to title V and PSD permitting at alternative regulatory thresholds. These affected source counts are multiplied by the permit burden cost estimates to derive the benefit (regulatory relief) estimates for the rule. Although there are different levels of uncertainty in our facility level estimates across sectors, we do believe that the data are sufficiently robust to use in the aggregate to assess national permitting level impacts. The threshold analysis also conservatively assumes that no GHG PTE limits are in place for any of the affected sources. Some sources may use PTE limits to avoid being classified as major, which would reduce burden. The number of PTE limits is uncertain. We assume there will be a limited number in the immediate stages of GHG permitting for affected sources, but this assumption is subject to some uncertainty.

There is also significant uncertainty in both our modification rate for newly major GHG sources and in our estimate of modification activity at existing major sources that will become subject to PSD review for GHG emission increases. The general uncertainty results from inherent uncertainty in predicting not only how many major sources will elect to undergo physical or operational changes in any given year, but also which of those changes would result in GHG emissions increases that would exceed a proposed GHG significance level. First, information is not available across sectors and source categories on the types and numbers of specific physical and operational changes that would result in GHG emissions increases in amounts that can be estimated and that therefore can be compared to various GHG emissions significance levels. Second, there is uncertainty in how many project modifications will occur within any given year because decisions on these projects are driven by facility- and sector-based growth patterns and business planning decisions. Lastly, some source categories and units that emit GHGs have not previously been subject to any type of permitting or reporting requirements; as a result, for these sources, there is very little historical record for use in estimating the number and types of projects that would occur at these sources and, in turn, establish an appropriate significance level for GHGs.

The permit burden estimates that are multiplied by the source counts to derive the benefits of the rule are also subject to uncertainty. The primary reference sources for our estimate of burden hours and costs for permitting GHGs are the most recent ICRs for the PSD and title V programs. There a number of uncertainties introduced in using these references for costing GHG permitting activities. First, we are assuming that the average, conventional pollutant per-permit costs will be similar for GHGs. We do recognize the likelihood that residential and commercial permits would be simpler and have a lower per-permit burden than traditional industrial sources, and have made adjustments for this: however, for industrial sources we assume per-permit costs on par with what are estimated in the latest ICRs for PSD and title V programs. There is uncertainty in applying these average ICR-based costs to GHG permitting, even for industrial sources, because the best source of this cost information is permitting experience and there is no historical track record for permitting these GHG sources and thus any cost efficiencies that have been realized over the years for conventional pollutant permitting, and thus reflected in the current ICRs, may not be initially realized for GHG permitting.

As mentioned above, in our burden scenario analyses we do discount the ICR-based per-permit costs for residential and commercial sources to reflect what we believe will generally be simpler permits, involving primarily uniform combustion type equipment. For PSD we discount the per-permit cost by 30%, and for title V we discount the per-permit cost by 50%. There is significant uncertainty in these estimated discounts since we have no track record for permitting these smaller commercial and residential sources. However, we do believe that, based solely on the type and uniformity of the GHG emission units that would be subject to permitting at these facilities under lower GHG threshold scenarios, that average per-permit costs would be less than those currently experienced by more complex industrial facilities, with numerous emission units, for currently regulated pollutants.

Current avoided permitting cost or regulatory relief estimates also do not include the avoided costs to comply with PSD BACT requirements due to lack of available data. This omission will tend to reduce the amount of regulatory relief that smaller sources of GHG will experience during the phase-in period. In addition to the avoided BACT costs that we are unable to quantify, there are likely general economic costs associated with requiring permitting for these smaller sources of GHG. Numerous public comments on the proposed rule spoke to the economic burden permitting would place on sources above the actual costs to obtain a permit. These costs might include delays or impediments to entering a new market or to expand existing facilities to accommodate increased demand for products or services. These avoided costs might be viewed as additional costs of doing business or barriers to entry for these smaller sources of GHG. The avoided economic costs of these possible additional costs or barriers to doing business have not been considered in the regulatory relief estimates provided for this final rule due to lack of sufficient information about these potential impacts. If such avoided cost estimates were available, these estimates would tend to increase the regulatory relief burden reported for the final rule.

For the phase-in period regulatory relief multiyear estimates, we assume that the annual estimates are representative for each year of the phase-in period. This presumes that permitting activity would be constant over time. It is quite possible that permit activity for these smaller sources may grow over time with economic growth in the general economy and will likely vary from year to year due to differences in business activity. However, we do not have sufficient information about these year to year variations nor expected growth in permitting to develop

more precise estimates. Given the uncertainty in the annual relief estimates and the short time frame analyzed (five years), we feel it reasonable to not consider these potential yearly fluctuations for the phase-in period. Consideration of growth in permits over time would tend to increase the regulatory relief estimates reported for the final rule.

In a similar manner, we do not discount the phase-in regulatory relief to the present in this final report. Since the analytical time period evaluated varies from annual to five years, we feel this is a reasonable approach. Discounting the regulatory relief estimates to present values would tend to lower the total present value amount of regulatory relief reported.

Social Cost Limitations and Uncertainties

The social costs of this rule are the foregone environmental benefits that might occur during the phase-in period absent this rulemaking. This subject is discussed in Section 4 of the RIA. We are unable to estimate the PSD BACT requirements that would likely occur for the smaller sources of GHG at this time. Because BACT is a case-by-case decision and evolves over time, because we do not at this time have historical experience with the available controls for small-source GHG emissions, and because of the inherent uncertainty in describing the types of sources that would have triggered BACT absent this rule, we cannot quantify the emission reductions that might be feasible or the associated pollution control costs. For this reason, the social costs of this rule are discussed qualitatively in this RIA.

Economic Impact Limitations and Uncertainties

As previously discussed there is uncertainty in the estimates of sources affected by this final rule and the permitting burden costs used to estimate the benefits (regulatory relief) of this rule. These uncertainties also affect the economic impact analysis conducted. In the economic impact analysis, we compare the avoided permit burden cost estimates to average industry revenues in order to gauge the magnitude of regulatory relief for affected sources. We used average industry revenue, and average revenue estimates by firm size to estimate avoided-cost-to-sales ratios due to lack of data specific to the sources actually obtaining regulatory relief. The actual benefits to individual firms affected by this rule may differ from industry averages.

1.2 Benefits, Cost, and Net Benefits of the Final Tailoring Rule

In the RIA, we estimated the benefits, costs and net benefits of the final rule. This rulemaking provides regulatory relief for a phase-in period of approximately 5 years to smaller sources of GHG by phasing in the statutory permitting threshold at levels above statutory

requirements. This final rule establishes thresholds and PSD significance levels for Steps 1 and 2 of the phase-in period (the 2½ year period between January 2, 2011 and July 1, 2013), commits to considering a further Step 3, and indicates floor title V and PSD threshold levels from July 1, 2013 through April 30, 2016. While the EPA commits to undertake a rulemaking for a further Step 3, the ultimate outcome for sources of GHG from this additional rulemaking is unknown at this time. Annual estimates for the final rule Steps 1 and 2 and regulatory alternatives are presented in Table 1.1. As Table 1.1 indicates, the annual net benefits associated with the final rule Step 1 are $77,530.2 million +*B*-*C* and for Step 2 are $77,416.2 +*B*-*C* million, where *B* denotes the unquantified benefits and *C* the quantified costs of this final rule. These unquantified benefits and costs are discussed in more detail in the preceding limitations and uncertainties section of this executive summary. Table 1.2 shows the final rule Steps 1 and 2 with regulatory alternatives for the two and one-half year phase-in period January 2, 2011 through July 1, 2013. The net benefits of the final rule for Steps 1 and 2 are $193,597.5 + *B* - *C* million for the two and one-half year period. Finally, Table 1.3 presents the final rule net benefits with two alternatives for Step 3, one in which Step 3 remains at the Step 2 100,000 tpy CO2e level and one in which Step 3 becomes the minimum threshold of at least 50,000 tpy CO2e previously discussed. These alternatives for Step 3 bound the net benefit estimates for the entire phase in period. If Step 3 remains at the Step 2 level, net benefits for the five year period are $387,153.4+*B*-*C* million. This net benefit estimate becomes $386,724.1 +*B*-*C* million if Step 3 becomes the minimum level of 50,000 tpy threshold for the five year phase-in period. Given the short time frame of the impact of this final rule, we did not consider the time value of money or discount the benefit and cost estimates provided in this report to present values, rather we assume these benefit and cost estimates are occurring currently. All dollar estimates shown are based upon 2007$.

Table 1.1 Annual Net Benefits for GHG Tailoring Rule Regulatory Alternatives

	Annual Benefits and Costs for Regulatory Alternatives (millions of 2007$)			
	Final Rule Step 1	**Final Rule Step 2**		
	Anyway	**100,000 tpy CO2e**	**50,000 tpy CO2e**	**25,000 tpy CO2e**
Benefits - Regulatory Relief				
Sources				
Title V[1]	$49,457.3	$49,447.4	$49,403.8	$49,334.2
PSD[2]	$5,488.8	$5,411.2	$5,326.0	$4,707.6
Total Source Regulatory Relief	$54,946.1	$54,858.6	$54,729.8	$54,041.8
Permitting Authority				
Title V[1]	$21,077.6	$21,072.4	$21,052.8	$21,014.9
PSD[2]	$1,506.5	$1,485.2	$1,461.8	$1,291.7
Total Permitting Authority	$22,584.1	$22,557.6	$22,514.6	$22,306.6
Total Regulatory Relief	$77,530.2+B	$77,416.2+B	$77,244.4+B	$76,348.4+B
Costs - Foregone GHG Emission Reductions				
Title V & PSD	C	C	C	C
Net Benefits[3]	**$77,530.2+B-C**	**$77,416.2+B-C**	**$77,244.4+B-C**	**$76,348.4+B-C**

Benefits relate to regulatory relief for sources with annual potential to emit levels below the thresholds shown.
B - unquantified benefits of the rule include regulatory relief from BACT requirements for PSD sources
C - unquantified social costs of tailoring rule represents economic value of foregone environmental benefits (possible GHG emission reductions) during Step 1 and 2 of the phase in period. Potential foregone GHG emission reductions during the phase-in period are not known at this time. See Section 4 of the RIA for a qualitative discussion of the social costs of the rule.
1Reflects estimates of regulatory relief or avoided permit burden costs for title V GHG sources and permitting authorities.
2 Shows estimates of regulatory relief or avoided permit burden costs for GHG PSD sources and permitting authorities.
3 Totals may not sum due to rounding.

Table 1.2. Net Benefits for the Final Rule and Regulatory Alternatives for Steps 1 and 2 of the Phase-In Period

	Benefits and Cost s for Step 1 and 2 Phase-In Period (January 2, 2011- July 1, 2013)						
	For Regulatory Alternatives (millions of 2007$)						
	Anyway[3]	**100,000 tpy CO2e[3]**	**50,000 tpy CO2e[3]**	**25,000 tpy CO2e[3]**	**Anyway/ 50,000 tpy CO2e[4]**	**Anyway/25,000 tpy CO2e[5]**	**Final Rule[6]**
Benefits - Regulatory Relief							
Sources							
Title V[1]	$123,643.3	$123,618.5	$123,509.5	$123,335.5	$123,536.3	$123,397.1	$123,623.5
PSD[2]	$13,722.0	$13,528.0	$13,315.0	$11,769.0	$13,396.4	$12,159.6	$13,566.8
Total Source Regulatory Relief	$137,365.3	$137,146.5	$136,824.5	$135,104.5	$136,932.8	$135,556.6	$137,190.3
Permitting Authority							
Title V[1]	$52,694.1	$52,681	$52,631.9	$52,537.3	$52,644.3	$52,568.7	$52,683.6
PSD[2]	$3,766.3	$3,713.0	$3,654.5	$3,229.3	$3,676.8	$3,336.7	$3,723.6
Total Permitting Authority	$56,460.4	$56,393.9	$56,286.3	$55,766.7	$56,321.1	$55,905.4	$56,407.2
Total Regulatory Relief	$193,825.6+*B*	$193,540.4+*B*	$193,110.9+*B*	$190,871.1+*B*	$193,253.9+*B*	$191,462.0+*B*	$193,597.5+*B*
Costs - Foregone GHG Emission Reductions							
Title V & PSD	C	C	C	C	C	C	C
Net Benefits	**$193,825.6+*B*-*C***	**$193,540.4+*B*-*C***	**$193,110.9+*B*-*C***	**$190,871.1+*B*-*C***	**$193,253.9+*B*-*C***	**$191,462.0+*B*-*C***	**$193,597.5+*B*-*C***

Benefits represent regulatory relief for those sources with the annual potential to emit less than the threshold shown.
B - unquantified benefits of the rule include regulatory relief from BACT requirements for PSD sources
C - unquantified social costs of tailoring rule represents economic value of foregone environmental benefits
(potential GHG emission reductions) during Step 1 and 2 of the phase in period. Foregone GHG emission reductions are not known at this time.
See Section 4 of the RIA for a qualitative discussion of the social costs of the rule.
1Reflects estimates of regulatory relief or avoided permit burden costs for title V GHG sources and permitting authorities.
2 Shows estimates of regulatory relief or avoided permit burden costs for GHG PSD sources and permitting authorities.
3 Shows alternative as single step for the 2½.year phase-in period for 'anyway', 100,000 tpy CO2e, 50,000 tpy CO2e, and 25,000 tpy CO2 e thresholds respectively.
4 Includes Step 1 for one-half year and 50,000 tpy CO2e threshold for two years.
5 Includes Step 1 for one-half year and 25,000 tpy CO2e threshold for two years.
6 Phase-in period for final rule includes 1/2 year of Step 1 thresholds and 2 years of Step 2 threshold.

Table 1.3 Net Benefits of the Final Rule and Step 3 Regulatory Alternatives

	Regulatory Alternative (millions 2007$)	
	Final Rule + Possible Step 3 of	
	100, 000 tpy CO2e[3]	50, 000 tpy CO2e[4]
Benefits - Regulatory Relief		
Sources		
Title V[1]	$247,253.6	$247,145.3
PSD[2]	$27,094.7	$26,881.8
Total Source Regulatory Relief	$274,348.3	$274,027.1
Permitting Authority		
Title V[1]	$105,368.5	$105,318.8
PSD[2]	$7,436.61	$7,378.1
Total Permitting Authority	$112,805.1	$112,696.8
Total Regulatory Relief	$387,153.4+*B*	$386,719.4+*B*
Costs - Foregone GHG Emission Reductions		
Title V & PSD	*C*	*C*
Net Benefits	**$387,153.4+*B*-*C***	**$386,724.1+*B*-*C***

Benefits represent regulatory relief for sources with the annual potential to emit below the thresholds shown.
B - unquantified benefits of the rule include regulatory relief from BACT requirements for PSD sources
C - unquantified social costs of tailoring rule represents economic value of foregone environmental benefits (potential GHG emission reductions) during Step 1, 2,and 3 of the phase in period.
Foregone GHG emission reductions are not known at this time. See Section 4 of the RIA for a qualitative discussion of the social costs of the rule.
1Reflects estimates of regulatory relief or avoided permit burden costs for title V GHG sources and permitting authorities.
2 Shows estimates of regulatory relief or avoided permit burden costs for GHG PSD sources and permitting authorities.
3 Includes ½ year of Step 1 (anyway threshold), 4½ years of Step 2 (100,000 threshold),
4 Includes ½ year of Step 1 (anyway threshold), 2 years of Step 2 (100,000 threshold), and 2½ years Step 3 alternative of 50,000.

1.3 Organization of this Report

The remainder of this report supports and details the methodology and the results of this illustrative RIA.

- Section 2 presents a discussion of the regulatory baseline, regulatory alternatives and affected entities.
- Section 3 describes the benefits of the rule.

- Section 4 provides a qualitative description of social costs of the rule.
- Section 5 presents the benefits, costs, and net benefits of the rule.
- Section 6 describes the methodology and the estimated economic impacts of the regulatory relief.
- Section 7 discusses small business impacts, unfunded mandates, and effects of the rule on energy supply
- Section 8 describes limitations and uncertainties of the analysis
- Section 9 lists the references for the analyses included in this RIA.

Section 2
Baseline Description, Regulatory Alternatives, and Affected Entities

As previously stated, this final rule is essentially providing regulatory relief and does not include direct regulatory provisions for any industrial, commercial, or residential entities. An analysis is presented for smaller sources that experience regulatory relief. This rule increases the GHG applicability threshold for title V from 100 tpy CO_2e and for new and modifying sources of GHG emissions from the CAA mandated 100 or 250 tpy CO_2e major source applicability threshold in a phased-in step process described in Table 2.0.

Table 2.0. Phase-In Steps for Large Sources for the Final GHG Tailoring Rule[1]

	PSD	Title V
Step 1: Phase-in of Large Sources (January 2, 2011 – June 30, 2011) (referred to as 'anyway' threshold or Step 1)	Permitting based on emissions of non-GHG pollutants and, for BACT applicability with GHG emissions or GHG emission increases above 75,000 tpy CO_2e	Sources with title V permits for non-GHG pollutants will address GHG as part of title V permitting
Step 2: Phase in for Large Sources (July 1, 2011 – June 30, 2013) (referred to as 100,000 tpy CO_2e threshold or Step 2)	Sources above 100,000 tpy (new) and 75,000 tpy (major modifications) of CO_2e (and not already subject to PSD based on non-GHG)	Sources that exceed 100,000 tpy GHG threshold will be required to obtain a title V permit if they do not already have one
Step 3: Phase in for Large Sources (July 1, 2013 – April 30, 2016) Effective only after additional regulatory process	An enforceable commitment to assess experience from Steps 1 and 2; commit to propose, consider comments, and promulgate potential Step 3 (level will not go below 50,000 tpy CO_2e [new] and 50,000 tpy CO_2e [major modifications])	An enforceable commitment to assess experience from Steps 1 and 2; commit to propose, consider comments, and promulgate potential Step 3 (level will not go below 50,000 tpy CO_2e)
Final Phase Effective only after additional regulatory process	EPA will take rulemaking action in 2016 or before to address small sources in light of the 5-year study	EPA will take rulemaking action in 2016 or before to address small sources in light of the 5-year study

[1] Thresholds/significance levels are based on PTE.

The rules also sets GHG significance levels for each step under PSD to determine applicability as it relates to GHG emissions or emission increases for projects at major sources.

The baseline for this rulemaking is a state of regulation in which the statutory thresholds of 100/250 tpy CO_2e apply for title V sources and new or modifying PSD sources beginning January 2, 2011 absent actions taken in the final tailoring rule. Within this framework, there are

two general possibilities – 'no action' or 'regulatory relief action' taken by EPA. Under the 'no action' case baseline, statutory limits become effective and permitting authorities are overwhelmed with permit applications. Millions of new sources in total many of which have not been regulated under the Act are required to obtain title V sources and tens of thousands of these sources will face PSD permitting annually. In contrast, the EPA may take action as it has in this final rule to provide 'regulatory relief'. As described, the 'no action' case is the analytical baseline for this RIA. All alternatives analyzed in this RIA show the level of regulatory relief in comparison to a baseline in which statutory CAA thresholds of 100/250 tpy CO_2e are required. **F**or larger sources of GHG, there are no direct economic burdens or costs as a result of this rule, because requirements to obtain a title V operating permit or to adhere to PSD requirements of the CAA are already mandated by the Act and by existing rules and are not imposed as a result of this rulemaking.

In order to analyze the baseline administrative burden created by adding GHGs to existing PSD and title V permitting programs, it was necessary to develop information on the number of affected facilities at the current permitting major source thresholds (generally, 100 tons per year for Title V and 100 or 250 tons per year for PSD depending on the source category classification). An affected facility would be one who's annual emissions of the GHG equal or exceed the major source threshold, based on a PTE basis. Detailed descriptions of the methodologies used are provided in Attachments B and C of the RIA. An explanation of the uncertainties associated with this methodology is discussed in Section 8 of this report. The following are the basic steps used in the methodology to estimate affected sources and permitting actions under the baseline scenario.

1) Identify GHG source categories. EPA evaluated the same range of stationary source types with direct GHG emissions as identified in EPA's proposed and final GHG mandatory reporting rule (MRR)[2]. The GHG MRR source categories were based on a comprehensive review of all U.S. source categories with GHG emissions from EPA's national inventory of GHG

[2] 74 FR 68, pp. 16447 – 16731 and 74 FR 209, pp. 56260-56519, respectively.

emissions[3]. The stationary sources evaluated in this analysis can be grouped in the sectors shown below:

- Electricity Generation (facilities with fossil fuel-fired electric generating units);
- Industry (range of industries with process and combustion GHG emissions);
- Energy (oil and gas extraction, transport, and processing; underground coal mining);
- Waste Treatment (landfills and municipal solid waste incinerators);
- Agriculture (stationary fuel combustion units);
- Commercial (variety of establishments including office, retail, hospitals, lodging, etc.);
- Residential (single-family and multi-family housing).

A small number of direct emission source types included in the GHG MRR analysis were not included in the tailoring rule analysis because the GHG emissions from these sources were primarily fugitive emissions. Fugitive emissions are generally defined as emissions which are not released, or could not be reasonably collected and released, through a stack or vent. Under the PSD rules, fugitive emissions are only included in potential to emit estimates if the source is one of 28 listed PSD source categories. The excluded categories included electrical equipment fugitive SF_6 emissions; wastewater treatment plant fugitive emissions not associated with one of 28 listed PSD source categories; and, agricultural manure management fugitive emissions.

2) Estimate Actual Facility Level GHG Emissions. We started with estimates of facility emissions based on actual operating conditions, not PTE, since this is the standard format of the EPA's national inventory of GHG emissions. Actual emissions for each source category were obtained from earlier analyses performed to develop emission thresholds for the proposed and final GHG MRR, or we used the same data sources when additional analyses were required. EPA generally relied on published research and publicly available government data, such as EPA's eGRID database of electric generating source emissions, Economic and Housing Census data, and Energy Information Agency (EIA) data on energy consumption. See Attachment B for full descriptions of the methodologies used to estimate emissions for each source category.

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[3] U.S. Environmental Protection Agency (EPA), *Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990 – 2007*, April 2009, US EPA 430-R-09-004. http://www.epa.gov/climatechange/emissions/usinventoryreport.html

3) Estimate PTE-based Facility Level GHG Emissions. It was necessary to convert actual emissions to a PTE basis, because as noted earlier, that is the basis for determining applicability under PSD and title V. PTE is generally defined as the amount of emissions that can be emitted from a source operating at full equipment capacity, 24 hours per day, 365 days per year. Capacity information and annual GHG emissions were available for some of the source categories from analyses performed to support the GHG MRR. In some cases the supporting analyses had already calculated GHG emissions on a full capacity basis, in which case EPA directly used those estimates as PTE estimates. Alternatively, some data from the supporting analysis estimated actual annual emissions using a baseline year. If capacity and baseline year production information was provided in the supporting data, EPA adjusted the source actual emissions estimate by the ratio of annual capacity to baseline production to estimate PTE. If capacity information was not available, EPA used capacity factors from other data sources to adjust actual emission estimates to PTE estimates. These capacity factors add varying uncertainty to the PTE estimate. Detailed descriptions of the different PTE calculation methodologies are included in the source descriptions in Attachment B.

4) Count Facilities that Exceed the Baseline GHG Thresholds. After compiling facility level PTE-based emission under Step 3, these estimates were evaluated against the threshold levels in order to determine whether or not a facility would be included in the baseline threshold count. The number of facilities exceeding the baseline threshold based on a PTE basis were then identified as 'major sources' for the purposes of GHG permitting under PSD and title V.

Our facility counts include both *existing* sources that would exceed the baseline GHG thresholds and *newly constructed* sources. Newly constructed sources only represent a small fraction (less than 2 percent for the baseline scenario) of the total population of GHG major sources in a given year. Growth rates used to estimate new construction were based on a variety of sources including Economic Census data, EIA energy survey data, and various EPA regulatory impact analyses and information collection requests which require source population estimates. In some cases there was sufficient information to distribute new sources to different thresholds based on emission information specific to the new sources (electric generating, municipal solid waste combustors, and commercial stationary fuel combustion).

5) *Estimate total permitting actions for PSD and title V based on facility counts*. The next basic step was to estimate permitting actions that result from the baseline facility counts.

For PSD, this required an estimate of modifications at existing facilities in addition to the estimate of newly constructed facilities from step 4. Our estimate for modifications at existing facilities is based on calculating how many of the facilities identified as major sources would undergo a modification project that would exceed our baseline GHG thresholds. The methodology for estimating modifications is described in detail in Attachment C. The basic methodology for estimating modifications at existing, but newly classified GHG major sources, under PSD was to apply a 4 percent modification rate to the population of facilities that exceed the threshold. For title V, any facility, existing or newly constructed, that exceeded the baseline thresholds for GHG permitting (i.e., 100 tpy CO2e) was considered to be required to get a title V permit under the baseline scenario.

6) Calculate costs for permitting actions. The total permitting actions calculated under step 5 above, were then combined with average permitting costs for each type of permitting activity for PSD and title V to calculate overall permitting burden. See Attachment C for full description on assumptions regarding permitting costs and how these were applied to different permitting actions under PSD and title V.

7) Adjustments based on public comment on proposal. We made three main adjustments to our basic methodology based on public comments received on our proposal. Two of these affected the estimate of modifications under PSD. Many commenters indicated that they felt EPA had underestimated the number of modification permitting actions associated with PSD. Our proposed general modification rate (2 percent of the newly major facility population) used to estimate modifications at existing, but newly newly major GHG sources did not appear to have caught the extent to which facility level changes could result in projects that exceed the GHG permitting threshold. In reassessing this modification rate, we determined that we had not fully accounted for all possible PSD modifications relative to the major source population in calculating this modification rate. Based on this reassessment we revised our general modification rate to 4 percent (as noted above in step 5) that is used to estimate the annual modification activity at existing, but newly major GHG sources.

Another adjustment to the PSD modifications methodology was based on public comments on the proposal that we did not fully account for the number of major modification projects at existing major sources because we did not capture the number of existing projects that avoid major PSD review (by either taking limits—synthetic based modifications—or by netting

out) for existing pollutants but that would not be able to avoid PSD for GHGs. Our modifications methodology, as described in Attachment C, now specifically includes additional modifications for these projects that would not be able to avoid PSD review because of their GHG emissions.

Lastly, based on public on public comments we revised our estimate of capacity utilization used for estimating PTE-based emissions for the general manufacturing source category (referred to as 'unspecified stationary combustion' in the GHG threshold analysis in Attachment B) and the oil and gas industry. In our proposal, the range for capacity utilization for 'unspecified stationary combustion' varied from 70 to 90 percent depending on manufacturing category, and for the oil and gas industry we used 90 percent. Based on comments received indicating that these utilization rates are higher than what is normally achieved in real-world conditions, particularly for smaller manufacturing type facilities, we used a 50 percent capacity utilization rate for both of these source categories. We believe that these assumptions better reflect what can be deemed reasonable operation under normal conditions for facilities in these source categories.

The baseline affected sources estimated using the preceding methodology are shown on Table 2.1. As Table 2.1 shows, EPA estimates the total number of title V sources and the annual estimate of new PSD sources that would be required to obtain permits absent this tailoring rule in a world where EPA takes 'no action'. These affected source estimates provide a baseline on which to estimate the regulatory relief allowed by EPA in this final rule and possible at alternative regulatory thresholds. We compare these baseline affected source counts to the sources counts at alternative regulatory relief thresholds to determine the number of sources likely to obtain regulatory relief due to the tailoring rule.

All regulatory alternatives evaluated in this RIA, except the 'no action' alternative, represent regulatory relief possibilities that establish title V permitting thresholds and PSD permitting thresholds and significance levels above the statutory 100/250 tpy CO_2e requirements. In this RIA, EPA analyzes the benefits and costs of the tailoring rule for thresholds finalized in this rule for Steps 1 and 2 of the phase-in period, as well as, the proposal thresholds of 25,000 tpy CO_2e and a possible Step 3 minimum threshold level of 50,000 tpy CO_2e. The annual levels of regulatory relief associated with these regulatory alternatives are evaluated, as well as, two

and one-half year estimates that cover the Steps 1 and 2 phase-in period and for the full phase-in period of approximately 5 years.

For the initial phase-in Step 1, only title V and new PSD sources already applying for permits due to air pollutants other than GHG emissions are required to obtain a permit. New PSD sources required to obtain permits for GHG must also comply with BACT requirements for GHG. However, under Step 1, only modification projects or sources with GHG emissions or emission increases that equal or exceed 75,000 tpy CO_2e PTE are required to comply with BACT requirements for GHG emissions. During Step 2 of the phase-in, sources at or above 100,000 tpy CO_2e PTE are required to a obtain title V permit. Likewise, new sources at or above the 100,000 tpy CO_2e PTE and modifying sources with PTE at or above 75,000 tpy CO_2e are required to comply with the requirements of PSD. After the initial two steps of the phase-in, EPA will determine whether a Step 3 that lowers thresholds below 100,000 tpy CO_2e PTE beginning July 2013 is feasible. However, in this final rule, the Agency is making an enforceable commitment to conduct a regulatory-setting process to consider the experience during the initial steps prior to lowering the threshold in a further Step 3. EPA also commits to not lowering the threshold below 50,000 tpy CO_2e PTE until 2016. EPA will also conduct a study of permitting processes at existing levels in the next 5 years and determine whether thresholds can be lowered below 50,000 tpy CO_2e PTE after another regulatory process. At proposal, EPA identified as the pollutants subject to PSD and title V the group of up to six GHG emissions, each one weighted for its global warming potential (GWP), that are included in regulations for their control under the CAA. EPA also proposed to conform its action on PSD state implementation plans (SIPs) and title V programs to match the proposed Federal applicability requirements. In its proposed rule, EPA provided temporary regulatory relief for sources of GHG emissions below a level of 25,000 tpy CO_2e PTE.

The rationale for finalizing the previously described thresholds in the tailoring rule is based in part on our review of the costs and benefits associated with the different thresholds evaluated and described in this RIA. However, the primary basis for choosing the threshold enumerated in Table 2.0 is to ensure consistency with the legal doctrines set forth in the preamble of the tailoring rule. To apply the statutory PSD and title V applicability thresholds to sources of GHG emissions would create immediate and insuperable administrative burdens for permitting authorities and perhaps absurd results. By establishing the applicability thresholds at

the levels for the first and second steps of the phase-in period, we would avoid an administratively impossible scenario where each year tens of thousands of new sources and modifications would become subject to PSD review, and, in total, millions of sources would require title V operating permits. We used the results of this RIA to support the threshold decisions, which we believe would result in a variance from existing statutory permitting thresholds that would—consistent with the supporting legal rationale—be as limited as possible and with consideration given to costs and benefits as described in this RIA.

Table 2.2 describes qualitatively the benefits, costs, and economic impacts analyzed for regulatory alternatives in this RIA. As shown in Table 2.1, leaving the CAA thresholds unchanged for sources of GHG emissions is the baseline or 'no action' alternative that will render this tailoring rule as having no impact on sources or permitting authorities beyond the current CAA requirements. In this 'no action' case, we are simply comparing the baseline to itself. Thus, this is a regulatory alternative with zero benefits and zero costs. Under this alternative, small and large sources of GHG emissions will be required to obtain title V operating and PSD permits as mandated by the Act. Although this alternative is considered for analytical completeness, its impact is essentially the same as no GHG tailoring rule and no further discussion of this alternative is considered in this document. In addition to the 'no action' alternative, this RIA examines Step 1 and 2 thresholds of the phase-in final rule, as well as a less

Table 2.1. Baseline Sources Subject to Statutory Permit Requirements

	Baseline Number of Sources Requiring Permits	
	100/250 tpy CO2e Thresholds	
Sector	**Title V**	**New PSD**
Electricity	2,237	93
Industrial	178,037	604
Energy	5,000	48
Waste Treatment	4,206	2
Agriculture	37,351	299
Commercial	1,355,921	12,041
Residential	4,535,500	6,915
Totals	6,118,252	20,002

Notes: Title V sources are the total number of sources estimated to require an operating permit under statutory CAA thresholds. PSD sources are new source estimates anticipated to require compliance with permitting annually. Estimates for PSD sources are for newly constructed facilities and do not include modifications at existing facilities that may also be subject to PSD requirements.

than 50,000 tpy CO_2e threshold (meaning sources below 50,000 tpy obtain regulatory relief and this is the minimum level for potential Step 3) and a less than 25,000 tpy CO_2e threshold (meaning sources below 25,000 tpy obtain regulatory relief and this is the proposed rule threshold level) regulatory alternatives.

The benefits of this rule (and the alternatives considered) are the permit burden costs avoided due to increasing the threshold levels above current CAA requirements as reflected in Table 2.1. Under this final rule, millions of title V sources in total and thousands of PSD sources annually are afforded regulatory relief. For each of the regulatory alternatives increasing the threshold above statutory levels, the benefits of this tailoring rule are primarily the avoided permitting costs for affected small sources of GHG emissions. The permitting costs avoided by small sources are quantified for the final rule Step 1 and 2 thresholds and each of the regulatory alternatives in Section 3 of this document. The avoided costs associated with compliance with BACT requirements for PSD new and modifying sources are addressed qualitatively in this RIA because of lack of sufficient data to estimate quantitative BACT requirements for affected GHG sources.

The industry categories for sources anticipated to experience regulatory relief at the threshold levels finalized in this regulation are shown in Table 2.3. As Table 2.3 shows, this action lifts permitting requirements for over 6 million potential title V sources in total and tens of thousands of potential PSD new and modifying sources annually otherwise required by the CAA to obtain permits. The estimates for title V sources represent the total number of sources afforded regulatory relief by this rule and for regulatory alternatives. In contrast, the estimates shown for PSD represent the annual estimate of new PSD sources expected to experience regulatory relief from this rule. For additional industry details including applicable affected industry North American Classification System (NAICS) codes see Attachment A "Source Categories Affected by the Rule with Industry Detail."

EPA considered a number of factors involving administrative burden and necessity in finalizing the thresholds for this rule, including comments received in response to the proposed rule. After considering the comments regarding the number of affected sources at various thresholds, EPA revised its estimates of sources potentially required to obtain permits significantly increasing the number of affected sources at the alternative threshold/significance levels as discussed in detail previously.

Table 2.2. Qualitative Description of Benefits and Cost of the Tailoring Rule

Description	No Action Alternative (Thresholds Remain at 100/250 tpy)[1]	Alternative (Proposal) 25,000 tpy GHG Emission Threshold[2]	Alternative 50,000 tpy GHG Emission Threshold[2]	Step 2 100,000 tpy GHG Emission Threshold[2]	Step 1 Anyway Threshold[2]
Benefits (Regulatory relief—avoided permitting requirements and associated costs)	No avoided permitting costs (i.e., over 6 million title V sources in total and over 80 thousand PSD small new and modifying GHG sources annually (over 240 thousand PSD sources during Steps 1 and 2) remain subject to programs)	Avoid permitting costs for 6.098 million title V sources in total and for 72.3 thousand new and modifying PSD sources annually (or 216.9 thousand PSD sources during the Steps 1 and 2 time period)	Avoid permitting costs for 6.102 million sources in total and for 79.7 thousand new and modifying PSD sources annually (or 239.1 thousand PSD sources during the Steps 1 and 2 time period)	Avoid permitting costs for 6.105 million sources in total and for 80.7 thousand new and modifying PSD sources annually (or 242.1 thousand PSD sources during the Steps 1 and 2 time period)	Avoid permitting costs for 6.106 million sources in total and for 81.6 thousand new and modifying PSD sources annually (or 244.8 thousand PSD sources during the Steps 1 and 2 time period)
Social Costs (Foregone emission reductions due to regulating GHG sources)	No foregone emission reductions	Foregone GHG emission reductions for affected sources (addressed qualitatively)	Foregone GHG emission reductions for affected sources (addressed qualitatively)	Foregone GHG emission reductions for affected sources (addressed qualitatively)	Foregone GHG emission reductions for affected sources (addressed qualitatively)
Economic Impacts (Avoided costs compared to annual sales or revenue data for affected sources)	No avoided costs	Impact of avoided costs (benefits) compared to annual sales revenues of affected sources	Impact of avoided costs (benefits) compared to annual sales revenues of affected sources	Impact of avoided costs (benefits) compared to annual sales revenues of affected sources	Impact of avoided costs (benefits) compared to annual sales revenues of affected sources

[1] This table recognizes that triggering for GHG permitting has occurred with promulgation of the LDVR. Because of this event, sources with the potential to emit 100 tpy CO_2e are required to obtain a title V permit and new or modifying sources with the potential to emit 250 tpy are required to obtain a PSD permit as mandated by the CAA. If current threshold levels in the CAA remain unchanged for GHG emissions, the tailoring rule has no effect on sources or permitting authorities and provides no regulatory relief to sources or permitting authorities.

[2] Promulgated Steps 1 and 2 thresholds and alternative regulatory thresholds are shown. Threshold levels represent PTE levels for affected sources. Sources affected, enumerated above, represent sources, permits, or actions. Alternative 50,000 tpy CO_2e is the minimum threshold level to be considered for a possible Step 3.

Table 2.3. Estimated Number of Affected Sources Experiencing Regulatory Relief for Final Rule and Regulatory Alternatives[1, 2, 3]

	Number of Sources Experiencing Regulatory Relief							
	25,000 CO_2e tpy		50,000 CO_2e tpy		Final Rule: Step 2 100,000 CO_2e tpy		Final Rule: Step 1 Anyway Threshold	
Sector	**Title V**	**New PSD**	**Title V**	**New PSD**	**Title V**	**New PSD**	**Title V**	**New PSD**
Electricity	161	20	285	29	285	33	285	93
Industrial	166,908	574	168,976	586	170,654	599	170,910	604
Energy	2,401	23	2,513	38	2,536	44	2,588	48
Waste Treatment	1,431	0	2,448	1	3,165	1	3,358	2
Agriculture	37,351	299	37,351	299	37,351	299	37,351	299
Commercial	1,354,760	12,034	1,355,321	12,038	1,355,870	12,039	1,355,921	12,041
Residential	4,535,340	6,912	4,535,480	6,915	4,535,500	6,915	4,535,500	6,915
Totals	6,098,352	19,862	6,102,374	19,906	6,105,361	19,930	6,105,913	20,002
% Emissions Covered[4]	3%		8%		11%		13%	

[1] Number of sources is determined on a PTE basis. Estimates for PSD sources are for newly constructed facilities and do not include modifications at existing facilities that may also be subject to PSD requirements. Source estimates shown above represent the total number of title V sources potentially afforded regulatory relief during Step 1 and 2 of the phase-in period. In contrast, for new PSD sources, the estimates shown are the annual estimates of permits avoided for new small PSD GHG sources.

[2] See Attachment B for more details of how thresholds and sources affected were developed.

[3] The "no action" alternative is not included since the number of sources experiencing regulatory relief for this regulatory alternative is by definition zero.

[4] Percentage of emissions covered represents estimated actual emissions from sources expected to experience regulatory relief as a percentage of total stationary source GHG emissions.

When comparing the regulatory alternatives for revised affected sources at alternative thresholds as discussed above, there are differences between them. The reason the thresholds and significance levels are chosen as shown in Table 2.0 for Steps 1 and 2 of the phase-in period with an additional Step 3 to be considered only after a subsequent regulatory process is because permitting authorities cannot immediately accommodate a huge increase in permitting. The thresholds chosen for Steps 1 and 2 are chosen over the proposal level of 25,000 tpy CO_2e, because evidence suggests that permitting authorities can run programs for the levels of permitting that would be required Steps 1 and 2, and EPA believes legal doctrine requires the threshold to be as low as administratively feasible. The choice of a threshold is a balancing act of administrative considerations between threshold levels that EPA feels are not administratively feasible at this time (i.e., 25,000 tpy CO_2e potential to emit threshold) compared to threshold levels that are not impossible such as the Step 1 'anyway' threshold and the Step 2 100,000 tpy CO_2e threshold achieving a reasonable balance. For more information on the process used to determine the appropriate thresholds/significance levels for Steps 1 and 2 of the phase-in period,

see Attachment B. There are a number of uncertainties involved in the determination of the baseline and regulatory alternative affected sources. These threshold analysis uncertainties are discussed in Section 8 of the RIA.

Section 3
Benefits (Regulatory Relief or Avoided Permit Burden Costs)

EPA estimated the regulatory relief or avoided title V and PSD permitting costs for small sources of GHG that will be postponed as a result of this rulemaking. This analysis focuses on the burdens that are being lifted for smaller sources as a result of this rule. In addition, an accounting of the avoided costs to State, local, and tribal permitting authorities is provided. These avoided costs relate specifically to information collection costs or burden costs for sources of GHG emissions that would have been required to obtain an operating permit under title V or required to modify an existing permit to address GHG if not for this rule. Avoided costs shown also include information collection requirements for additional PSD permits required for new or modifying sources of GHG, as well as the costs to State, local, and tribal permitting authorities for extending their existing permitting programs to include sources of GHG. These avoided costs do not include the cost of modifying and new source compliance with BACT because of the lack of available data. Within this benefits section of the RIA we are providing an illustrative monetary estimate of statutory permitting requirements to show the magnitude of the savings that hypothetically result from this rulemaking. While we believe it is impossible to implement these permit requirements by January 2, 2011 for the reasons laid out in the preamble, it is useful to understand the scale of what the burden may have been. For sake of simplicity, we refer to this illustrative monetary estimate as the monetized benefits of the regulatory relief presented by this rulemaking or regulatory relief benefits for brevity.

Time and costs associated with permit activities are derived from existing Information Collection Request (ICR) EPA documents for title V and PSD as described below. Significant uncertainties exist in the following estimates because of the lack of historical record and permitting experience on which to base resource needs to consider sources of GHG emissions in permitting and are discussed more fully in Section 8 of this RIA.

3.1 Avoided Burden Costs for Title V

Under Step 1 of the phase-in, major sources of GHG that would otherwise be required to obtain an operating permit due to emissions of non-GHG pollutants are required to include GHG in permit requests. During this period, sources other than those obtaining permits for non-GHG pollutants will experience regulatory relief. Under Step 2, sources below 100,000 tpy CO_2 e PTE will experience regulatory relief, while sources above this threshold will be required to obtain

operating permits. Table 3.0 shows the estimated annual permitting cost or burden cost avoided for sources subject to title V experiencing regulatory relief during the period January 2, 2011, through June 30, 2013, as well as for two other regulatory alternatives. The alternatives shown are a threshold of 50,000 tpy CO_2 e PTE (the minimum threshold for a possible Step 3) and 25,000 tpy CO_2 e PTE (the proposal threshold level). Estimates shown are the annual portion of regulatory relief expected to occur for small GHG sources and permitting authorities due to this final rule and equate to regulatory relief for approximately 2 million title V sources.

As shown on Table 3.0, the cost for a new industrial source to obtain an operating permit for GHG is $46,350 per permit. Over 71,000 industrial sources are likely to benefit from this rule because of the postponement of permitting requirements under Steps 1 and 2 of the phase-in period annually. Approximately 61,836 industrial sources annually will be allowed to postpone permit revisions for GHG at an avoided cost of $1,677 per permit revision under the 'anyway' threshold Step 1. The estimate of industrial sources avoiding permit revisions becomes 60,921 annually under Step 2, the less than 100,000 tpy CO_2e threshold. The burden cost to obtain a new commercial or multifamily residential operating permit is approximately $23,175 per permit with about 2.0 million of these sources annually benefiting from this rule by avoiding these costs for the phase-in period. The total regulatory relief or benefits for smaller sources of GHG amount to approximately $49.5 billion per year under Steps 1 and 2 of the phase-in period. Avoided costs for sources at regulatory alternative threshold levels of 50,000 tpy and 25,000 tpy CO_2e are also presented in Table 3.0. All benefits estimates shown in this report are in 2007$.

State, local, and tribal permitting authorities will also benefit from this rule by avoiding the administrative burden of processing over 2 million title V operating permits for small industrial, commercial, and residential sources of GHG annually. Avoided permitting cost estimates for permitting authorities and sources are calculated based on information obtained from the April 2007 *Information Collection Request for State Operating Permit Regulations*[4] Annual values are derived from Tables 7 and 8 of this document. For consistency, the permitting authority labor costs are updated to 2007 dollars using the *2007 General Schedule Salary Table* from the Office of Personnel Management. For the purposes of this analysis, we assume that

[4] Information Collection Request for State Operating Permit Regulations (Renewal), EPA ICR Number 1587.07, OMB Control Number 2060-0243, 2007.

Table 3.0. Annual Title V Regulatory Relief (Avoided Cost) Estimates for Affected Sources of GHG and Permitting Authorities at Alternative Thresholds[1,2,3]

Activity	Cost per Permit (2007$)	Regulatory Alternative 25,000 CO_2e tpy		Regulatory Alternative 50,000 CO_2e tpy		Final Rule: Step 2 100,000 CO_2e tpy		Final Rule: Step 1 Anyway Threshold	
		Number of Permits	Avoided Costs (millions 2007$)	Number of Permits	Avoided Costs (millions 2007$)	Number of Permits	Avoided Costs (millions 2007$)	Number of Permits	Avoided Costs (millions 2007$)
Sources									
New Industrial	$46,350	69,726	$3,231.8	70,848	$3,283.8	71,657	$3,321.3	71,829	$3,329.3
New Commercial/Residential	$23,175	1,985,504	$46,014.1	1,985,740	$46,019.5	1,985,930	$46,023.9	1,985,948	$46,024.3
Permit Revisions due to GHG	$1,677	52,639	$88.3	59,930	$100.5	60,921	$102.2	61,836	$103.7
Source Total		2,107,869	$49,334.1	2,116,518	$49,403.8	2,118,508	$49,447.4	2,119,613	$49,457.3
Permitting Authority									
New Industrial	$19,688	69,726	$1,372.8	70,848	$1,394.9	71,657	$1,410.8	71,829	$1,414.2
New Commercial/Residential	$9,844	1,985,504	$19,545.3	1,985,740	$19,547.6	1,985,930	$19,549.5	1,985,948	$19,549.7
Permit Revisions due to GHG	$1,840	52,639	$96.9	59,930	$110.3	60,921	$112.1	61,836	$113.8
Permitting Authority Total		2,107,869	$21,014.9	2,116,518	$21,052.8	2,118,508	$21,072.4	2,119,613	$21,077.6
Total Title V Regulatory Relief			**$70,349**		**$70,456.6**		**$70,519.8**		**$70,534.9**
Percentage of Emissions Covered[3]			**3%**		**8%**		**11%**		**13%**

Sums may not add due to rounding.

[1] Avoided costs shown represent the annual estimates of the regulatory burden relief from this rule and for regulatory alternatives for over 2 million sources of GHGs (about 1/3 of the total number of title V sources expected to obtain regulatory relief). See Appendix B and C for more details. Sources experiencing regulatory relief are those with the potential to emit less than the threshold levels annually.

[2] These estimates are explained in more detail in Attachment C "Summary of Methodology and Data Used to Estimate Burden Relief and Evaluate Resource Requirements at Alternative Greenhouse Gas Permitting Thresholds."

[3] Percentage of emissions covered represents estimated actual emissions from sources expected to experience regulatory relief as a percentage of total stationary source GHG emissions.

commercial/residential sources that exceed the major source threshold due to GHG emissions will not likely have as substantial applicable permitting cost requirements as industrial sources. We assumed that permits for such sources will require only one half the time to prepare and issue as those for industrial sources, which have applicable requirements in addition to GHG. Therefore, it is estimated that new commercial/residential permits require 50 percent of the time needed for new industrial permits, or 214 hours compared to 428 hours for permitting authorities. For significant revisions and permit renewals, it is assumed that incorporating GHG information adds 40 hours, or an additional 10 percent to the current updating and processing time. For more information on the methods used to calculate permit processing costs for permitting authorities for title V permitting, see Attachment C, "Summary of Methodology and Data Used to Estimate Burden Relief and Evaluate Resource Requirements at Alternative Greenhouse Gas Permitting Thresholds."

The cost savings for permitting authorities relating to title V are summarized in Table 3.0 and are estimated to exceed $21 billion annually. Costs avoided annually for permitting authorities at alternative threshold levels other than Steps 1 and 2 are also shown on Table 3.0.

This rule specifies a phased-in step approach to establish title V and PSD thresholds. For this reason, it is appropriate to assess the regulatory relief during the various steps of the phase-in period in addition to looking at regulatory relief on an annual basis as previously discussed. Since thresholds for only Steps 1 and 2 are promulgated in this rulemaking with a potential Step 3 to be considered only after subsequent rulemaking, we calculate the regulatory relief possible for a two and one-half year period, the approximate time period covered by Steps 1 and 2 of this tailoring rule. Considering the regulatory relief for the 2.5 year period allows us to evaluate alternative regulatory relief based not only on threshold levels, but also based upon the timing of the steps of the phase-in period. Table 3-1 presents the Steps 1 and 2 regulatory relief for title V based upon alternative regulatory thresholds and the timing of the phase-in steps. Alternatives of 25,000 tpy CO_2e, 50,000 tpy CO_2e, 100,000 tpy CO_2e, and the 'anyway' thresholds are evaluated as if they were implemented for the entire Step 1 and 2 period. The 25,000 tpy CO_2e and the 'anyway' threshold regulatory relief shown represent the bounding estimates for regulatory relief for these threshold alternatives as well as alternative timings of the steps. If the 25,000 tpy CO_2e threshold were imposed for Steps 1 and 2 of the phase-in, regulatory relief or avoided title V permitting costs for sources and permitting authorities would amount to approximately $175.9

billion for a Steps 1 and 2 phase-in period. Alternatively if the 'anyway' based threshold were imposed for a 2.5 year period, the regulatory relief would be $176.3 billion for sources and permitting authorities during the first two steps of the phase-in period. The final tailoring rule promulgated, establishes the 'anyway' threshold for Step 1 and 100,000 tpy CO_2e threshold for Step 2. The total regulatory relief for the final rule for the 2.5 year period for title V is estimated to be $176.3 billion. Altering Step 2 to be 25,000 tpy CO_2e and 50,000 tpy CO_2e with Step 1 as the 'anyway' threshold would result regulatory relief estimates for the three year period of $176 billion and $176.2 billion, respectively.

3.2 Avoided Information Collection Costs Associated with the PSD Program

This rulemaking limits the new sources requiring PSD permits for Step 1 to those that would be required to comply with PSD for non-GHG emissions. For modifying sources, the significance level requiring permits is 75,000 or greater tpy CO_2e PTE. In Step 2 of the phase-in period, the threshold becomes 100,000 tpy CO_2e PTE or greater for new sources and the significance level for modifying sources remains at 75,000 or greater tpy CO_2e. Table 3.2 summarizes the estimated benefits to small GHG sources resulting from this final rule. Annual regulatory relief for Steps 1 and 2 of the phase-in period, as well as additional alternative regulatory thresholds, are depicted on Table 3.2. The estimated annual burden or permit-related costs avoided by small GHG sources amount to around $5.5 billion annually during Step 1 and $5.4 billion during Step 2 with the burden costs per permit expected to be $131 thousand for new sources, $84.5 thousand for modified industrial sources, $82.3 thousand for new commercial or residential sources, and $59.2 thousand for modifying commercial and residential sources. State, local, and tribal permitting authorities are expected to avoid administrative costs of $1.5 billion under Step 1 and $1,485 million under Step 2 annually.

Burden estimates for the PSD program permitting authorities are calculated based on listed values obtained from Tables 6-1 and 6-2 on pages 18-19 in the *Information Collection Request for Prevention of Significant Deterioration and Nonattainment New Source Review*

Table 3-1. Steps 1 and 2 Title V Regulatory Relief (Avoided Cost) Estimates for Affected Sources of GHG and Permitting Authorities at Alternative Thresholds[1,2]

	Regulatory Relief Estimates for Step 1 and 2 of the Phase-In Period (January 2, 2011 through July 1, 2013)						
Activity	**Regulatory Alternatives (Avoided Permitting Costs in million 2007$)**						
Sources	**25,000 CO2e tpy**	**50,000 CO2e tpy**	**100,000 CO2e tpy**	**Anyway Threshold**	**Anyway/ 50,000**	**Anyway/25,000**	**Final Rule Anyway/100,000**
New Industrial	$8,079.5	$8,209.5	$8,303.3	$8,323.3	$8,232.3	$8,128.3	$8,307.3
New Commercial/Residential	$115,035.3	$115,048.8	$115,059.8	$115,060.8	$115,051.2	$115,040.4	$115,060.0
Permit revisions due to GHG	$220.8	$251.3	$255.5	$259.3	$252.9	$228.5	$256.3
Source Total	$123,335.5	$123,509.5	$123,618.5	$123,643.3	$123,536.3	$123,397.1	$123,623.5
Permitting Authority							
New Industrial	$3,431.9	$3,487.2	$3,527	$3,535.4	$3,496.8	$3,452.6	$3,528.7
New Commercial/Residential	$48,863.3	$48,869.1	$48,873.7.0	$48,874.2	$48,870.1	$48,865.4	$48,873.8
Permit revisions due to GHG	$242.1	$275.7	$280.2	$284.5	$277.4	$250.6	$281.1
Permitting Authority Total	$52,537.3	$52,632	$52,680.9	$52,694.1	$52,644.3	$52,568.6	$52,683.6
Total Title V Regulatory Relief	**$175,872.8**	**$176,141.5**	**$176,299.4**	**$176,337.5**	**$176,180.6**	**$175,965.7**	**$176,307.1**

Benefits represent regulatory relief or avoided costs for sources with the potential to emit below the thresholds shown.

[1] Avoided costs shown represent the 2½ year estimates of the regulatory burden relief from this rule and for regulatory alternatives for Steps 1 and 2 for the period Jan. 2, 2011 through July 1, 2013. Alternatives 25,000 CO2e tpy, 50,000 CO2e tpy, 100,000 CO2e tpy, and non-GHG based assume these thresholds remain in effect for entire 2½ years. Alternatives Anyway/50,000 and Anyway/25,000 assume the Anyway threshold for Step 1 and 50,000 CO2e tpy and 25,000 CO2e tpy thresholds for Step 2, respectively. Finally the final rule estimates shown in the last column of the table assume the Anyway threshold for Step 1 (one half year) and the 100,000 CO2e tpy threshold for Step 2 (two years).
Sums may not add due to rounding.

[2] These estimates are explained in more detail in Attachment C "Summary of Methodology and Data Used to Estimate Burden Relief and Evaluate Resource Requirements at Alternative Greenhouse Gas Permitting Thresholds."

Table 3.2. Annual PSD Regulatory Relief (Avoided Costs) for Sources of GHG and Permitting Authorities at Alternative Thresholds[1,2]

Activity	Cost per Permit (2007$)	Regulatory Alternative 25,000 CO_2e tpy		Regulatory Alternative 50,000 CO_2e tpy		Step 2 100,000 CO_2e tpy Threshold, 75,000 CO_2e tpy Significance Level		Step 1 Anyway 75,000 CO_2e tpy Significance Level	
		Number of Permits	Avoided Costs (millions 2007$)	Number of Permits	Avoided Costs (millions 2007$)	Number of Permits	Avoided Costs (millions 2007$)	Number of Permits	Avoided Costs (millions 2007$)
Sources									
New Industrial	$84,530	16,892	$1,427.9	24,183	$2,044.2	25,174	$2,128.0	26,089	$2,205.3
New Commercial/Residential	$59,152	55,446	$3,279.7	55,481	$3,281.8	55,505	$3,283.2	55,509	$3,283.5
Source Total		72,338	$4,707.6	79,664	$5,326.0	80,679	$5,411.2	81,598	$5,488.8
Permitting Authority									
New Industrial	$23,243	16,892	$392.6	24,183	$562.1	25,174	$585.1	26,089	$606.4
New Commercial/Residential	$16,216	55,446	$899.1	55,481	$899.7	55,505	$900.1	55,509	$900.1
Permitting Authority Total		72,338	$1,291.7	79,664	$1,461.8	80,679	$1,485.2	81,598	$1,506.5
Total PSD Regulatory Relief			**$5,999.4**		**$6,787.8**		**$6,896.4**		**$6,995.3**

[1] Avoided costs shown represent annual estimates of the regulatory burden relief for this rule and for regulatory alternatives for sources with the potential to emit below the threshold. Sums may not add due to rounding.

[2] Attachment C: "Summary of Methodology and Data Used to Estimate Burden Relief and Evaluate Resource Requirements at Alternative Greenhouse Gas Permitting Thresholds

August 2008.[5] As shown in Table 3.2, State, local, and tribal permitting authorities are estimated to expend $23,243 per permit to process a new GHG industrial PSD permit and $16,216 per permit for a new commercial or residential PSD permit. It is assumed that permit preparation and issuance for commercial/residential permits require less time to prepare and issue than industrial source permits since commercial/residential sources would likely be somewhat less complex in terms of numbers and types of emission sources and control requirements. Estimates obtained are additional burden and costs to those currently experienced by permitting authorities and sources. For more information on the estimates of burden costs for PSD permits, see Attachment C. Avoided costs estimates for regulatory alternatives of 25,000 tpy (proposal level) and 50,000tpy CO_2e PTE are also shown in Table 3.2. The PSD estimated costs on Table 3.2 represent annual estimates of costs avoided for sources and permitting authorities.

Regulatory relief alternatives for Steps 1 and 2 for PSD are shown on Table 3.3. Evaluating regulatory alternatives for the approximate 2.5 year time period covered by Steps 1 and 2 provides comparisons of the threshold levels and the impacts of timing choices for the steps. As shown on Table 3.3, regulatory alternatives of 25,000 tpy CO_2e, 50,000 tpy CO_2e, 100,000 tpy CO_2e, and the 'anyway' thresholds are evaluated as if they were implemented for the entire two step phase-in period. The 25,000 tpy CO_2e and the 'anyway' thresholds represent the bounding alternatives over the period with the 25,000 tpy CO_2e alternative providing the least regulatory relief and the 'anyway' threshold the greatest. If the 25,000 tpy CO_2e were implemented for Steps 1 and 2, the regulatory relief for PSD sources would amount to approximately $14,998.3 million during the Steps 1 and 2 phase-in period. This regulatory relief would be $17,488.3 million over the same period with the 'anyway' threshold. All other alternatives shown and combinations of regulatory alternatives within the 2.5 year time frame lie within the 25,000 tpy CO_2e threshold and the 'anyway' threshold. The final rule 'anyway' threshold for Step 1 and 100,000 tpy CO_2e threshold for Step 2 results in PSD regulatory relief of $17,290.5 million for the 2.5 year phase-in period.

This rule also alleviates the regulatory burden associated with complying with PSD BACT requirements for small new and modifying sources. The BACT costs foregone are not

[5] Prevention of Significant Deterioration and Non-Attainment Area New Source Review (Renewal), EPA ICR Number 123.23, OMB Control Number 2060-0003, 2008.

estimated or shown in Tables 3.2 or 3.3 because of the significant uncertainties involved in these requirements for affected sources and lack of sufficient information to estimate these costs currently. Likewise, the foregone emission reductions associated with these BACT requirements for small sources are not estimated. This issue is discussed further in Section 4 of this RIA. The benefits estimates for this rule are subject to limitations and uncertainties that are discussed in Section 8 of this RIA.

Table 3.4 presents the title V and PSD regulatory relief for the full phase-in period of approximately five years. The final rule benefits are shown for two alternatives for Step 3, one in which Step 3 remains at the Step 2 level and one in which Step 3 becomes the minimum threshold of at least 50,000 tpy CO_2e previously discussed. These alternatives for Step 3 bound the net benefit estimates for the entire phase in period. If Step 3 remains at the Step 2 level, net benefits for the five year period are \$387,153.4 +*B* million. This benefit estimate becomes \$386,724.1 +*B* million if Step 3 becomes the minimum level of 50,000 tpy for the five year phase-in period. The letter B represents the benefits we are not able to quantify in this analysis and are discussed in section 8 of this report. Given the short time frame of the impact of this final rule, we did not consider the time value of money or discount the benefit and cost estimates provided in this report, rather we assume these benefit and cost estimates are occurring currently. All benefit dollar estimates shown are based upon 2007\$.

Table 3.3 Step 1 and 2 PSD Regulatory Relief (Avoided Costs) for Sources of GHG and Permitting Authorities at Alternative Thresholds[1,2]

Activity	Regulatory Relief for Step 1 and 2 Phase-in Period (January 2, 2011 through July 1, 2013) Regulatory Alternatives (Avoided Permitting Costs in millions 2007$)						
	25,000 CO2e tpy	50,000 CO2e tpy	100,000 CO2e tpy	Anyway Threshold	Anyway/50,000	Anyway/25,000	**Final Rule** Anyway/100,000
Sources							
New Industrial	$3,569.8	$5,110.5	$5,320.0	$5,513.3	$5,191.1	$3,958.5	$5,358.7
New Commercial/Residential	$8,199.3	$8,204.5	$8,208.0	$8,208.8	$8,205.4	$8,201.2	$8,208.2
Source Total	$11,769.0	$13,315.0	$13,528.0	$13,722.0	$13,396.4	$12,159.6	$13,566.8
Permitting Authority							
New Industrial	$981.5	$1,405.3	$1,462.8	$1,516.0	$1,427.4	$1,088.4	$1,473.4
New Commercial/Residential	$2,247.8	$2,249.3	$2,250.3	$2,250.3	$2,249.5	$2,248.3	$2,250.3
Permitting Authority Total	$3,229.3	$3,654.5	$3,713.0	$3,766.3	$3,676.9	$3,336.7	$3,723.7
Total PSD Regulatory Relief	$14,998.3	$16,969.5	$17,241.0	$17,488.3	$17,073.3	$15,496.3	$17,290.5

Benefits are regulatory relief or avoided costs for sources with the potential to emit below the thresholds shown.

[1] Avoided costs shown represent the 2½ year estimates of the regulatory burden relief from this rule and for regulatory alternatives for Steps 1 and 2 of the phase-in period January 2, 2011 through July 1, 2013. Alternatives 25,000 CO2e tpy, 50,000 CO2e tpy, 100,000 CO2e tpy, and 'anyway' assume these thresholds remain in effect for 2½ years. Alternatives Anyway/50,000 and Anyway/25,000 assume the Anyway threshold for Step 1 and 50,000 CO2e tpy and 25,000 CO2e tpy thresholds for Step 2, respectively. Finally the final rule estimates shown in the last column of the table show the Anyway threshold for Step 1 (one half year), and the 100,000 CO2e tpy threshold for Step 2 (two years). Sums may not add due to rounding.

[2] Attachment C: "Summary of Methodology and Data Used to Estimate Burden Relief and Evaluate Resource Requirements at Alternative Greenhouse Gas Permitting Thresholds."

Table 3.4 Benefits of the Final Rule and Step 3 Regulatory Alternatives

Benefits for the Five Year Period Beginning January 2, 2011	Regulatory Alternative (millions 2007$)	
	Final Rule + Possible Step 3 of	
	100, 000 tpy CO2e[3]	50, 000 tpy CO2e[4]
Benefits - Regulatory Relief		
Sources		
Title V[1]	$247,253.6	$247,145.3
PSD[2]	$27,094.7	$26,881.8
Total Source Regulatory Relief	$274,348.3	$274,027.1
Permitting Authority		
Title V[1]	$105,368.5	$105,318.8
PSD[2]	$7,436.61	$7,378.1
Total Permitting Authority	$112,805.1	$112,696.8
Total Regulatory Relief	$387,153.4+*B*	$386,724.1+*B*

Benefits are regulatory relief for sources with the potential to emit below the thresholds shown.
B - unquantified benefits of the rule include regulatory relief from BACT requirements for PSD sources
1Reflects estimates of regulatory relief or avoided permit burden costs for title V GHG sources and permitting authorities.
2 Shows estimates of regulatory relief or avoided permit burden costs for GHG PSD sources and permitting authorities.
3 Includes ½ year of Step 1 (anyway threshold), 4½ years of Step 2 (100,000 threshold),
4 Includes ½ year of Step 1 (anyway threshold), 2 years of Step 2 (100,000 threshold), and 2½ years of Step 3 alternative of 50,000.

Section 4
Social Costs

EPA examined the social costs of this final rule. For this rule, the social costs represent the foregone environmental benefits that would occur if regulatory relief was not offered to small sources of GHG emissions. This action is one of regulatory relief since it increases the emissions thresholds for the title V and PSD programs, as they apply to sources of GHG, to levels above those in the CAA. Previous sections have discussed the avoided cost of such relief, but there is also a social cost imposed by such relief because this rule may forego some of the possible benefits associated with title V and PSD programs for sources of GHG emissions below Step 1 and 2 phase-in thresholds but above the statutory 100/250 tpy levels. These benefits are those attributed to title V and PSD permitting programs in general. These benefits are based on the relevance of these programs to policymaking, transparency issues, and market efficiency and, therefore, are very difficult to quantify and monetize. For title V, they include the benefits of improved compliance with CAA requirements that stem from (1) improved clarity regarding applicability of requirements; (2) discovery and required correction of noncompliance prior to receiving a permit; (3) improving monitoring, recordkeeping, and reporting concerning compliance status; (4) self-certification of compliance with applicable requirements initially and annually, and prompt reporting of deviations from permit requirements; (5) enhanced opportunity for the public to understand and monitor sources' compliance obligations; and (6) improved ability of EPA, permitting authorities, and the public to enforce CAA requirements.

However, it is important to remember that a title V permit does not add new requirements for pollution control itself but rather collects all of a facility's applicable requirements under the CAA in one permit. Therefore, the compliance benefits above are less when title V permits contain few or no CAA applicable requirements. During the first two steps of this phase-in period, we expect that the vast majority of sources excluded from title V would be sources that have no CAA applicable requirements for GHG emissions and few or no requirements for other pollutants because their emissions of those pollutants are so small. For this reason, although it is extremely difficult to measure the degree of improved compliance, if any, that would be foregone or to quantify the social costs that would be imposed, we expect that they would be negligible.

For PSD, the primary social cost imposed by the tailoring rule stems from the foregone benefit of applying BACT to the tens of thousands of small new sources and modifications that will be below our thresholds during the first phase. This social cost potentially weighs against the cost savings described above that stem (in part) from avoiding the administrative and control costs of applying BACT to these sources. The BACT requirement ensures that when new and modified sources increase their emissions they are using state-of-the-art emission controls and afford the public an opportunity to comment on the control decision. It does not prohibit increases, but it ensures that such controls are applied. Delaying the BACT requirement for numerous small sources during the first phase of this rule could allow increases from these smaller sources that are greater than they would be if BACT were applied. A detailed analysis of this difference is beyond the scope of this rule because we do not have detailed information on the universe of these tens of thousands of small PSD actions, the candidate BACT technologies for each of them, how permitting authorities would make the BACT decisions, and how the BACT limit would compare to what would otherwise be installed absent BACT. Below we present an illustrative example of how BACT impacts might be determined for sources that would be excluded from review under the tailoring rule. This example illustrates the difficulty in quantifying the social costs of avoided BACT but helps explain the nature of such costs.

To assess the effect of avoided BACT, we would identify the universe of source types that are affected by the tailoring rule. More specifically, we would have to project the number of various source types (within those affected by the tailoring rule) that would actually be constructing or modifying. We have generally characterized these sources as part of the tailoring rule threshold evaluation and have determined a large proportion of these to consist of small commercial and residential sources. This determination was based on rough energy usage data, but to assess BACT, we would require more specific information about the proposed equipment that will actually be emitting GHG (e.g., water heaters, furnaces, cooking equipment, dryers), and more specific characterization would be subject to a very high degree of uncertainty.

Following characterization of new and modified sources, we would need to determine, for each category of source, what GHG control technologies are available for such equipment. For commercial sources, we may have to determine commercial availability of a range of lower emitting processes, more efficient technologies, and other techniques for improving energy efficiency. Next, we would assess affected sources' capital and operating costs of control

options and determine energy and environmental impacts. Finally, we would need to apply judgment (as the permitting authority would do in each case) to select the technology that represented the maximum degree of control taking the costs, energy, and environmental impacts into account.

The social cost component of the impact of foregoing BACT for sources that construct or modify during the first phase would be represented by the difference between the increased emissions that would result from such sources absent BACT and the increase that would be allowed under the BACT requirement. However, although we can point to the existence of such differences, we cannot quantify them (though as explained below we expect that overall they will be very limited in scope and magnitude). Since there has been no regulatory experience with controlling GHG emissions from these sources, and limited permitting experience of any kind with mandatory control requirements on smaller commercial and residential sources, we are not in a position at this point to identify the specific control technologies and quantify this difference to estimate the greater increases that might occur in the absence of applying the BACT process to these sources across the country. In addition, since the PSD BACT review and selection process is implemented on a case-by-case basis, there is additional uncertainty in predicting program-wide reductions because even for similar sources, permitting authorities may ultimately weigh the BACT factors differently and adopt different control measures.

For all these reasons, it is not possible at this time to quantify the social costs of avoided BACT. However, we note that the universe of possible emissions that would be regulated by sources excluded under the tailoring rule is small compared to those that would remain subject to PSD. The sources excluded in the first steps of this phased-in rule comprise only 11 percent of total stationary source GHG emissions, while 68 percent remain subject to regulation. The remaining fraction of stationary GHG source emissions come from sources below statutory CAA thresholds of 100/250 tons per year. Furthermore, we expect the emissions differences due to BACT controls for sources excluded by the tailoring rule to be relatively small because of the lack of available cost-effective capture and control technologies for GHG at such sources that are akin to those that exist for conventional pollutants and large sources, as well as the likelihood that even in the absence of BACT such sources would already be installing relatively efficient GHG technologies to save on fuel costs. Thus, although potential benefits would be foregone by excluding smaller sources from the permitting programs, these benefits are likely to be small.

Under the tailoring rule, we will work during the 6-year period to greatly improve our understanding of both the administrative costs of regulating and the social costs of not regulating smaller sources under PSD and title V, and we will rely on that information to support our future threshold analyses called for under the rule.

Since EPA is unable to quantify these GHG emission reductions foregone at this time because of these uncertainties involved in this estimation, it is also not possible to provide a monetized estimate of the foregone benefits or social costs of this rule. If such emission reductions foregone were quantified, EPA could use the social cost of carbon benefit estimates such as those used in the "Rulemaking to Establish Light Duty Vehicle Greenhouse Gas Emission Standards and Corporate Average Fuel Economy Standards"[6] recently published to compute the dollar value associated with the social costs of this rule. Nonetheless, we expect that the value would be small because, as discussed above, the emissions differences from which this value would be computed are small.

In reaching the decisions for this GHG tailoring rule, EPA recognizes the GHG emissions can remain in the atmosphere for decades to centuries, meaning that their concentrations become well mixed throughout the global atmosphere regardless of emission origin, and their effects on climate are long lasting and significant. A detailed explanation of climate change and its impact on health, society, and the environment is included in EPA's technical support document for the endangerment finding (Docket ID No. EPA-HQ-OAR-2009-0171). EPA recognizes the importance of reducing climate change emissions for all sources of GHG emissions, including those sources afforded regulatory relief in this rule, and plans to address potential emission reductions from these small sources using voluntary and energy efficiency approaches. Elsewhere, we have discussed EPA's interest in continuing to use regulatory and/or nonregulatory tools for reducing emissions from smaller GHG sources because we believe that these tools will likely result in more efficient and cost-effective regulation than would case-by-case permitting.

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[6] U.S. EPA 2010. Rulemaking to Establish Light Duty Vehicle Greenhouse Gas Emission Standards and Corporate Average Fuel Economy Standards. EPA-HQ-OAR-2009-0472. http://www.epa.gov/otaq/climate/regulations/ghg-preamble-regs.pdf.

Section 5
Net Benefits

The net benefits of this GHG tailoring rule represent the difference between the benefits and costs of this rule to society. This section presents the net benefits of the final rule and other regulatory alternatives. As discussed in Section 3, this rule is one of regulatory relief and the benefits to society are estimates the regulatory relief (avoided permit burden costs) to sources and permitting authorities for Steps 1 and 2 of the phase-in period. Within this RIA we are providing an illustrative monetary estimate of statutory permitting requirements to show the magnitude of the savings that hypothetically result from this rulemaking. While we believe it is impossible to implement these permit requirements by January 2, 2011 for the reasons laid out in the preamble, it is useful to understand the scale of what the burden may have been. For sake of simplicity, we refer to this illustrative monetary estimate as the monetized benefits of the regulatory relief presented by this rulemaking or regulatory relief benefits for brevity. The social costs of the rule are the foregone environmental benefits in the form of potential GHG emission reductions that could occur during the phase-in period and are discussed in Section 4.

This rulemaking provides regulatory relief for a phase-in period of approximately 5 years to smaller sources of GHG by phasing in the statutory permitting threshold at levels above statutory requirements. This final rule establishes thresholds and PSD significance levels for Steps 1 and 2 of the phase-in period (the 2.5 year period between January 2, 2011 and July 1, 2013), commits to considering a further Step 3, and indicates floor title V and PSD threshold levels from July 1, 2013 through April 30, 2016. While the EPA commits to undertake a rulemaking for a further Step 3, the ultimate outcome for sources of GHG from this additional rulemaking is unknown at this time.

Annual estimates for the final rule Steps 1 and 2 and regulatory alternatives are presented in Table 5.1. As Table 5.1 indicates, the annual net benefits associated with the final rule Step 1 are $77,530.2 million +*B*-*C* and for Step 2 are $77,416.2 +*B*-*C* million annually, where *B* denotes the unquantified benefits and *C* the quantified costs of this final rule. These unquantified benefits and costs are discussed in more detail in the limitations and uncertainties Section 8 of this report. Table 5.2 shows the final rule Steps 1 and 2 with regulatory alternatives for the two and one-half year phase-in period January 2, 2011 through July 1, 2013. The net benefits of the final rule for Steps 1 and 2 are $193,597.5+*B*-*C* million for the two and one-half year period.

Finally, Table 5.3 presents the final rule net benefits with two alternatives for Step 3, one in which Step 3 remains at the Step 2 level of 100, 000 tpy CO_2e and one in which Step 3 becomes the minimum threshold of at least 50,000 tpy CO2e previously discussed. These alternatives for Step 3 bound the net benefit estimates for the entire phase in period. If Step 3 remains at the Step 2 level, net benefits for the five year period are $387,153.4 +*B*-*C* million. This net benefit estimate becomes $386,724.1 +*B*-*C* million if Step 3 becomes the minimum level of 50,000 tpy CO_2e threshold for the five year phase-in period. Given the short time frame of the impact of this final rule, we did not consider the time value of money or discount the benefit and cost estimates provided in this report, rather we assume these benefit and cost estimates are occurring currently. All dollar estimates shown are based upon 2007$.

Table 5.1 Annual Net Benefits for GHG Tailoring Rule Regulatory Alternatives

	Annual Benefits and Costs for Regulatory Alternatives (millions of 2007$)[3]			
	Final Rule Step 1	**Final Rule Step 2**		
	Anyway	**100,000 tpy CO2e**	**50,000 tpy CO2e**	**25,000 tpy CO2e**
Benefits - Regulatory Relief				
Sources				
Title V[1]	$49,457.3	$49,447.4	$49,403.8	$49,334.2
PSD[2]	$5,488.8	$5,411.2	$5,326.0	$4,707.6
Total Source Regulatory Relief	$54,946.1	$54,858.6	$54,729.8	$54,041.8
Permitting Authority				
Title V[1]	$21,077.6	$21,072.4	$21,052.8	$21,014.9
PSD[2]	$1,506.5	$1,485.2	$1,461.8	$1,291.7
Total Permitting Authority	$22,584.1	$22,557.6	$22,514.6	$22,306.6
Total Regulatory Relief	$77,530.2+B	$77,416.2+B	$77,244.4+B	$76,348.4+B
Costs - Foregone GHG Emission Reductions				
Title V & PSD	C	C	C	C
Net Benefits[3]	**$77,530.2+B-C**	**$77,416.2+B-C**	**$77,244.4+B-C**	**$76,348.4+B-C**

Benefits are regulatory relief or avoided permit costs for sources with the annual potential to emit less than the threshold shown.
B - unquantified benefits of the rule include regulatory relief from BACT requirements for PSD sources
C - unquantified social costs of tailoring rule represents economic value of foregone environmental benefits (possible GHG emission reductions) during Step 1 and 2 of the phase in period. Potential foregone GHG emission reductions during the phase-in period are not known at this time. See Section 4 of the RIA for a qualitative discussion of the social costs of the rule.
1Reflects estimates of regulatory relief or avoided permit burden costs for title V GHG sources and permitting authorities.
2 Shows estimates of regulatory relief or avoided permit burden costs for GHG PSD sources and permitting authorities.
3 Totals may not sum due to rounding.

Table 5.2. Net Benefits of the Final GHG Tailoring Rule and Regulatory Alternatives

	Step 1 and 2 Phase-In Period (January 2, 2011- July 1, 2013)						
	Regulatory Alternatives (millions of 2007$)						
	Anyway[3]	**100,000 tpy CO2e[3]**	**50,000 tpy CO2e[3]**	**25,000 tpy CO2e[3]**	**Anyway/50,000[4]**	**Anyway/25,000[5]**	**Final Rule[6]**
Benefits - Regulatory Relief							
Sources							
Title V[1]	$123,643.3	$123,618.5	$123,509.5	$123,335.5	$123,536.3	$123,397.1	$123,623.5
PSD[2]	$13,722.0	$13,528.0	$13,315.0	$11,769.0	$13,396.4	$12,159.6	$13,566.8
Total Source Regulatory Relief	$137,365.3	$137,146.5	$136,824.5	$135,104.5	$136,932.8	$135,556.6	$137,190.3
Permitting Authority							
Title V[1]	$52,694.1	$52,681	$52,631.9	$52,537.3	$52,644.3	$52,568.7	$52,683.6
PSD[2]	$3,766.3	$3,713.0	$3,654.5	$3,229.3	$3,676.8	$3,336.7	$3,723.6
Total Permitting Authority	$56,460.4	$56,393.9	$56,286.3	$55,766.7	$56,321.1	$55,905.4	$56,407.2
Total Regulatory Relief	$193,825.6+*B*	$193,540.4+*B*	$193,110.9+*B*	$190,871.1+*B*	$193,253.9+*B*	$191,462.0+*B*	$193,597.5+*B*
Costs - Foregone GHG Emission Reductions							
Title V & PSD	C	C	C	C	C	C	C
Net Benefits	**$193,825.6+*B*-*C***	**$193,540.4+*B*-*C***	**$193,110.9+*B*-*C***	**$190,871.1+*B*-*C***	**$193,253.9+*B*-*C***	**$191,462.0+*B*-*C***	**$193,597.5+*B*-*C***

Benefits represent regulatory relief for those sources with the annual potential to emit less than the threshold shown.
B - unquantified benefits of the rule include regulatory relief from BACT requirements for PSD sources
C - unquantified social costs of tailoring rule represents economic value of foregone environmental benefits (potential GHG emission reductions) during Step 1 and 2 of the phase in period. Foregone GHG emission reductions are not known at this time. See Section 4 of the RIA for a qualitative discussion of the social costs of the rule.
1Reflects estimates of regulatory relief or avoided permit burden costs for title V GHG sources and permitting authorities.
2 Shows estimates of regulatory relief or avoided permit burden costs for GHG PSD sources and permitting authorities.
3 Shows alternative as single step for the 2½.year phase-in period for 'anyway', 100,000 tpy CO2e, 50,000 tpy CO2e, and 25,000 tpy CO2 e thresholds respectively.
4 Includes Step 1 for one-half year and 50,000 tpy CO2e threshold for two years.
5 Includes Step 1 for one-half year and 25,000 tpy CO2e threshold for two years.
6 Phase-in period for final rule includes 1/2 year of Step 1 ‘anyway’ threshold and 2 years of Step 2 100,000 tpy CO2e threshold.

Table 5.3 Net Benefits of the Final Rule and Step 3 Regulatory Alternatives

	Regulatory Alternatives (millions 2007$)	
	Final Rule + Possible Step 3 (five year period)	
	100, 000 tpy CO2e[3]	**50, 000 tpy CO2e[4]**
Benefits - Regulatory Relief		
Sources		
Title V[1]	$247,253.6	$247,144.1
PSD[2]	$27,094.7	$26,881.8
Total Source Regulatory Relief	$274,348.3	$274,025.9
Permitting Authority		
Title V[1]	$105,368.5	$105,320.2
PSD[2]	$7,436.61	$7,378.1
Total Permitting Authority	$112,805.1	$112,698.2
Total Regulatory Relief	$387,153.4+*B*	$386,724.1+*B*
Costs - Foregone GHG Emission Reductions		
Title V & PSD	*C*	*C*
Net Benefits	**$387,153.4+*B*-*C***	**$386,724.1+*B*-*C***

Benefits are regulatory relief for sources with the annual potential to emit less than the thresholds shown.
B - unquantified benefits of the rule include regulatory relief from BACT requirements for PSD sources
C - unquantified social costs of tailoring rule represents economic value of foregone environmental benefits (potential GHG emission reductions) during Step 1, 2,and 3 of the phase in period.
Foregone GHG emission reductions are not known at this time.
See Section 4 of the RIA for a qualitative discussion of the social costs of the rule.
1Reflects estimates of regulatory relief or avoided permit burden costs for title V GHG sources and permitting authorities.
2 Shows estimates of regulatory relief or avoided permit burden costs for GHG PSD sources and permitting authorities.
3 Includes ½ year of Step 1 (anyway threshold), 2 years of Step 2 (100,000 threshold), and 2½ years of Step 3 (alternative of 100,000 threshold). Covers five year period beginning January 2, 2011.
4 Includes ½ year of Step 1 (anyway threshold), 2 years of Step 2 (100,000 threshold), and 2½ years of Step 3 (alternative of 50,000 threshold). Covers five year period beginning January 2, 2011.

Section 6
Impacts of Regulatory Relief

This final rulemaking does not impose economic impacts on any sources or permitting authorities but should instead be viewed as regulatory relief for smaller GHG emission sources. This RIA illustrates the burden impacts avoided as a result of this rule. The avoided impacts of extending these programs for State, local, and tribal permitting authorities are also reported. To estimate the avoided economic impacts, which include small business impacts, EPA estimated cost-to-sales ratios by comparing the estimated total annualized compliance cost per permit per source avoided to industry average revenues per establishment. EPA also evaluated cost-to-sales ratios by comparing avoided burden costs to revenues of firms at different firm size categories, recognizing that the sources required to comply with these CAA permit provisions during the phase-in period are larger emissions sources and more likely to be large business entities.

6.1 Method for Analyzing Avoided Economic and Small Entity Impacts

EPA used cost-to-sales comparisons to evaluate the potential impacts to sources affected by this rule. Since this regulatory action provides regulatory relief, these cost-to-sales ratios represent the economic impacts that are avoided or postponed for small GHG sources as a result of this rule. For all regulatory actions, EPA must determine whether a rule will have a significant impact on a substantial number of small entities (SISNOSE). This rule provides regulatory relief to small sources and thus does not have a significant impact on a substantial number of small entities. The approach for estimating the postponed or avoided economic impacts and the small entity analysis are the same for this analysis. The steps followed include gathering data to characterize the affected entities by size, selecting and describing the measures and economic impact thresholds used in the analysis, and determining cost-to-sales ratios for the affected industrial, commercial, and residential categories.

6.1.1 Identifying Affected Sectors and Entities

The industrial, commercial, and residential sectors covered by the rule were identified during the development of the cost analysis for the rule. For the industrial sector, these sources are summarized with applicable NAICS codes in Tables 6.0 through 6.3. For commercial and residential sources, the sources are listed in Tables 6.4 through 6.7.

6.1.2 Data Used to Characterize Affected Entities by Size

The Census Bureau's Statistics of U.S. Businesses (SUSB) data provide national information on the distribution of economic variables by industry and size.[7] Specifically, the tables report data for each industry on the number of firms (Table 6.0), number of establishments (Table 6.1), employment (Table 6.2), and receipts (Table 6.3) by enterprise size category in affected sectors. Similar results are shown for commercial and residential sources in Tables 6.4 through 6.7. The census definitions in these data elements are as follows:

- *establishment*: An establishment is a single physical location where business is conducted or where services or industrial operations are performed.
- *employment*: Paid employment consists of full- and part-time employees, including salaried officers and executives of corporations, who were on the payroll in the pay period including March 12. Included are employees on sick leave, holidays, and vacations; not included are proprietors and partners of unincorporated businesses.
- *receipts*: Receipts (net of taxes) are defined as the revenue for goods produced, distributed, or services provided, including revenue earned from premiums, commissions and fees, rents, interest, dividends, and royalties. Receipts exclude all revenue collected for local, state, and federal taxes.
- *enterprise*: An enterprise is a business organization consisting of one or more domestic establishments that were specified under common ownership or control. The enterprise and the establishment are the same for single-establishment firms. Each multiestablishment company forms one enterprise—the enterprise employment and annual payroll are summed from the associated establishments. Enterprise size designations are determined by the summed employment of all associated establishments.[8]

The SBA small business size standard(s) is provided for each industry group in order to facilitate comparisons and different thresholds.

The receipt data are reported in 2002 dollars. Therefore, to adjust to 2007 dollars for comparison to costs, EPA used the U.S. Bureau of Labor Statistics' consumer price index (CPI). Using the annual U.S. city average price index for all consumer goods, EPA adjusted revenues to 2007 dollars.

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[7] These data were developed in cooperation with, and partially funded by, the Office of Advocacy of the Small Business Administration (SBA).

[8] Because the SBA's business size definitions (SBA, 2008c) apply to an establishment's "ultimate parent company," we assume in this analysis that the "enterprise" definition above is consistent with the concept of ultimate parent company that is typically used for Small Business Regulatory Enforcement Fairness Act (SBREFA) screening analyses and the terms are used interchangeably.

Table 6.0. Number of Firms by Industry and Enterprise Size: 2002

Sector	Source Category	NAICS	SBA Size Standard	Total Firms	<20 Employees	20 to 99 Employees	100 to 499 Employees	500 to 749 Employees	750 to 999 Employees	1,000 to 1,499 Employees
Electricity Generating Units	Electricity Generating Units	22	[1]	7,603	5,636	901	288	26	18	19
Industrial	Adipic Acid Production	325199	1,000	443	157	95	59	16	3	10
Industrial	Aluminum Production	331312	1,000	43	28	2	3	1	1	NA
Industrial	Ammonia Manufacturing	325311	1,000	130	78	18	6	2	1	7
Industrial	Cement Production	327310	750	136	67	21	12	6	3	4
Industrial	Electronics Manufacturing	334	[2]	13,833	7,698	3,291	1,149	150	80	86
Industrial	Ferroalloy Production	331112	750	14	3	NA	5	NA	1	1
Industrial	Glass Production	327	500–1,000	11,395	7,108	2,553	590	57	51	32
Industrial	HCFC-22 Production	325120	1,000	87	45	12	8	NA	3	2
Industrial	Hydrogen Production	325120	1,000	87	45	12	8	NA	3	2
Industrial	Iron and Steel Production	331111	1,000	1,135	687	166	53	9	12	11
Industrial	Lead Production	3314	750–1,000	760	384	161	74	14	8	5
Industrial	Lime Manufacturing	327410	500	41	16	10	4	1	2	1
Industrial	Magnesium Production	3314	750–1,000	760	384	161	74	14	8	5
Industrial	Nitric Acid Production	325311	1,000	130	78	18	6	2	1	7
Industrial	Petrochemical Production	3251	500–1,000	1,145	475	277	131	29	14	20
Industrial	Petroleum Refineries	324110	[3]	202	84	24	23	6	3	3
Industrial	Phosphoric Acid Production	325312	500	35	12	5	6	1	NA	2
Industrial	Pulp and Paper Manufacturing	3221	750	338	96	55	72	7	12	12
Industrial	Silicon Carbide Production	327910	500	299	161	94	25	2	NA	NA
Industrial	Soda Ash Manufacturing	325181	1,000	25	10	5	2	NA	1	1
Industrial	Titanium Dioxide Production	325188	1,000	367	139	92	43	11	6	3
Industrial	Zinc Production	3314	750–1,000	760	384	161	74	14	8	5
Industrial	Ethanol Production	325193	1,000	60	19	16	3	1	NA	3
Industrial	Food Processing	311	500–1,000	21,384	13,645	3,935	1,247	147	63	96
Energy	Underground Coal Mines	21211	500	802	387	246	67	6	6	3
Energy	Oil and Natural Gas Systems	211	500	6,317	5,184	354	89	13	11	5

(continued)

Table 6.0. Number of Firms by Industry and Enterprise Size: 2002 (continued)

Sector	Source Category	NAICS	SBA Size Standard	Total Firms	<20 Employees	20 to 99 Employees	100 to 499 Employees	500 to 749 Employees	750 to 999 Employees	1,000 to 1,499 Employees
Energy	Oil and Natural Gas Systems	486	[4]	244	110	22	16	8	3	2
Waste Treatment	Landfills	562	$12.5 million	14,184	10,726	1,616	258	22	11	15
Waste Treatment	MWCs	562	$12.5 million	14,184	10,726	1,616	258	22	11	15

The Census Bureau defines an enterprise as a business organization consisting of one or more domestic establishments that were specified under common ownership or control. The enterprise and the establishment are the same for single-establishment firms. Each multiestablishment company forms one enterprise—the enterprise employment and annual payroll are summed from the associated establishments. Enterprise size designations are determined by the summed employment of all associated establishments.

Since the SBA's business size definitions (http://www.sba.gov/size) apply to an establishment's ultimate parent company, we assume in this analysis that the enterprise definition above is consistent with the concept of ultimate parent company that is typically used for SBREFA screening analyses. SBA size standards as of 8/11/08.

[1] NAICS codes 221111, 221112, 221113, 221119, 221121, 221122: A firm is small if, including its affiliates, it is primarily engaged in the generation, transmission, and/or distribution of electric energy for sale and its total electric output for the preceding fiscal year did not exceed 4 million megawatt hours.

[2] NAICS Subsectors 333, 334, 335 and 336: For rebuilding machinery or equipment on a factory basis, or equivalent, use the NAICS code for a newly manufactured product. Concerns performing major rebuilding or overhaul activities do not necessarily have to meet the criteria for being a "manufacturer" although the activities may be classified under a manufacturing NAICS code. Ordinary repair services or preservation are not considered rebuilding.

[3] 500 to 1,500. For NAICS code 324110: For purposes of Government procurement, the petroleum refiner must be a concern that has 1,500 employees or fewer or has 125,000 barrels per calendar day or less total Operable Atmospheric Crude Oil Distillation capacity. Capacity includes owned or leased facilities as well as facilities under a processing agreement or an arrangement such as an exchange agreement or a throughput. The total product to be delivered under the contract must be at least 90 percent refined by the successful bidder from either crude oil or bona fide feedstocks.

[4] Subsector 486: Pipeline Transportation (486110 Pipeline Transportation of Crude Oil 1,500, 486210 Pipeline Transportation of Natural Gas $7.0 million, 486910 Pipeline Transportation of Refined Petroleum Products 1,500, 486990 All Other Pipeline Transportation $34.5 million).

Table 6.1. Number of Establishments by Affected Industry and Enterprise Size: 2002

Sector	Source Category	NAICS	SBA Size Standard	Total Establish-ments	<20 Employees	20 to 99 Employees	100 to 499 Employees	500 to 749 Employees	750 to 999 Employees	1,000 to 1,499 Employees
Electricity Generating Units	Electricity Generating Units	22	[1]	18,432	5,715	1,423	1,126	282	144	209
Industrial	Adipic Acid Production	325199	1,000	640	157	99	78	24	4	17
Industrial	Aluminum Production	331312	1,000	50	28	2	4	1	1	NA
Industrial	Ammonia Manufacturing	325311	1,000	157	78	18	15	5	1	12
Industrial	Cement Production	327310	750	253	67	29	22	11	9	20
Industrial	Electronics Manufacturing	334	[2]	15,883	7,709	3,435	1,497	282	130	174
Industrial	Ferroalloy Production	331112	750	17	3	NA	7	NA	1	1
Industrial	Glass Production	327	500–1,000	16,674	7,161	3,302	1,788	306	438	337
Industrial	HCFC-22 Production	325120	1,000	551	45	20	20	NA	30	55
Industrial	Hydrogen Production	325120	1,000	551	45	20	20	NA	30	55
Industrial	Iron and Steel Production	331111	1,000	1,242	690	169	62	9	19	18
Industrial	Lead Production	3314	750–1,000	958	386	174	108	24	14	11
Industrial	Lime Manufacturing	327410	500	77	18	13	6	7	19	4
Industrial	Magnesium Production	3314	750–1,000	958	386	174	108	24	14	11
Industrial	Nitric Acid Production	325311	1,000	157	78	18	15	5	1	12
Industrial	Petrochemical Production	3251	500–1,000	2,287	478	316	231	68	63	97
Industrial	Petroleum Refineries	324110	[3]	349	85	29	28	10	7	3
Industrial	Phosphoric Acid Production	325312	500	50	12	5	6	2	NA	2
Industrial	Pulp and Paper Manufacturing	3221	750	628	97	55	88	13	34	21
Industrial	Silicon Carbide Production	327910	500	347	161	100	42	2	NA	NA
Industrial	Soda Ash Manufacturing	325181	1,000	38	10	5	4	NA	1	1
Industrial	Titanium Dioxide Production	325188	1,000	611	141	111	69	38	25	6
Industrial	Zinc Production	3314	750–1,000	958	386	174	108	24	14	11
Industrial	Ethanol Production	325193	1,000	66	20	16	5	1	NA	4
Industrial	Food Processing	311	500–1,000	25,698	13,719	4,254	1,951	370	211	319
Energy	Underground Coal Mines	21211	500	1,194	390	279	138	23	20	24

(continued)

Table 6.1. Number of Establishments by Affected Industry and Enterprise Size: 2002 (continued)

Sector	Source Category	NAICS	SBA Size Standard	Total Establish-ments	<20 Employees	20 to 99 Employees	100 to 499 Employees	500 to 749 Employees	750 to 999 Employees	1,000 to 1,499 Employees
Energy	Oil and Natural Gas Systems	211	500	7,629	5,239	456	292	60	64	31
Energy	Oil and Natural Gas Systems	486	[4]	2,701	110	59	79	115	5	42
Waste Treatment	Landfills	562	$12.5 million	17,698	10,775	1,839	612	86	63	58
Waste Treatment	MWCs	562	$12.5 million	17,698	10,775	1,839	612	86	63	58

The Census Bureau defines an enterprise as a business organization consisting of one or more domestic establishments that were specified under common ownership or control. The enterprise and the establishment are the same for single-establishment firms. Each multiestablishment company forms one enterprise—the enterprise employment and annual payroll are summed from the associated establishments. Enterprise size designations are determined by the summed employment of all associated establishments.

Since the SBA's business size definitions (http://www.sba.gov/size) apply to an establishment's ultimate parent company, we assume in this analysis that the enterprise definition above is consistent with the concept of ultimate parent company that is typically used for SBREFA screening analyses. SBA Small Entity standards as of 8/11/08.

[1] NAICS codes 221111, 221112, 221113, 221119, 221121, 221122: A firm is small if, including its affiliates, it is primarily engaged in the generation, transmission, and/or distribution of electric energy for sale and its total electric output for the preceding fiscal year did not exceed 4 million megawatt hours.

[2] NAICS Subsectors 333, 334, 335 and 336: For rebuilding machinery or equipment on a factory basis, or equivalent, use the NAICS code for a newly manufactured product. Concerns performing major rebuilding or overhaul activities do not necessarily have to meet the criteria for being a "manufacturer" although the activities may be classified under a manufacturing NAICS code. Ordinary repair services or preservation are not considered rebuilding.

[3] 500 to 1,500. For NAICS code 324110: For purposes of Government procurement, the petroleum refiner must be a concern that has 1,500 employees or fewer and has 125,000 barrels or less per calendar day total Operable Atmospheric Crude Oil Distillation capacity. Capacity includes owned or leased facilities as well as facilities under a processing agreement or an arrangement such as an exchange agreement or a throughput. The total product to be delivered under the contract must be at least 90 percent refined by the successful bidder from either crude oil or bona fide feedstocks.

[4] Subsector 486: Pipeline Transportation (486110 Pipeline Transportation of Crude Oil 1,500, 486210 Pipeline Transportation of Natural Gas $7.0 million, 486910 Pipeline Transportation of Refined Petroleum Products 1,500, 486990 All Other Pipeline Transportation $34.5 million).

Table 6.2. Number of Employees by Affected Industry and Enterprise Size: 2002

Sector	Source Category	NAICS	SBA Size Standard	Total Establish-ments	<20 Employees	20 to 99 Employees	100 to 499 Employees	500 to 749 Employees	750 to 999 Employees	1,000 to 1,499 Employees
Electricity Generating Units	Electricity Generating Units	22	[1]	648,254	24,257	39,391	46,942	12,042	6,519	14,653
Industrial	Adipic Acid Production	325199	1,000	73,342	1,023	2,412	3,232	NA	754	NA
Industrial	Aluminum Production	331312	1,000	10,158	38	NA	NA	NA	NA	NA
Industrial	Ammonia Manufacturing	325311	1,000	4,949	363	210	NA	NA	NA	NA
Industrial	Cement Production	327310	750	16,905	493	418	1,157	NA	NA	2,051
Industrial	Electronics Manufacturing	334	[2]	1,300,411	50,279	139,966	186,772	53,138	33,589	43,361
Industrial	Ferroalloy Production	331112	750	2,266	NA	NA	NA	NA	NA	NA
Industrial	Glass Production	327	500–1,000	475,476	47,315	98,637	85,569	17,516	17,946	17,512
Industrial	HCFC-22 Production	325120	1,000	9,557	88	294	510	NA	NA	NA
Industrial	Hydrogen Production	325120	1,000	9,557	88	294	510	NA	NA	NA
Industrial	Iron and Steel Production	331111	1,000	124,703	1,434	6,235	3,227	1,456	NA	NA
Industrial	Lead Production	3314	750–1,000	64,203	2,421	6,680	10,407	NA	NA	1,337
Industrial	Lime Manufacturing	327410	500	4,393	33	227	NA	NA	NA	NA
Industrial	Magnesium Production	3314	750–1,000	64,203	2,421	6,680	10,407	NA	NA	1,337
Industrial	Nitric Acid Production	325311	1,000	4,949	363	210	NA	NA	NA	NA
Industrial	Petrochemical Production	3251	500–1,000	172,964	3,171	10,392	16,525	5,548	3,354	5,001
Industrial	Petroleum Refineries	324110	[3]	62,132	454	942	2,870	2,903	NA	NA
Industrial	Phosphoric Acid	325312	500	6,288	27	NA	NA	NA	NA	NA
Industrial	Pulp and Paper	3221	750	162,988	537	2,279	12,554	2,782	7,707	7,121
Industrial	Silicon Carbide Production	327910	500	16,079	1,237	3,637	3,536	NA	NA	NA
Industrial	Soda Ash Manufacturing	325181	1,000	4,483	56	NA	NA	NA	NA	NA
Industrial	Titanium Dioxide Production	325188	1,000	49,845	566	881	1,839	NA	NA	NA
Industrial	Zinc Production	3314	750–1,000	64,203	2,421	6,680	10,407	NA	NA	1,337
Industrial	Ethanol Production	325193	1,000	64,203	2,421	6,680	10,407	NA	NA	1,337
Industrial	Food Processing	311	500–1,000	1,735	NA	NA	NA	NA	NA	NA
Energy	Underground Coal Mines	21211	500	1,443,766	85,850	156,158	218,041	67,104	30,099	72,262

(continued)

Table 6.2. Number of Employees by Affected Industry and Enterprise Size: 2002 (continued)

Sector	Source Category	NAICS	SBA Size Standard	Total Establish-ments	<20 Employees	20 to 99 Employees	100 to 499 Employees	500 to 749 Employees	750 to 999 Employees	1,000 to 1,499 Employees
Energy	Oil and Natural Gas Systems	211	500	74,915	2,801	10,205	11,576	NA	1,773	NA
Energy	Oil and Natural Gas Systems	486	[4]	88,280	19,336	12,113	11,656	2,421	3,551	1,061
Waste Treatment	Landfills	562	$12.5 million	300,580	56,529	59,245	37,530	5,122	3,401	3,645
Waste Treatment	MWCs	562	$12.5 million	300,580	56,529	59,245	37,530	5,122	3,401	3,645

The Census Bureau defines an enterprise as a business organization consisting of one or more domestic establishments that were specified under common ownership or control. The enterprise and the establishment are the same for single-establishment firms. Each multi-establishment company forms one enterprise—the enterprise employment and annual payroll are summed from the associated establishments. Enterprise size designations are determined by the summed employment of all associated establishments.

Since the SBA's business size definitions (http://www.sba.gov/size) apply to an establishment's ultimate parent company, we assume in this analysis that the enterprise definition above is consistent with the concept of ultimate parent company that is typically used for SBREFA screening analyses. SBA small entity definitions as of 8/11/08.

[1] NAICS codes 221111, 221112, 221113, 221119, 221121, 221122: A firm is small if, including its affiliates, it is primarily engaged in the generation, transmission, and/or distribution of electric energy for sale and its total electric output for the preceding fiscal year did not exceed 4 million megawatt hours.

[2] NAICS Subsectors 333, 334, 335 and 336: For rebuilding machinery or equipment on a factory basis, or equivalent, use the NAICS code for a newly manufactured product. Concerns performing major rebuilding or overhaul activities do not necessarily have to meet the criteria for being a "manufacturer" although the activities may be classified under a manufacturing NAICS code. Ordinary repair services or preservation are not considered rebuilding.

[3] 500 to 1,500. For NAICS code 324110: For purposes of Government procurement, the petroleum refiner must be a concern that has 1,500 employees or fewer or 125,000 barrels or less per calendar day total Operable Atmospheric Crude Oil Distillation capacity. Capacity includes owned or leased facilities as well as facilities under a processing agreement or an arrangement such as an exchange agreement or a throughput. The total product to be delivered under the contract must be at least 90 percent refined by the successful bidder from either crude oil or bona fide feedstocks.

[4] Subsector 486: Pipeline Transportation (486110 Pipeline Transportation of Crude Oil 1,500, 486210 Pipeline Transportation of Natural Gas $7.0 million, 486910 Pipeline Transportation of Refined Petroleum Products 1,500, 486990 All Other Pipeline Transportation $34.5 million).

Table 6.3. Receipts by Industry and Enterprise Size: 2002 (in millions of 2007$)

Sector	Source Category	NAICS	SBA Size Standard	Total Receipts ($)	<20 Employees	20 to 99 Employees	100 to 499 Employees	500 to 749 Employees	750 to 999 Employees	1,000 to 1,499 Employees
Electricity Generating Units	Electricity Generating Units	22	[1]	456,494	10,324	28,259	29,111	8,522	5,211	11,027
Industrial	Adipic Acid Production	325199	1,000	54,024	437	880	2,117	NA	984	NA
Industrial	Aluminum Production	331312	1,000	4,165	7	NA	NA	NA	NA	NA
Industrial	Ammonia Manufacturing	325311	1,000	3,844	152	60	NA	NA	NA	NA
Industrial	Cement Production	327310	750	8,358	207	120	526	NA	NA	992
Industrial	Electronics Manufacturing	334	[2]	437,886	9,887	26,268	41,653	14,340	8,589	12,994
Industrial	Ferroalloy Production	331112	750	1,008	NA	NA	NA	NA	NA	NA
Industrial	Glass Production	327	500–1,000	110,002	7,430	17,700	16,967	4,154	4,000	4,366
Industrial	HCFC-22 Production	325120	1,000	6,662	25	337	82	NA	NA	NA
Industrial	Hydrogen Production	325120	1,000	6,662	25	337	82	NA	NA	NA
Industrial	Iron and Steel Production	331111	1,000	54,363	275	1,237	1,192	639	NA	NA
Industrial	Lead Production	3314	750–1,000	24,584	582	2,391	3,007	NA	NA	364
Industrial	Lime Manufacturing	327410	500	1,173	7	64	NA	NA	NA	NA
Industrial	Magnesium Production	3314	750–1,000	24,584	582	2,391	3,007	NA	NA	364
Industrial	Nitric Acid Production	325311	1,000	3,844	152	60	NA	NA	NA	NA
Industrial	Petrochemical Production	3251	500–1,000	123,343	1,603	4,722	7,974	3,990	2,048	3,819
Industrial	Petroleum Refineries	324110	[3]	225,612	538	2,903	5,186	10,094	NA	NA
Industrial	Phosphoric Acid Production	325312	500	4,607	7	NA	NA	NA	NA	NA
Industrial	Pulp and Paper Manufacturing	3221	750	81,766	146	719	5,269	805	3,294	2,833
Industrial	Silicon Carbide Production	327910	500	3,861	206	561	715	NA	NA	NA
Industrial	Soda Ash Manufacturing	325181	1,000	2,386	12	NA	NA	NA	NA	NA
Industrial	Titanium Dioxide Production	325188	1,000	18,803	199	267	685	NA	NA	NA
Industrial	Zinc Production	3314	750–1000	24,584	582	2,391	3,007	NA	NA	364
Industrial	Ethanol Production	325193	1,000	2,416	NA	NA	NA	NA	NA	NA
Industrial	Food Processing	311	500–1000	527,312	14,597	37,198	65,304	26,627	11,533	25,216

(continued)

Table 6.3. Receipts by Industry and Enterprise Size: 2002 (in Millions of 2007$) (continued)

Sector	Source Category	NAICS	SBA Size Standard	Total Receipts ($)	<20 Employees	20 to 99 Employees	100 to 499 Employees	500 to 749 Employees	750 to 999 Employees	1,000 to 1,499 Employees
Energy	Underground Coal Mines	21211	500	22,873	501	2,415	3,328	NA	506	NA
Energy	Oil and Natural Gas Systems	211	500	185,420	8,465	7,826	11,075	5,312	4,600	3,233
Energy	Oil and Natural Gas Systems	486	[4]	51,926	1,163	158	258	NA	NA	NA
Waste Treatment	Landfills	562	$12.5 million	55,557	7,451	8,366	5,940	965	858	586
Waste Treatment	MWCs	562	$12.5 million	55,557	7,451	8,366	5,940	965	858	586

The Census Bureau defines an enterprise as a business organization consisting of one or more domestic establishments that were specified under common ownership or control. The enterprise and the establishment are the same for single-establishment firms. Each multi-establishment company forms one enterprise—the enterprise employment and annual payroll are summed from the associated establishments. Enterprise size designations are determined by the summed employment of all associated establishments.

Since the SBA's business size definitions (http://www.sba.gov/size) apply to an establishment's ultimate parent company, we assume in this analysis that the enterprise definition above is consistent with the concept of ultimate parent company that is typically used for SBREFA screening analyses. SBA Small Business categorization as of 8/11/08.

[1] NAICS codes 221111, 221112, 221113, 221119, 221121, 221122: A firm is small if, including its affiliates, it is primarily engaged in the generation, transmission, and/or distribution of electric energy for sale and its total electric output for the preceding fiscal year did not exceed 4 million megawatt hours.

[2] NAICS Subsectors 333, 334, 335 and 336: For rebuilding machinery or equipment on a factory basis, or equivalent, use the NAICS code for a newly manufactured product. Concerns performing major rebuilding or overhaul activities do not necessarily have to meet the criteria for being a "manufacturer" although the activities may be classified under a manufacturing NAICS code. Ordinary repair services or preservation are not considered rebuilding.

[3] 500 to 1,500. For NAICS code 324110: For purposes of Government procurement, the petroleum refiner must be a concern that has 1,500 employees or fewer and 125,000 barrels or less per calendar day total Operable Atmospheric Crude Oil Distillation capacity. Capacity includes owned or leased facilities as well as facilities under a processing agreement or an arrangement such as an exchange agreement or a throughput. The total product to be delivered under the contract must be at least 90 percent refined by the successful bidder from either crude oil or bona fide feedstocks.

[4] Subsector 486: Pipeline Transportation (486110 Pipeline Transportation of Crude Oil 1,500, 486210 Pipeline Transportation of Natural Gas $7.0 million, 486910 Pipeline Transportation of Refined Petroleum Products 1,500, 486990 All Other Pipeline Transportation $34.5 million)

Table 6.4. Number of Firms by Affected Industry and Enterprise Size in Commercial Sectors: 2002

Sector	Source Category	NAICS	SBA Size Standard in Millions of Dollars	Total Firms	<20 Employees	20 to 99 Employees	100 to 499 Employees	500 to 749 Employees	750 to 999 Employees	1,000 to 1,499 Employees
Commercial	Education	61	$7.035.0	65,933	40,824	12,379	3,071	289	174	187
Commercial	Enclosed Mall	531120	7.0	28,241	22,509	1,077	329	43	32	30
Commercial	Food Sales			NA	NA	NA	NA	NA	NA	NA
Commercial	Food Service	722	7.020.5	376,637	248,494	67,549	6,629	447	191	223
Commercial	Inpatient Health C are	622	34.5	4,548	427	487	1,590	384	237	333
Commercial	Laboratory	541380	12.0	4,708	3,335	680	148	22	6	12
Commercial	Laboratory	5417	7.0	11,418	7,365	1,478	532	72	29	39
Commercial	Lodging	721	7.0	51,168	33,326	7,968	1,428	135	70	77
Commercial	Nonrefrigerated Warehouse	49311	25.5	3,152	2,005	514	199	15	10	19
Commercial	Nursing	623	7.013.5	32,720	14,632	8,486	5,836	418	179	174
Commercial	Office	531120	7.0	28,241	22,509	1,077	329	43	32	30
Commercial	Other	81	7.025.0	675,218	568,285	41,363	4,449	290	164	165
Commercial	Outpatient Health Care	621	7.034.5	424,694	351,540	27,991	4,699	428	216	238
Commercial	Public Assembly	71	7.0	103,043	64,915	12,227	2,292	153	82	95
Commercial	Public Order and Safety			NA	NA	NA	NA	NA	NA	NA
Commercial	Refrigerated Warehouse	49312	25.5	608	358	138	34	3	2	4
Commercial	Religious Worship	813110	7.0	172,311	147,505	15,942	1,213	39	21	19
Commercial	Retail Other than Mall	44-45	7.029.0	736,130	579,905	59,639	8,723	577	289	338
Commercial	Service	81	7.025.0	675,218	568,285	41,363	4,449	290	164	165
Commercial	Strip Shopping Mall	531120	7.0	28,241	22,509	1,077	329	43	32	30
Residential	Residential	531110	7.0	52,190	44,477	1,799	441	55	29	30

The Census Bureau defines an enterprise as a business organization consisting of one or more domestic establishments that were specified under common ownership or control. The enterprise and the establishment are the same for single-establishment firms. Each multi-establishment company forms one enterprise—the enterprise employment and annual payroll are summed from the associated establishments. Enterprise size designations are determined by the summed employment of all associated establishments.

Since the SBA's business size definitions (http://www.sba.gov/size) apply to an establishment's ultimate parent company, we assume in this analysis that the enterprise definition above is consistent with the concept of ultimate parent company that is typically used for SBREFA screening analyses. SBA size categories as of 8/11/08.

Table 6.5. Number of Establishments by Affected Industry and Enterprise Size: 2002

Sector	Source Category	NAICS	SBA Size Standard	Total Firms	<20 Employees	20 to 99 Employees	100 to 499 Employees	500 to 749 Employees	750 to 999 Employees	1,000 to 1,499 Employees
Commercial	Education	61	7.0–35.0	73,701	41,136	13,925	5,604	864	398	501
Commercial	Enclosed Mall	531120	7.0	30,777	22,706	1,313	597	123	180	141
Commercial	Food Sales			NA	NA	NA	NA	NA	NA	NA
Commercial	Food Service	722	7.0–20.5	503,354	249,889	79,906	31,769	7,297	4,524	6,819
Commercial	Inpatient Health Care	622	34.5	7,569	441	513	1,725	442	294	420
Commercial	Laboratory	541380	12.0	5,962	3,371	972	488	67	41	195
Commercial	Laboratory	5417	7.0	13,944	7,462	1,836	996	228	112	150
Commercial	Lodging	721	7.0	61,795	33,613	9,057	2,962	761	249	663
Commercial	Nonrefrigerated Warehouse	49311	25.5	4,893	2,057	805	529	311	97	87
Commercial	Nursing	623	7.0–13.5	67,900	14,824	11,701	18,516	3,717	1,898	2,043
Commercial	Office	531120	7.0	30,777	22,706	1,313	597	123	180	141
Commercial	Other	81	7.0–25.0	740,118	573,318	54,021	16,431	2,960	1,850	2,317
Commercial	Outpatient Health Care	621	7.0–34.5	487,747	357,221	41,650	19,182	3,021	2,087	1,933
Commercial	Public Assembly	71	7.0	110,375	65,195	13,408	3,715	566	591	394
Commercial	Public Order and Safety				NA	NA	NA	NA	NA	NA
Commercial	Refrigerated Warehouse	49312	25.5	970	367	204	96	20	13	36
Commercial	Religious Worship	813110	7.0	172,562	147,510	16,009	1,272	115	25	27
Commercial	Retail Other than Mall	44-45	7.0–29.0	1,125,693	594,655	98,116	51,814	12,028	8,897	13,004
Commercial	Service	81	7.0–25.0	740,118	573,318	54,021	16,431	2,960	1,850	2,317
Commercial	Strip Shopping Mall	531120	7.0	30,777	22,706	1,313	597	123	180	141

NA

(continued)

Table 6.5. Number of Establishments by Affected Industry and Enterprise Size: 2002 (continued)

Sector	Source Category	NAICS	SBA Size Standard	Total Firms	<20 Employees	20 to 99 Employees	100 to 499 Employees	500 to 749 Employees	750 to 999 Employees	1,000 to 1,499 Employees
Residential	Residential	531110	7.0	57,748	45,104	2,992	2,491	479	132	205

The Census Bureau defines an enterprise as a business organization consisting of one or more domestic establishments that were specified under common ownership or control. The enterprise and the establishment are the same for single-establishment firms. Each multi-establishment company forms one enterprise—the enterprise employment and annual payroll are summed from the associated establishments. Enterprise size designations are determined by the summed employment of all associated establishments.

Since the SBA's business size definitions (http://www.sba.gov/size) apply to an establishment's ultimate parent company, we assume in this analysis that the enterprise definition above is consistent with the concept of ultimate parent company that is typically used for SBREFA screening analyses. SBA small business categories as of 8/11//08.

Table 6.6. Number of Employees by Affected Industry and Commercial Enterprise Size: 2002

Sector	Source Category	NAICS	SBA Size Standard	Total Establish-ments	<20 Employees	20 to 99 Employees	100 to 499 Employees	500 to 749 Employees	750 to 999 Employees	1,000 to 1,499 Employees
Commercial	Education	61	7.0–35.0	2,701,675	223,695	516,135	535,272	148,370	121,656	190,930
Commercial	Enclosed Mall	531120	7.0	163,501	73,311	32,364	22,319	5,066	3,583	4,095
Commercial	Food Sales			NA	NA	NA	NA	NA	NA	NA
Commercial	Food Service	722	7.0–20.5	8,352,174	1,622,740	2,551,714	1,184,119	232,483	134,402	216,606
Commercial	Inpatient Health Care	622	34.5	5,121,584	2,374	30,243	389,501	220,984	192,908	385,312
Commercial	Laboratory	541380	12.0	100,797	18,415	25,714	19,918	3,920	2,677	4,786
Commercial	Laboratory	5417	7.0	399,213	35,669	60,951	84,936	22,983	9,641	15,808
Commercial	Lodging	721	7.0	1,696,701	202,509	292,528	232,976	56,837	37,156	53,296
Commercial	Nonrefrigerated Warehouse	49311	25.5	94,316	11,294	18,392	21,859	3,802	2,144	2,654
Commercial	Nursing	623	7.0–13.5	2,770,665	92,274	409,004	965,200	172,278	91,599	132,119
Commercial	Office	531120	7.0	163,501	73,311	32,364	22,319	5,066	3,583	4,095
Commercial	Other	81	7.0–25.0	5,420,087	2,547,460	1,482,350	640,068	84,297	61,553	74,082
Commercial	Outpatient Health Care	621	7.0–34.5	4,917,156	1,829,546	1,029,355	751,711	134,712	89,264	107,577
Commercial	Public Assembly	71	7.0	1,800,991	315,475	496,962	380,688	65,678	NA	72,282
Commercial	Public Order and Safety			NA	NA	NA	NA	NA	NA	NA
Commercial	Refrigerated Warehouse	49312	25.5	28,100	2,238	5,427	5,010	NA	NA	1,545
Commercial	Religious Worship	813110	7.0	1,638,915	722,630	607,209	197,037	20,211	13,453	14,081
Commercial	Retail Other than Mall	44–45	7.0–29.0	14,819,904	2,889,481	2,204,104	1,267,733	213,518	138,205	200,867
Commercial	Service	81	7.0–25.0	5,420,087	2,547,460	1,482,350	640,068	84,297	61,553	74,082
Commercial	Strip Shopping Mall	531120	7.0	163,501	73,311	32,364	22,319	5,066	3,583	4,095
Residential	Residential	531110	7.0	281,250	152,350	59,796	42,104	7,627	NA	NA

The Census Bureau defines an enterprise as a business organization consisting of one or more domestic establishments that were specified under common ownership or control. The enterprise and the establishment are the same for single-establishment firms. Each multi-establishment company forms one enterprise—the enterprise employment and annual payroll are summed from the associated establishments. Enterprise size designations are determined by the summed employment of all associated establishments.

Since the SBA's business size definitions (http://www.sba.gov/size) apply to an establishment's ultimate parent company, we assume in this analysis that the enterprise definition above is consistent with the concept of ultimate parent company that is typically used for SBREFA screening analyses. SBA small business sizes as of 8/11/08.

Table 6.7. Receipts by Affected Industry and Enterprise Size: 2002 (Millions of 2007 $)

Sector	Source Category	NAICS	SBA Size Standard in Millions of Dollars	Total Receipts	<20 Employees	20 to 99 Employees	100 to 499 Employees	500 to 749 Employees	750 to 999 Employees	1,000 to 1,499 Employees
Commercial	Education	61	7.0–35.0	207,779	15,586	30,849	38,207	10,456	7,620	11,997
Commercial	Enclosed Mall	531120	7.0	52,796	21,467	8,090	6,609	2,148	2,145	3,281
Commercial	Food Sales			NA	NA	NA	NA	NA	NA	NA
Commercial	Food Service	722	7.0–20.5	373,666	79,827	98,916	49,500	9,774	5,742	9,036
Commercial	Inpatient Health Care	622	34.5	575,286	845	2,892	33,554	20,075	18,448	41,167
Commercial	Laboratory	541380	12.0	11,854	2,018	2,763	2,091	478	319	574
Commercial	Laboratory	5417	7.0	72,013	6,419	10,785	15,439	4,422	1,942	2,802
Commercial	Lodging	721	7.0	141,193	15,159	18,413	15,047	4,287	2,869	4,431
Commercial	Nonrefrigerated Warehouse	49311	25.5	10,705	1,546	2,199	2,281	508	286	301
Commercial	Nursing	623	7.0–13.5	145,529	4,624	18,714	49,332	9,058	4,989	7,319
Commercial	Office	531120	7.0	52,796	21,467	8,090	6,609	2,148	2,145	3,281
Commercial	Other	81	7.0–25.0	491,097	215,897	120,283	67,821	10,225	5,946	5,999
Commercial	Outpatient Health Care	621	7.0–34.5	582,829	229,611	118,216	73,667	12,923	8,277	10,556
Commercial	Public Assembly	71	7.0	170,062	35,446	31,146	35,130	6,972	NA	7,610
Commercial	Public Order and Safety	NA	NA	NA	NA	NA	NA	NA	NA	NA
Commercial	Refrigerated Warehouse	49312	25.5	4,889	325	765	586	NA	NA	233
Commercial	Religious Worship	813110	7.0	95,558	37,076	34,178	13,933	1,681	1,165	1,025
Commercial	Retail Other than Mall	44–45	7.0–29.0	3,612,583	577,700	662,037	441,243	65,923	34,570	49,386
Commercial	Service	81	7.0–25.0	491,097	215,897	120,283	67,821	10,225	5,946	5,999
Commercial	Strip Shopping Mall	531120	7.0	52,796	21,467	8,090	6,609	2,148	2,145	3,281
Residential	Residential	531110	7.0	57,365	32,327	9,943	6,854	1,366	NA	NA

The Census Bureau defines an enterprise as a business organization consisting of one or more domestic establishments that were specified under common ownership or control. The enterprise and the establishment are the same for single-establishment firms. Each multi-establishment company forms one enterprise—the enterprise employment and annual payroll are summed from the associated establishments. Enterprise size designations are determined by the summed employment of all associated establishments.

Since the SBA's business size definitions (http://www.sba.gov/size) apply to an establishment's ultimate parent company, we assume in this analysis that the enterprise definition above is consistent with the concept of ultimate parent company that is typically used for SBREFA screening analyses. SBA small business sizes as of 8/11.08.

Because the SBA's business size definitions (SBA, 2008c) apply to an establishment's "ultimate parent company," we assume in this analysis that the "enterprise" definition above is consistent with the concept of ultimate parent company that is typically used for SBREFA screening analyses, and the terms are used interchangeably. We also report the SBA size standard(s) for each industry group to facilitate comparisons and different thresholds.

6.2 Developing Economic and Small Entity Regulatory Relief Impact Measures

We measured the postponed impacts of the rule on small entities in each sector using methods presented in EPA's Final SBREFA Guidance (EPA, 2006). Because the rule covers a large number of sectors and primarily covers businesses, the analysis generated a set of sales tests (represented as cost-to-receipt ratios)[9] for NAICS codes associated with the affected sectors. Although the appropriate SBA size definition should be applied at the parent company (enterprise) level, data limitations allowed us only to compute and compare ratios for a *model establishment* for six *enterprise size* ranges (i.e., all categories, enterprises with 1 to 20 employees, 20 to 99 employees, 100 to 499 employees, 500 to 999 employees, and 1,000 to 1,499 employees). This approach allowed us to account for differences in establishment receipts between large and small enterprises and differences in small business definitions across affected industries. It is also a conservative approach, because an establishment's parent company (the "enterprise") may have other economic resources that could be used to cover the costs of the reporting program.

6.3 Implementing the Sales Test to Measure Impacts on Industrial, Commercial, and Multifamily Residential Sources

To implement the recommended sales test, EPA computed cost-to-sales ratios for affected sectors at the establishment (or facility) level.[10] The ratios examine the ratio of the average

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[9] The following metrics for other small entity economic impact measures (if applicable) would potentially include

- Small governments (if applicable): "Revenue" test—annualized compliance cost as a percentage of annual government revenues
- Small nonprofits (if applicable): "Expenditure" test—annualized compliance cost as a percentage of annual operating expenses

[10] Typically, SBREFA impact assessments are conducted at the ultimate parent company level. As noted above, we assume that Census definition of enterprise is equivalent to ultimate parent company. Theoretically, the comparison of compliance costs to sales should be conducted at the enterprise level. Because Census only provides data for typical establishments within various enterprise size categories, EPA chose to compute the cost-to-sales ratio at the establishment (or facility level). The same ratio could be computed at the enterprise level by multiplying both the numerator and the denominator by the typical number of establishments per enterprise in

establishment's total annualized mandatory reporting costs to the average establishment receipts for enterprises within several employment categories.[11] The average entity costs used to compute the sales test are the same across all of these enterprise size categories. As a result, the sales test will overstate the cost-to-receipt ratio for establishments owned by small businesses, because the reporting costs are likely lower than average entity estimates provided by the engineering cost analysis.

Cost-to-sales ratios for industrial categories are reported in Tables 6.9 through 6.12. Table 6.8 shows impacts avoided for small sources of GHG for title V. In Tables 6.9 and 6.10, impacts avoided for new and modifying PSD sources, respectively, are presented. Table 6.11 shows the avoided costs compared to sales for title V permitting. These ratios are calculated using data on the average avoided cost of compliance per facility and data on the average sales per establishment obtained from the Census Bureau. Cost-to-sales or revenue ratios for commercial and residential categories are reported in Tables 6.12 through 6.14. Table 6.12 shows impacts avoided for small commercial and residential sources of GHG for title V. Tables 6.13 and 6.14 show impacts avoided for modifying and new PSD commercial and residential sources, respectively.

The burden avoided per-entity costs of the rule are shown in Table 3.0 for title V. The avoided burden cost associated with obtaining an operating permit is $46.4 thousand per source for industrial sources of GHG emissions and approximately $23 thousand for commercial and residential sources. An avoided cost of $1,677 is estimated for sources requiring title V permitting revision. For modifying PSD sources, the avoided burden costs with obtaining a permit is $84.5 thousand per source for industrial sources of GHG emissions and approximately $59 thousand per source for commercial and residential sources. Finally, for new PSD sources, the avoided burden costs are the sum of the avoided title V and modifying PSD costs. Thus, the avoided burden costs are approximately $130.8 thousand per source for new industrial sources of GHG emissions and approximately $82 thousand per source for new commercial and residential sources.

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the appropriate enterprise size categories. Using the SUSB data on typical establishments means that the cost-to-sales ratios are identical, whether computed at the establishment level or at the enterprise level.

[11] For the one to 20 employee category, we excluded SUSB data for enterprises with zero employees. These enterprises did not operate the entire year.

The cost-to-sales estimates show that the avoided costs for industrial sources typically are zero up to 1.5 percent of their sales, but they can be as high as 19 percent for certain sources (e.g., aluminum plants with less than 20 employees). For PSD, the avoided ICR cost-to-sales ratios range from zero to 2.7 percent for modifying and from zero to 4.2 percent of sales for new industrial sources. These avoided cost-to-sales ratio for PSD do not consider avoided BACT costs due to lack of sufficient data currently.

For commercial sources, the average avoided cost to sales ratios range from 0.5 to 4.2 percent for title V. These average avoided cost-to-sales ranges increase for PSD to approximately from 1.2 to 10.7 percent of their sales or revenues for modifying commercial and multifamily residential sources and 1.6 to 14.9 for new commercial and residential PSD sources.

6.4 Economic Relief to Permitting Authorities

In this final rule, the thresholds for requiring title V and PSD permits are increased above statutory CAA levels resulting in millions of potential title V sources and tens of thousands of new and modifying PSD sources being able to postpone obtaining a permit for a phase-in period of about 5 years. This action will provide significant regulatory relief to States, local government, and tribal permitting authorities. The magnitude of permits that would need to be addressed and the dollar estimate of the additional costs in labor and administrative costs permitting authorities would otherwise incur if GHG are a regulated pollutant absent this rulemaking are shown in Tables 3.0 and 3.2 in Section 3.

For title V permits, permitting authorities will experience avoided costs of approximately $21 billion relating to approximately 2 million new operating permits annually that otherwise would need to be processed. Although this administrative burden represents a huge burden to these agencies, Part 70 of the CAA does provide for a mechanism for the affected permitting authorities to recoup the costs of operation associated with administering this expanded permit program. EPA recognizes in this tailoring rule that the sheer magnitude and burden of these additional small GHG sources cannot feasibly be met by these permitting authorities on administrative burden grounds for a period of at least 5 years regardless of the ability to include these increased costs in fees charged to sources. However, the economic consequences to permitting authorities of this permitting program are offset in the fee structure these authorities are allowed to charge sources obtaining title V permits.

For PSD permitting authorities, no such mitigating fee structure currently exists. Thus, the funding for administering a PSD permitting program to include tens of thousands of additional new and modifying PSD sources annually would need to be met by these permitting authorities from current revenue sources. At present, there are approximately 58 State, local, and tribal PSD permitting programs operating in the United States and approximately 49 additional State, local, or tribal government authorities that are administering federal programs under delegation from EPA. It is difficult to estimate the economic consequences of the regulatory relief afforded to the individual permitting authorities, because the number of PSD permits processed each year varies by permitting authority over time depending on the number of new and modifying sources occurring in a given location. However, the National Association of Clean Air Agencies (NACAA) has, through a member survey, broadly assessed the additional resource and burden considerations of EPA treating GHG as a regulated pollutant. NACAA provided this information to EPA to help improve our understanding of agencies' burdens.[12] Under the current PSD program requirements, these permitting authorities process an average of 8 PSD permits for new and modifying sources each year (range of 0 to 56 for individual respondents). These surveyed permitting authorities indicate they would need an average of 12 new full-time employees (range of 1 to 63) costing an average of $1.1 million annually (range $60 thousand to $6.3 million) with a 10-fold increase in permits occurring as a result of including GHG as a regulated pollutant. Some of these permitting authorities indicated that hiring new employees is not possible at this time because of budget constraints and hiring freezes. All respondents indicated that new training would be needed to address GHG permitting. Rather than the 10-fold increase in permits postulated in NACAA's survey, EPA estimates the increase would more likely be 100-fold making these estimates a significant understatement of the potential impacts on permitting authorities. For more information about the sources affected by alternative thresholds and currently covered by title V and PSD, see Attachments B and C.

[12] Memorandum from Mary Stewart Douglas NACAA, to Juan E. Santiago, Group Leader, Operating Permits Group, U.S. EPA OAQPS. September 3, 2009.

Table 6.8. Avoided Title V Costs to Sales for Small Industrial Sources of GHG Emissions

Sector	Source Category	NAICS	SBA Size Standard	Average Cost Per Entity (2007$)	Cost per entity for All Establishments (%)	Cost per Entity for <20 Employees (%)	Cost per Entity for 20 to 99 Employees (%)	Cost per Entity 100 to 499 Employees (%)	Cost per Entity for 500 to 749 Employees (%)	Cost per Entity for 750 to 999 Employees (%)	Cost per Entity for 1,000 to 1,499 Employees (%)
Electricity Generating Units	Electricity Generating Units	22	[1]	$46,350	0.2%	2.6%	0.2%	0.2%	0.2%	0.1%	0.1%
Industrial	Adipic Acid Production	325199	1,000	$46,350	0.1%	1.7%	0.5%	0.2%	NA	0.0%	NA
Industrial	Aluminum Production	331312	1,000	$46,350	0.1%	19.0%	NA	NA	NA	NA	NA
Industrial	Ammonia Manufacturing	325311	1,000	$46,350	0.2%	2.4%	1.4%	NA	NA	NA	NA
Industrial	Cement Production	327310	750	$46,350	0.1%	1.5%	1.1%	0.2%	NA	NA	0.1%
Industrial	Electronics Manufacturing	334	[2]	$46,350	0.2%	3.6%	0.6%	0.2%	0.1%	0.1%	0.1%
Industrial	Ferroalloy Production	331112	750	$46,350	0.1%	NA	NA	NA	NA	NA	NA
Industrial	Glass Production	327	500–1,000	$46,350	0.7%	4.5%	0.9%	0.5%	0.3%	0.5%	0.4%
Industrial	HCFC-22 Production	325120	1,000	$46,350	0.4%	8.3%	0.3%	1.1%	NA	NA	NA
Industrial	Hydrogen Production	325120	1,000	$46,350	0.4%	8.3%	0.3%	1.1%	NA	NA	NA
Industrial	Iron and Steel Production	331111	1,000	$46350	0.1%	11.6%	0.6%	0.2%	0.1%	NA	NA
Industrial	Lead Production	3314	750–1,000	$46,350	0.2%	3.1%	0.3%	0.2%	NA	NA	0.1%
Industrial	Lime Manufacturing	327410	500	$46,350	0.3%	12.8%	0.9%	NA	NA	NA	NA
Industrial	Magnesium Production	3314	750–1,000	$46,350	0.2%	3.1%	0.3%	0.2%	NA	NA	0.1%
Industrial	Nitric Acid Production	325311	1,000	$46,350	0.2%	2.4%	1.4%	NA	NA	NA	NA
Industrial	Petrochemical Production	3251	500–1,000	$46,350	0.1%	1.4%	0.3%	0.1%	0.1%	0.1%	0.1%
Industrial	Petroleum Refineries	324110	[3]	$46,350	0.0%	0.7%	0.0%	0.0%	0.0%	NA	NA
Industrial	Phosphoric Acid Production	325312	500	$46,350	0.1%	7.8%	NA	NA	NA	NA	NA
Industrial	Pulp and Paper Manufacturing	3221	750	$46,350	0.0%	3.1%	0.4%	0.1%	0.1%	0.0%	0.0%

(continued)

Table 6.8. Avoided Title V Costs to Sales for Small Industrial Sources of GHG Emissions (continued)

Sector	Source Category	NAICS	SBA Size Standard	Average Cost Per Entity (2007$)	Cost per entity for All Establishments (%)	Cost per Entity for <20 Employees (%)	Cost per Entity for 20 to 99 Employees (%)	Cost per Entity 100 to 499 Employees (%)	Cost per Entity for 500 to 749 Employees (%)	Cost per Entity for 750 to 999 Employees (%)	Cost per Entity for 1,000 to 1,499 Employees (%)
Industrial	Silicon Carbide Production	327910	500	$46,350	0.4%	3.6%	0.8%	0.3%	NA	NA	NA
Industrial	Soda Ash Manufacturing	325181	1,000	$46,350	0.1%	3.8%	NA	NA	NA	NA	NA
Industrial	Titanium Dioxide Production	325188	1,000	$46,350	0.2%	3.3%	1.9%	0.5%	NA	NA	NA
Industrial	Zinc Production	3314	750–1,000	$46,350	0.2%	3.1%	0.3%	0.2%	NA	NA	0.1%
Industrial	Ethanol Production	325193	1,000	$46,350	0.1%	NA	NA	NA	NA	NA	NA
Industrial	Food Processing	311	500–1,000	$46,350	0.2%	4.4%	0.5%	0.1%	0.1%	0.1%	0.1%
Energy	Underground Coal Mines	21211	500	$46,350	0.2%	3.6%	0.5%	0.2%	NA	0.2%	NA
Energy	Oil and Natural Gas Systems	211	500	$46,350	0.2%	2.9%	0.3%	0.1%	0.1%	0.1%	0.0%
Energy	Oil and Natural Gas Systems	486	[4]	$46,350	0.2%	0.4%	1.7%	1.4%	NA	NA	NA
Waste Treatment	Landfills	562	$12.5 million	$46,350	1.5%	6.7%	1.0%	0.5%	0.4%	0.3%	0.5%
Waste Treatment	MWCs	562	$12.5 million	$46,350	1.5%	6.7%	1.0%	0.5%	0.4%	0.3%	0.5%

Since the SBA's business size definitions (http://www.sba.gov/size) apply to an establishment's ultimate parent company, we assume in this analysis that the enterprise definition above is consistent with the concept of ultimate parent company that is typically used for Small Business Regulatory Enforcement Fairness Act (SBREFA) screening analyses.

[1] NAICS codes 221111, 221112, 221113, 221119, 221121, 221122 – A firm is small if, including its affiliates, it is primarily engaged in the generation, transmission, and/or distribution of electric energy for sale and its total electric output for the preceding fiscal year did not exceed 4 million megawatt hours.

[2] 500 to 1,500. For NAICS code 324110: For purposes of Government procurement, the petroleum refiner must be a concern that has no more than 1,500 employees nor production greater than 125,000 barrels per calendar day total Operable Atmospheric Crude Oil Distillation capacity. Capacity includes owned or leased facilities as well as facilities under a processing agreement or an arrangement such as an exchange agreement or a throughput. The total product to be delivered under the contract must be at least 90 percent refined by the successful bidder from either crude oil or bona fide feedstocks.

[3] NAICS Subsectors 333, 334, 335 and 336: For rebuilding machinery or equipment on a factory basis, or equivalent, use the NAICS code for a newly manufactured product. Concerns performing major rebuilding or overhaul activities do not necessarily have to meet the criteria for being a "manufacturer" although the activities may be classified under a manufacturing NAICS code. Ordinary repair services or preservation are not considered rebuilding.

[4] Subsector 486: Pipeline Transportation (486110 Pipeline Transportation of Crude Oil 1,500, 486210 Pipeline Transportation of Natural Gas $7.0 million, 486910 Pipeline Transportation of Refined Petroleum Products 1,500, 486990 All Other Pipeline Transportation $34.5 million)

Table 6.9. Avoided Costs to Sales for Small Modifying Industrial GHG PSD Emission Sources

Sector	Source Category	NAICS	SBA Size Standard (effective August 11, 2008)	Average Cost Per Entity (2007$)	Cost per Entity for All Establish-ments (%)	Cost per Entity for <20 Employees (%)	Cost per Entity for 20 to 99 Employees (%)	Cost per Entity 100 to 499 Employees (%)	Cost per Entity for 500 to 749 Employees (%)	Cost per Entity for 750 to 999 Employees (%)	Cost per Entity for 1,000 to 1,499 Employees (%)
Electricity Generating Units	Electricity Generating Units	22	[1]	$84,530	0.3%	4.7%	0.4%	0.3%	0.3%	0.2%	0.2%
Industrial	Adipic Acid Production	325199	1,000	$84,530	0.1%	3.0%	1.0%	0.3%	NA	0.0%	NA
Industrial	Aluminum Production	331312	1,000	$84,530	0.1%	34.6%	NA	NA	NA	NA	NA
Industrial	Ammonia Manufacturing	325311	1,000	$84,530	0.3%	4.3%	2.5%	NA	NA	NA	NA
Industrial	Cement Production	327310	750	$84,530	0.3%	2.7%	2.0%	0.4%	NA	NA	0.2%
Industrial	Electronics Manufacturing	334	[2]	$84,530	0.3%	6.6%	1.1%	0.3%	0.2%	0.1%	0.1%
Industrial	Ferroalloy Production	331112	750	$84,530	0.1%	NA	NA	NA	NA	NA	NA
Industrial	Glass Production	327	500–1,000	$84,530	1.3%	8.1%	1.6%	0.9%	0.6%	0.9%	0.7%
Industrial	HCFC-22 Production	325120	1,000	$84,530	0.7%	15.1%	0.5%	2.1%	NA	NA	NA
Industrial	Hydrogen Production	325120	1,000	$84,530	0.7%	15.1%	0.5%	2.1%	NA	NA	NA
Industrial	Iron and Steel Production	331111	1,000	$84,530	0.2%	21.2%	1.2%	0.4%	0.1%	NA	NA
Industrial	Lead Production	3314	750–1,000	$84,530	0.3%	5.6%	0.6%	0.3%	NA	NA	NA
Industrial	Lime Manufacturing	327410	500	$84,530	0.6%	23.3%	1.7%	NA	NA	NA	0.3%
Industrial	Magnesium Production	3314	750–1,000	$84,530	0.3%	5.6%	0.6%	0.3%	NA	NA	NA
Industrial	Nitric Acid Production	325311	1,000	$84,530	0.3%	4.3%	2.5%	NA	NA	NA	0.3%
Industrial	Petrochemical Production	3251	500–1,000	$84,530	0.2%	2.5%	0.6%	0.2%	0.1%	0.3%	NA
Industrial	Petroleum Refineries	324110	[3]	$84,530	0.0%	1.3%	0.1%	0.0%	0.0%	NA	NA
Industrial	Phosphoric Acid Production	325312	500	$84,530	0.1%	14.2%	NA	NA	NA	NA	NA
Industrial	Pulp and Paper Manufacturing	3221	750	$84,530	0.1%	5.6%	0.6%	0.1%	0.1%	0.1%	0.1%
Industrial	Silicon Carbide Production	327910	500	$84,530	0.8%	6.6%	1.5%	0.5%	NA	NA	NA
Industrial	Soda Ash Manufacturing	325181	1,000	$84,530	0.1%	6.9%	NA	NA	NA	NA	NA

(continued)

Table 6.9. Avoided Costs to Sales for Small Modifying Industrial GHG PSD Emission Sources (continued)

Sector	Source Category	NAICS	SBA Size Standard (effective August 11, 2008)	Average Cost Per Entity (2007$)	Cost per Entity for All Establish-ments (%)	Cost per Entity for <20 Employees (%)	Cost per Entity for 20 to 99 Employees (%)	Cost per Entity 100 to 499 Employees (%)	Cost per Entity for 500 to 749 Employees (%)	Cost per Entity for 750 to 999 Employees (%)	Cost per Entity for 1,000 to 1,499 Employees (%)
Industrial	Titanium Dioxide Production	325188	1,000	$84,530	0.3%	6.0%	3.5%	0.9%	NA	NA	NA
Industrial	Zinc Production	3314	750–1,000	$84,530	0.3%	5.6%	0.6%	0.3%	NA	NA	0.3%
Industrial	Ethanol Production	325193	1,000	$84,530	0.2%	NA	NA	NA	NA	NA	NA
Industrial	Food Processing	311	500–1,000	$84,530	0.4%	7.9%	1.0%	0.3%	0.1%	0.2%	0.1%
Energy	Underground Coal Mines	21211	500	$84,530	0.4%	6.6%	1.0%	0.4%	NA	0.3%	NA
Energy	Oil and Natural Gas Systems	211	500	$84,530	0.3%	5.2%	0.5%	0.2%	0.1%	0.1%	0.1%
Energy	Oil and Natural Gas Systems	486	[4]	$84,530	0.4%	0.8%	3.2%	2.6%	NA	NA	NA
Waste Treatment	Landfills	562	$12.5 million	$84,530	2.7%	12.2%	1.9%	0.9%	0.8%	0.6%	0.8%
Waste Treatment	MWCs	562	$12.5 million	$84,530	2.7%	12.2%	1.9%	0.9%	0.8%	0.6%	0.8%

Since the SBA's business size definitions (http://www.sba.gov/size) apply to an establishment's ultimate parent company, we assume in this analysis that the enterprise definition above is consistent with the concept of ultimate parent company that is typically used for Small Business Regulatory Enforcement Fairness Act (SBREFA) screening analyses.

[1] NAICS codes 221111, 221112, 221113, 221119, 221121, 221122 – A firm is small if, including its affiliates, it is primarily engaged in the generation, transmission, and/or distribution of electric energy for sale and its total electric output for the preceding fiscal year did not exceed 4 million megawatt hours.

[2] 500 to 1,500. For NAICS code 324110: For purposes of Government procurement, the petroleum refiner must be a concern that has no more than 1,500 employees nor production greater than 125,000 barrels per calendar day total Operable Atmospheric Crude Oil Distillation capacity. Capacity includes owned or leased facilities as well as facilities under a processing agreement or an arrangement such as an exchange agreement or a throughput. The total product to be delivered under the contract must be at least 90 percent refined by the successful bidder from either crude oil or bona fide feedstocks.

[3] NAICS Subsectors 333, 334, 335 and 336: For rebuilding machinery or equipment on a factory basis, or equivalent, use the NAICS code for a newly manufactured product. Concerns performing major rebuilding or overhaul activities do not necessarily have to meet the criteria for being a "manufacturer" although the activities may be classified under a manufacturing NAICS code. Ordinary repair services or preservation are not considered rebuilding.

[4] Subsector 486: Pipeline Transportation (486110 Pipeline Transportation of Crude Oil 1,500, 486210 Pipeline Transportation of Natural Gas $7.0 million, 486910 Pipeline Transportation of Refined Petroleum Products 1,500, 486990 All Other Pipeline Transportation $34.5 million)

Table 6.10. Avoided Costs to Sales for Small New PSD Industrial GHG Sources

Sector	Source Category	NAICS	SBA Size Standard (effective August 11, 2008)	Average Cost per Entity (2007$)	Cost per Entity for All Enterprises	Cost per Entity for <20 Employees	Cost per Entity for 20 to 99 Employees	Cost per Entity 100 to 499 Employees	Cost per Entity for 500 to 749 Employees	Cost per Entity for 750 to 999 Employees	Cost per Entity for 1,000 to 1,499 Employees
Electricity Generating Units	Electricity Generating Units	22	[1]	$130,880	0.5%	7.2%	0.7%	0.5%	0.4%	0.4%	0.2%
Industrial	Adipic Acid Production	325199	1,000	$130,880	0.2%	4.7%	1.5%	0.5%	NA	0.1%	NA
Industrial	Aluminum Production	331312	1,000	$130,880	0.2%	53.6%	NA	NA	NA	NA	NA
Industrial	Ammonia Manufacturing	325311	1,000	$130,880	0.5%	6.7%	3.9%	NA	NA	NA	NA
Industrial	Cement Production	327310	750	$130,880	0.4%	4.2%	3.2%	0.5%	NA	NA	0.3%
Industrial	Electronics Manufacturing	334	[2]	$130,880	0.5%	10.2%	1.7%	0.5%	0.3%	0.2%	0.2%
Industrial	Ferroalloy Production	331112	750	$130,880	0.2%	NA	NA	NA	NA	NA	NA
Industrial	Glass Production	327	500–1,000	$130,880	2.0%	12.6%	2.4%	1.4%	1.0%	1.4%	1.0%
Industrial	HCFC-22 Production	325120	1,000	$130,880	1.1%	23.3%	0.8%	3.2%	NA	NA	NA
Industrial	Hydrogen Production	325120	1,000	$130,880	1.1%	23.3%	0.8%	3.2%	NA	NA	NA
Industrial	Iron and Steel Production	331111	1,000	$130,880	0.3%	32.9%	1.8%	0.7%	0.2%	NA	NA
Industrial	Lead Production	3314	750–1,000	$130,880	0.5%	8.7%	1.0%	0.5%	NA	NA	0.4%
Industrial	Lime Manufacturing	327410	500	$130,880	0.9%	36.1%	2.7%	NA	NA	NA	NA
Industrial	Magnesium Production	3314	750–1,000	$130,880	0.5%	8.7%	1.0%	0.5%	NA	NA	0.4%
Industrial	Nitric Acid Production	325311	1,000	$130,880	0.5%	6.7%	3.9%	NA	NA	NA	NA
Industrial	Petrochemical Production	3251	500–1,000	$130,880	0.2%	3.9%	0.9%	0.4%	0.2%	0.4%	0.3%
Industrial	Petroleum Refineries	324110	[3]	$130,880	0.0%	2.1%	0.1%	0.1%	0.0%	NA	NA
Industrial	Phosphoric Acid Production	325312	500	$130,880	0.1%	22.0%	NA	NA	NA	NA	NA
Industrial	Pulp and Paper Manufacturing	3221	750	$130,880	0.1%	8.7%	1.0%	0.2%	0.2%	0.1%	0.1%
Industrial	Silicon Carbide Production	327910	500	$130,880	1.2%	10.2%	2.3%	0.8%	NA	NA	NA
Industrial	Soda Ash Manufacturing	325181	1,000	$130,880	0.2%	10.7%	NA	NA	NA	NA	NA
Industrial	Titanium Dioxide Production	325188	1,000	$130,880	0.4%	9.3%	5.4%	1.3%	NA	NA	NA
Industrial	Zinc Production	3314	750–1,000	$130,880	0.5%	8.7%	1.0%	0.5%	NA	NA	0.4%

(continued)

Table 6.10. Avoided Costs to Sales for Small New PSD Industrial GHG Sources (continued)

Sector	Source Category	NAICS	SBA Size Standard (effective August 11, 2008)	Average Cost per Entity (2007$)	Cost per Entity for All Enterprises	Cost per Entity for <20 Employees	Cost per Entity for 20 to 99 Employees	Cost per Entity 100 to 499 Employees	Cost per Entity for 500 to 749 Employees	Cost per Entity for 750 to 999 Employees	Cost per Entity for 1,000 to 1,499 Employees
Industrial	Ethanol Production	325193	1,000	$130,880	0.4%	NA	NA	NA	NA	NA	NA
Industrial	Food Processing	311	500–1,000	$130,880	0.6%	12.3%	1.5%	0.4%	0.2%	0.2%	0.2%
Energy	Underground Coal Mines	21211	500	$130,880	0.7%	10.2%	1.5%	0.5%	NA	0.5%	NA
Energy	Oil and Natural Gas Systems	211	500	$130,880	0.5%	8.1%	0.8%	0.3%	0.1%	0.2%	0.1%
Energy	Oil and Natural Gas Systems	486	[4]	$130,880	0.7%	1.2%	4.9%	4.0%	NA	NA	NA
Waste Treatment	Landfills	562	$12.5 million	$130,880	4.2%	18.9%	2.9%	1.3%	1.2%	1.0%	1.3%
Waste Treatment	MWCs	562	$12.5 million	$130,880	4.2%	18.9%	2.9%	1.3%	1.2%	1.0%	1.3%

Since the SBA's business size definitions (http://www.sba.gov/size) apply to an establishment's ultimate parent company, we assume in this analysis that the enterprise definition above is consistent with the concept of ultimate parent company that is typically used for Small Business Regulatory Enforcement Fairness Act (SBREFA) screening analyses.

[1] NAICS codes 221111, 221112, 221113, 221119, 221121, 221122 – A firm is small if, including its affiliates, it is primarily engaged in the generation, transmission, and/or distribution of electric energy for sale and its total electric output for the preceding fiscal year did not exceed 4 million megawatt hours.

[2] 500 to 1,500. For NAICS code 324110: For purposes of Government procurement, the petroleum refiner must be a concern that has no more than 1,500 employees nor production greater than 125,000 barrels per calendar day total Operable Atmospheric Crude Oil Distillation capacity. Capacity includes owned or leased facilities as well as facilities under a processing agreement or an arrangement such as an exchange agreement or a throughput. The total product to be delivered under the contract must be at least 90 percent refined by the successful bidder from either crude oil or bona fide feedstocks.

[3] NAICS Subsectors 333, 334, 335 and 336: For rebuilding machinery or equipment on a factory basis, or equivalent, use the NAICS code for a newly manufactured product. Concerns performing major rebuilding or overhaul activities do not necessarily have to meet the criteria for being a "manufacturer" although the activities may be classified under a manufacturing NAICS code. Ordinary repair services or preservation are not considered rebuilding.

[4] Subsector 486: Pipeline Transportation (486110 Pipeline Transportation of Crude Oil 1,500, 486210 Pipeline Transportation of Natural Gas $7.0 million, 486910 Pipeline Transportation of Refined Petroleum Products 1,500, 486990 All Other Pipeline Transportation $34.5 million)

Table 6-11. Avoided Title V Permitting Costs to Sales for Permit Revisions Due to GHG

Sector	Source Category	NAICS	SBA Size Standard (effective August 11, 2008)	Average Cost Per Entity (2007$/entity)	Cost per Entity for All Enterprises	Cost per Entity for Size <20 Employees	Cost per Entity for Size 20 to 99 Employees	Cost per Entity for Size 100 to 499 Employees	Cost per Entity for Size 500 to 749 Employees	Cost per Entity for Size 750 to 999 Employees	Cost per Entity For Size 1,000 to 1,499 Employees
Electricity Generating Unites	Electricity Generating Units	22	[1]	$1,677	0.0%	0.1%	0.0%	0.0%	0.0%	0.0%	0.0%
Industrial	Adipic Acid Production	325199	1,000	$1,677	0.0%	0.1%	0.0%	0.0%	NA	0.0%	NA
Industrial	Aluminum Production	331312	1,000	$1,677	0.0%	0.7%	NA	NA	NA	NA	NA
Industrial	Ammonia Manufacturing	325311	1,000	$1,677	0.0%	0.1%	0.1%	NA	NA	NA	NA
Industrial	Cement Production	327310	750	$1,677	0.0%	0.1%	0.0%	0.0%	NA	NA	0.0%
Industrial	Electronics Manufacturing	334	[2]	$1,677	0.0%	0.1%	0.0%	0.0%	0.0%	0.0%	0.0%
Industrial	Ferroalloy Production	331112	750	$1,677	0.0%	NA	NA	NA	NA	NA	NA
Industrial	Glass Production	327	500–1,000	$1,677	0.0%	0.2%	0.0%	0.0%	0.0%	0.0%	0.0%
Industrial	HCFC-22 Production	325120	1,000	$1,677	0.0%	0.3%	0.0%	0.0%	NA	NA	NA
Industrial	Hydrogen Production	325120	1,000	$1,677	0.0%	0.3%	0.0%	0.0%	NA	NA	NA
Industrial	Iron and Steel Production	331111	1,000	$1,677	0.0%	0.4%	0.0%	0.0%	0.0%	NA	NA
Industrial	Lead Production	3314	750–1,000	$1,677	0.0%	0.1%	0.0%	0.0%	NA	NA	0.0%
Industrial	Lime Manufacturing	327410	500	$1,677	0.0%	0.5%	0.0%	NA	NA	NA	NA
Industrial	Magnesium Production	3314	750–1,000	$1,677	0.0%	0.1%	0.0%	0.0%	NA	NA	0.0%
Industrial	Nitric Acid Production	325311	1,000	$1,677	0.0%	0.1%	0.1%	NA	NA	NA	NA
Industrial	Petrochemical Production	3251	500–1,000	$1,677	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Industrial	Petroleum Refineries	324110	[3]	$1,677	0.0%	0.0%	0.0%	0.0%	0.0%	NA	NA

(continued)

Table 6.11. Avoided Title V Permitting Costs to Sales for Permit Revisions Due to GHG (continued)

Sector	Source Category	NAICS	SBA Size Standard (effective August 11, 2008)	Average Cost Per Entity (2007$/entity)	Cost per Entity for All Enterprises	Cost per Entity for Size <20 Employees	Cost per Entity for Size 20 to 99 Employees	Cost per Entity for Size 100 to 499 Employees	Cost per Entity for Size 500 to 749 Employees	Cost per Entity for Size 750 to 999 Employees	Cost per Entity For Size 1,000 to 1,499 Employees
Industrial	Phosphoric Acid Production	325312	500	$1,677	0.0%	0.3%	NA	NA	NA	NA	NA
Industrial	Pulp and Paper Manufacturing	3221	750	$1,667	0.0%	0.1%	0.0%	0.0%	0.0%	0.0%	0.0%
Industrial	Silicon Carbide Production	327910	500	$1,677	0.0%	0.1%	0.0%	0.0%	NA	NA	NA
Industrial	Soda Ash Manufacturing	325181	1,000	$1,677	0.0%	0.1%	NA	NA	NA	NA	NA
Industrial	Titanium Dioxide Production	325188	1,000	$1,677	0.0%	0.1%	0.1%	0.0%	NA	NA	NA
Industrial	Zinc Production	3314	750–1,000	$1,677	0.0%	0.1%	0.0%	0.0%	NA	NA	0.0%
Industrial	Ethanol Production	325193	1,000	$1,677	0.0%	NA	NA	NA	NA	NA	NA
Industrial	Food Processing	311	500–1,000	$1,677	0.0%	0.2%	0.0%	0.0%	0.0%	0.0%	0.0%
Energy	Underground Coal Mines	21211	500	$1,677	0.0%	0.1%	0.0%	0.0%	NA	0.0%	NA
Energy	Oil and Natural Gas Systems	211	500	$1,677	0.0%	0.1%	0.0%	0.0%	0.0%	0.0%	0.0%
Energy	Oil and Natural Gas Systems	486	4	$1,677	0.0%	0.0%	0.1%	0.1%	NA	NA	NA
Waste Treatment	Landfills	562	$12.5 million	$1,677	0.1%	0.2%	0.0%	0.0%	0.0%	0.0%	0.0%

(continued)

Table 6.11. Avoided Title V Permitting Costs to Sales for Permit Revisions Due to GHG (continued)

Sector	Source Category	NAICS	SBA Size Standard (effective August 11, 2008)	Average Cost Per Entity (2007$/entity)	Cost per Entity for All Enterprises	Cost per Entity for Size <20 Employees	Cost per Entity for Size 20 to 99 Employees	Cost per Entity for Size 100 to 499 Employees	Cost per Entity for Size 500 to 749 Employees	Cost per Entity for Size 750 to 999 Employees	Cost per Entity For Size 1,000 to 1,499 Employees
Waste Treatment	MWCs	562	$12.5 million	$1,677	0.1%	0.2%	0.0%	0.0%	0.0%	0.0%	0.0%

Since the SBA's business size definitions (http://www.sba.gov/size) apply to an establishment's ultimate parent company, we assume in this analysis that the enterprise definition above is consistent with the concept of ultimate parent company that is typically used for Small Business Regulatory Enforcement Fairness Act (SBREFA) screening analyses.

[1] NAICS codes 221111, 221112, 221113, 221119, 221121, 221122 – A firm is small if, including its affiliates, it is primarily engaged in the generation, transmission, and/or distribution of electric energy for sale and its total electric output for the preceding fiscal year did not exceed 4 million megawatt hours.

[2] 500 to 1,500. For NAICS code 324110: For purposes of Government procurement, the petroleum refiner must be a concern that has no more than 1,500 employees nor production greater than 125,000 barrels per calendar day total Operable Atmospheric Crude Oil Distillation capacity. Capacity includes owned or leased facilities as well as facilities under a processing agreement or an arrangement such as an exchange agreement or a throughput. The total product to be delivered under the contract must be at least 90 percent refined by the successful bidder from either crude oil or bona fide feedstocks.

[3] NAICS Subsectors 333, 334, 335 and 336: For rebuilding machinery or equipment on a factory basis, or equivalent, use the NAICS code for a newly manufactured product. Concerns performing major rebuilding or overhaul activities do not necessarily have to meet the criteria for being a "manufacturer" although the activities may be classified under a manufacturing NAICS code. Ordinary repair services or preservation are not considered rebuilding.

[4] Subsector 486: Pipeline Transportation (486110 Pipeline Transportation of Crude Oil 1,500, 486210 Pipeline Transportation of Natural Gas $7.0 million, 486910 Pipeline Transportation of Refined Petroleum Products 1,500, 486990 All Other Pipeline Transportation $34.5 million)

Table 6.12. Title V Avoided Costs for Small New Commercial Sources of GHG Emissions Compared to Annual Sales Revenue

Sector	Source Category	NAICS	SBA Size Standard (effective August 11, 2008)	Average Cost Per Entity ($1,000/entity)	Avoided Cost to Average Sales Revenues for All Enterprises	Avoided Cost to Sales Revenues Size <20 Employees	Avoided Cost to Sales Revenues Size 20 to 99 Employees	Avoided Cost to Sales Revenues Size 100 to 499 Employees	Avoided Cost to Sales Revenues Size 500 to 749 Employees	Avoided Cost to Sales Revenues Size 750 to 999 Employees	Avoided Cost to Sales Revenues Size 1,000 to 1,499 Employees
Commercial	Education	61	7.0–35.0	$23,175	0.82%	6.12%	1.05%	0.34%	0.19%	0.12%	0.10%
Commercial	Enclosed Mall	531120	7	$23,175	1.35%	2.45%	0.38%	0.21%	0.13%	0.19%	0.10%
Commercial	Food Sales			$23,175	NA	NA	NA	NA	NA	NA	NA
Commercial	Food Service	722	7.0–20.5	$23,175	3.12%	7.25%	1.87%	1.49%	1.73%	1.83%	1.75%
Commercial	Inpatient Health Care	622	34.5	$23,175	0.03%	1.21%	0.41%	0.12%	0.05%	0.04%	0.02%
Commercial	Laboratory	541380	12	$23,175	1.17%	3.87%	0.82%	0.54%	0.32%	0.30%	0.79%
Commercial	Laboratory	5417	7	$23,175	0.45%	2.69%	0.39%	0.15%	0.12%	0.13%	0.12%
Commercial	Lodging	721	7	$23,175	1.01%	5.14%	1.14%	0.46%	0.41%	0.20%	0.35%
Commercial	Nonrefrigerated Warehouse	49311	25.5	$23,175	1.06%	3.08%	0.85%	0.54%	1.42%	0.79%	0.67%
Commercial	Nursing	623	7.0–13.5	$23,175	1.08%	7.43%	1.45%	0.87%	0.95%	0.88%	0.65%
Commercial	Office	531120	7	$23,175	1.35%	2.45%	0.38%	0.21%	0.13%	0.19%	0.10%
Commercial	Other	81	7.0–25.0	$23,175	3.49%	6.15%	1.04%	0.56%	0.67%	0.72%	0.90%
Commercial	Outpatient Health Care	621	7.0–34.5	$23,175	1.94%	3.61%	0.82%	0.60%	0.54%	0.58%	0.42%
Commercial	Public Assembly	71	7	$23,175	1.50%	4.26%	1.00%	0.25%	0.19%	NA	0.12%
Commercial	Public Order and Safety			$23,175	NA	NA	NA	NA	NA	NA	NA
Commercial	Refrigerated Warehouse	49312	25.5	$23,175	0.46%	2.62%	0.62%	0.38%	NA	NA	0.36%
Commercial	Religious Worship	813110	7	$23,175	4.19%	9.22%	1.09%	0.21%	0.16%	0.05%	0.06%
Commercial	Retail Other than Mall	44–45	7.0–29.0	$23,175	0.72%	2.39%	0.34%	0.27%	0.42%	0.60%	0.61%
Commercial	Service	81	7.0–25.0	$23,175	3.49%	6.15%	1.04%	0.56%	0.67%	0.72%	0.90%
Commercial	Strip Shopping Mall	531120	7	$23,175	1.35%	2.45%	0.38%	0.21%	0.13%	0.19%	0.10%

(continued)

Table 6.12. Title V Avoided Costs for Small New Commercial Sources of GHG Emissions Compared to Annual Sales Revenue (continued)

Sector	Source Category	NAICS	SBA Size Standard (effective August 11, 2008)	Average Cost Per Entity ($1,000/entity)	Avoided Cost to Average Sales Revenues for All Enterprises	Avoided Cost to Sales Revenues Size <20 Employees	Avoided Cost to Sales Revenues Size 20 to 99 Employees	Avoided Cost to Sales Revenues Size 100 to 499 Employees	Avoided Cost to Sales Revenues Size 500 to 749 Employees	Avoided Cost to Sales Revenues Size 750 to 999 Employees	Avoided Cost to Sales Revenues Size 1,000 to 1,499 Employees
Residential	Residential	531110	7	$23,175	2.33%	3.23%	0.70%	0.84%	0.81%	NA	NA

The Census Bureau defines an enterprise as a business organization consisting of one or more domestic establishments that were specified under common ownership or control. The enterprise and the establishment are the same for single-establishment firms. Each multi-establishment company forms one enterprise—the enterprise employment and annual payroll is summed from the associated establishments. Enterprise size designations are determined by the summed employment of all associated establishments.

Since the SBA's business size definitions (http://www.sba.gov/size) apply to an establishment's ultimate parent company, we assume in this analysis that the enterprise definition above is consistent with the concept of ultimate parent company that is typically used for SBREFA screening analyses.

NAICS code 611519: Job Corps Centers. For classifying a Federal procurement, the purpose of the solicitation must be for the management and operation of a U.S. Department of Labor Job Corps Center. The activities involved include admissions activities, life skills training, educational activities, comprehensive career preparation activities, career development activities, career transition activities, as well as the management and support functions and services needed to operate and maintain the facility. For SBA assistance as small business concern, other than for Federal Government procurements, a concern must be primarily engaged in providing the services to operate and maintain Federal Job Corps Centers.

NAICS code 541711 and 541712: For research and development contracts requiring the delivery of a manufactured product, the appropriate size standard is that of the manufacturing industry.

Table 6.13. Avoided Costs for Small Modifying Commercial PSD GHG Emission Sources Compared to Annual Sales Revenue

Sector	Source Category	NAICS	SBA Size Standard (effective August 11, 2008)	Average Cost Per Entity ($1,000/entity)	Avoided Cost to Average Sales Revenues for All Enterprises	Avoided Cost to Sales Revenues Size <20 Employees	Avoided Cost to Sales Revenues Size 20 to 99 Employees	Avoided Cost to Sales Revenues Size 100 to 499 Employees	Avoided Cost to Sales Revenues Size 500 to 749 Employees	Avoided Cost to Sales Revenues Size 750 to 999 Employees	Avoided Cost to Sales Revenues Size 1,000 to 1,499 Employees
Commercial	Education	61	7.0–35.0	$59,152	2.10%	15.61%	2.67%	0.87%	0.49%	0.31%	0.25%
Commercial	Enclosed Mall	531120	7	$59,152	3.45%	6.26%	0.96%	0.53%	0.34%	0.50%	0.25%
Commercial	Food Sales			$59,152	NA	NA	NA	NA	NA	NA	NA
Commercial	Food Service	722	7.0–20.5	$59,152	7.97%	18.52%	4.78%	3.80%	4.42%	4.66%	4.46%
Commercial	Inpatient Health Care	622	34.5	$59,152	0.08%	3.09%	1.05%	0.30%	0.13%	0.09%	0.06%
Commercial	Laboratory	541380	12	$59,152	2.98%	9.88%	2.08%	1.38%	0.83%	0.76%	2.01%
Commercial	Laboratory	5417	7	$59,152	1.15%	6.88%	1.01%	0.38%	0.31%	0.34%	0.32%
Commercial	Lodging	721	7	$59,152	2.59%	13.12%	2.91%	1.16%	1.05%	0.51%	0.89%
Commercial	Nonrefrigerated Warehouse	49311	25.5	$59,152	2.70%	7.87%	2.17%	1.37%	3.62%	2.01%	1.71%
Commercial	Nursing	623	7.0–13.5	$59,152	2.76%	18.96%	3.70%	2.22%	2.43%	2.25%	1.65%
Commercial	Office	531120	7	$59,152	3.45%	6.26%	0.96%	0.53%	0.34%	0.50%	0.25%
Commercial	Other	81	7.0–25.0	$59,152	8.91%	15.71%	2.66%	1.43%	1.71%	1.84%	2.28%
Commercial	Outpatient Health Care	621	7.0–34.5	$59,152	4.95%	9.20%	2.08%	1.54%	1.38%	1.49%	1.08%
Commercial	Public Assembly	71	7	$59,152	3.84%	10.88%	2.55%	0.63%	0.48%	NA	0.31%
Commercial	Public Order and Safety				NA	NA	NA	NA	NA	NA	NA
Commercial	Refrigerated Warehouse	49312	25.5	$59,152	1.17%	6.69%	1.58%	0.97%	NA	NA	0.92%
Commercial	Religious Worship	813110	7	$59,152	10.68%	23.53%	2.77%	0.54%	0.40%	0.13%	0.16%
Commercial	Retail Other than Mall	44-45	7.0–29.0	$59,152	1.84%	6.09%	0.88%	0.69%	1.08%	1.52%	1.56%
Commercial	Service	81	7.0–25.0	$59,152	8.91%	15.71%	2.66%	1.43%	1.71%	1.84%	2.28%
Commercial	Strip Shopping Mall	531120	7	$59,152	3.45%	6.26%	0.96%	0.53%	0.34%	0.50%	0.25%

$59,152

(continued)

Table 6.13. Avoided Costs for Small Modifying Commercial PSD GHG Emission Sources Compared to Annual Sales Revenue (continued)

Sector	Source Category	NAICS	SBA Size Standard (effective August 11, 2008)	Average Cost Per Entity ($1,000/entity)	Avoided Cost to Average Sales Revenues for All Enterprises	Avoided Cost to Sales Revenues Size <20 Employees	Avoided Cost to Sales Revenues Size 20 to 99 Employees	Avoided Cost to Sales Revenues Size 100 to 499 Employees	Avoided Cost to Sales Revenues Size 500 to 749 Employees	Avoided Cost to Sales Revenues Size 750 to 999 Employees	Avoided Cost to Sales Revenues Size 1,000 to 1,499 Employees
Residential	Residential	531110	7	$59,152	5.95%	8.25%	1.78%	2.15%	2.07%	NA	NA

The Census Bureau defines an enterprise as a business organization consisting of one or more domestic establishments that were specified under common ownership or control. The enterprise and the establishment are the same for single-establishment firms. Each multi-establishment company forms one enterprise—the enterprise employment and annual payroll is summed from the associated establishments. Enterprise size designations are determined by the summed employment of all associated establishments.

Since the SBA's business size definitions (http://www.sba.gov/size) apply to an establishment's ultimate parent company, we assume in this analysis that the enterprise definition above is consistent with the concept of ultimate parent company that is typically used for SBREFA screening analyses.

NAICS code 611519: Job Corps Centers. For classifying a Federal procurement, the purpose of the solicitation must be for the management and operation of a U.S. Department of Labor Job Corps Center. The activities involved include admissions activities, life skills training, educational activities, comprehensive career preparation activities, career development activities, career transition activities, as well as the management and support functions and services needed to operate and maintain the facility. For SBA assistance as small business concern, other than for Federal Government procurements, a concern must be primarily engaged in providing the services to operate and maintain Federal Job Corps Centers.

NAICS code 541711 and 541712: For research and development contracts requiring the delivery of a manufactured product, the appropriate size standard is that of the manufacturing industry.

Table 6.14. Avoided Costs to Small PSD New Commercial GHG Emission Sources

Sector	Source Category	NAICS	SBA Size Standard (effective August 11, 2008)	Average Cost Per Entity ($1000/entity)	Avoided Cost to Average Sales Revenues for All Enterprises	Avoided Cost to Sales Revenues Size <20 employees	Avoided Cost to Sales Revenues Size 20 to 99 employees	Avoided Cost to Sales Revenues Size 100 to 499 employees	Avoided Cost to Sales Revenues Size 500 to 749 employees	Avoided Cost to Sales Revenues Size 750 to 999 employees	Avoided Cost to Sales Revenues Size 1,000 to 1,499 employees
Commercial	Education	61	7.0–35.0	$82,327	2.92%	21.74%	3.72%	1.21%	0.68%	0.43%	0.34%
Commercial	Enclosed Mall	531120	7	$82,327	4.80%	8.71%	1.34%	0.74%	0.47%	0.69%	0.35%
Commercial	Food Sales			$82,327	NA	NA	NA	NA	NA	NA	NA
Commercial	Food Service	722	7.0–20.5	$82,327	11.09%	25.78%	6.65%	5.29%	6.15%	6.49%	6.21%
Commercial	Inpatient Health Care	622	34.5	$82,327	0.11%	4.30%	1.46%	0.42%	0.18%	0.13%	0.08%
Commercial	Laboratory	541380	12	$82,327	4.14%	13.76%	2.90%	1.92%	1.15%	1.06%	2.80%
Commercial	Laboratory	5417	7	$82,327	1.59%	9.57%	1.40%	0.53%	0.42%	0.48%	0.44%
Commercial	Lodging	721	7	$82,327	3.60%	18.26%	4.05%	1.62%	1.46%	0.71%	1.23%
Commercial	Nonrefrigerated Warehouse	49311	25.5	$82,327	3.76%	10.96%	3.02%	1.91%	5.04%	2.79%	2.38%
Commercial	Nursing	623	7.0–13.5	$82,327	3.84%	26.40%	5.15%	3.09%	3.38%	3.13%	2.30%
Commercial	Office	531120	7	$82,327	4.80%	8.71%	1.34%	0.74%	0.47%	0.69%	0.35%
Commercial	Other	81	7.0–25.0	$82,327	12.41%	21.87%	3.70%	2.00%	2.38%	2.56%	3.18%
Commercial	Outpatient Health Care	621	7.0–34.5	$82,327	6.89%	12.81%	2.90%	2.14%	1.93%	2.08%	1.51%
Commercial	Public Assembly	71	7	$82,327	5.35%	15.15%	3.55%	0.87%	0.67%	NA	0.43%
Commercial	Public Order and Safety				NA	NA	NA	NA	NA	NA	NA
Commercial	Refrigerated Warehouse	49312	25.5	$82,327	1.63%	9.31%	2.20%	1.35%	NA	NA	1.28%
Commercial	Religious Worship	813110	7	$82,327	14.87%	32.77%	3.86%	0.75%	0.56%	0.18%	0.22%
Commercial	Retail Other than Mall	44-45	7.0–27.0	$82,327	2.57%	8.48%	1.22%	0.97%	1.50%	2.12%	2.17%
Commercial	Service	81	7.0–25.0	$82,327	12.41%	21.87%	3.70%	2.00%	2.38%	2.56%	3.18%
Commercial	Strip Shopping Mall	531120	7	$82,327	4.80%	8.71%	1.34%	0.74%	0.47%	0.69%	0.35%

(continued)

Table 6.14. Avoided Costs to Small PSD New Commercial GHG Emission Sources (continued)

Sector	Source Category	NAICS	SBA Size Standard (effective August 11, 2008)	Average Cost Per Entity ($1000/entity)	Avoided Cost to Average Sales Revenues for All Enterprises	Avoided Cost to Sales Revenues Size <20 employees	Avoided Cost to Sales Revenues Size 20 to 99 employees	Avoided Cost to Sales Revenues Size 100 to 499 employees	Avoided Cost to Sales Revenues Size 500 to 749 employees	Avoided Cost to Sales Revenues Size 750 to 999 employees	Avoided Cost to Sales Revenues Size 1,000 to 1,499 employees
Residential	Residential	531110	7	$82,327	8.29%	11.49%	2.48%	2.99%	2.89%	NA	NA

The Census Bureau defines an enterprise as a business organization consisting of one or more domestic establishments that were specified under common ownership or control. The enterprise and the establishment are the same for single-establishment firms. Each multi-establishment company forms one enterprise—the enterprise employment and annual payroll is summed from the associated establishments. Enterprise size designations are determined by the summed employment of all associated establishments.

Since the SBA's business size definitions (http://www.sba.gov/size) apply to an establishment's ultimate parent company, we assume in this analysis that the enterprise definition above is consistent with the concept of ultimate parent company that is typically used for SBREFA screening analyses.

NAICS code 611519: Job Corps Centers. For classifying a Federal procurement, the purpose of the solicitation must be for the management and operation of a U.S. Department of Labor Job Corps Center. The activities involved include admissions activities, life skills training, educational activities, comprehensive career preparation activities, career development activities, career transition activities, as well as the management and support functions and services needed to operate and maintain the facility. For SBA assistance as small business concern, other than for Federal Government procurements, a concern must be primarily engaged in providing the services to operate and maintain Federal Job Corps Centers.

NAICS code 541711 and 541712: For research and development contracts requiring the delivery of a manufactured product, the appropriate size standard is that of the manufacturing industry.

Section 7
Statutory and Executive Order Reviews

7.1 Executive Order 12866 - Regulatory Planning and Review

Under section 3(f)(1) of Executive Order (EO) 12866 (58 FR 51735, October 4, 1993), this action is an "economically significant regulatory action" because it is likely to have an annual effect on the economy of $100 million or more. Accordingly, EPA submitted this action to the Office of Management and Budget (OMB) for review under EO 12866 and any changes made in response to OMB recommendations have been documented in the docket for this action.

In addition, EPA prepared an analysis of the potential costs and benefits associated with this action. This analysis is contained in the RIA for this final rule. A copy of the analysis is available in the docket for this action and the analysis is briefly summarized in section VII of this preamble.

This rule uses a phased-in approach for requiring larger sources of GHG emissions to comply with title V operating permit and PSD statutory requirements, essentially lifting this burden for a period of at least 6 years for a large number of sources of GHG. Thus, this rule provides regulatory relief rather than regulatory requirements for these GHG sources. For sources of GHG that will be required to obtain title V permits and/or comply with PSD requirements, there are no direct economic burdens or costs as a result of this final rule, because these requirements are not imposed as a result of this rulemaking. Statutory requirements to obtain a title V operating permit or to adhere to PSD requirements are already mandated by the CAA and by existing rules, not by this rule. As a result, this Tailoring rule annual effect on the economy will be positive because it will result in billions of dollars of regulatory relief during the phase-in period.

7.2 Paperwork Reduction Act

This action does not impose any new information collection burden. Instead, this action will significantly reduce costs incurred by sources and permitting authorities relative to the costs that would be incurred if EPA did not revise the rule. Based on our revised GHG threshold data analysis, we estimate that over 80,000 new and modified facilities per year would be subject to PSD review based on applying a GHG emissions threshold of 100/250 tpy using a CO_2e metric. This is compared to 280 PSD permits currently issued per year, which is an increase of more than 280-fold. Similarly, for title V, we estimate that over six million new sources would be

affected at the 100-tpy threshold for GHGs using the CO_2e metric. By increasing the volume of permits by over 400 times, the administrative burden would be unmanageable without this rule.

However, OMB has previously approved the information collection requirements contained in the existing regulations for PSD (see, e.g., 40 CFR 52.21) and title V (see 40 CFR parts 70 and 71) under the provisions of the Paperwork Reduction Act, 44 U.S.C. 3501 et seq. and has assigned OMB control number 2060-0003 and OMB control number 2060-0336. The OMB control numbers for EPA's regulations in 40 CFR are listed in 40 CFR part 9.

7.3 Regulatory Flexibility Act

The Regulatory Flexibility Act (RFA) generally requires an agency to prepare a regulatory flexibility analysis of any rule subject to notice and comment rulemaking requirements under the APA or any other statute unless the agency certifies that the rule will not have a significant economic impact on a substantial number of small entities. Small entities include small businesses, small organizations, and small governmental jurisdictions.

For purposes of assessing the impacts of this final action on small entities, small entity is defined as: (1) a small business that is a small industrial entity as defined in the U.S. SBA size standards (see 13 CFR 121.201); (2) a small governmental jurisdiction that is a government of a city, county, town, school district, or special district with a population of less than 50,000; or (3) a small organization that is any not-for-profit enterprise that is independently owned and operated and is not dominant in its field.

After considering the economic impacts of this final rule on small entities, the Administrator certified that this final action will not have a significant economic impact on a substantial number of small entities. In determining whether a rule has a significant economic impact on a substantial number of small entities, the impact of concern is any significant adverse economic impact on small entities, since the primary purpose of the regulatory flexibility analyses is to identify and address regulatory alternatives "which minimize any significant economic impact of the rule on small entities." 5 USC 603 and 604. Thus, an agency may certify that a rule will not have a significant economic impact on a substantial number of small entities if the rule relieves regulatory burden, or otherwise has a positive economic effect on all of the small entities subject to the rule.

We have therefore concluded that this final rule will relieve the regulatory burden for most affected small entities associated with the major PSD and title V operating permits

programs for new or modified major sources that emit GHGs, including small businesses. This is because this rule raises the major source applicability thresholds for these programs for the sources that emit GHGs. As a result, the program changes provided in this rule are not expected to result in a significant economic impact on a substantial number of small entities.

7.4 Unfunded Mandates Reform Act

This rule does not contain a federal mandate that may result in expenditures of $100 million or more for state, local, and tribal governments, in the aggregate, or the private sector in any 1 year. Only those few states whose permitting authorities do not implement the federal PSD and title V rules by reference in their SIPs will have a small increase in burden. These states will have to amend their corresponding SIPs to incorporate the new applicability thresholds, since the burden reducing thresholds that we are finalizing with this rule will not otherwise apply to the PSD and title V programs. Thus, this rule is not subject to the requirements of sections 202 or 205 of UMRA.

This rule is also not subject to the requirements of section 203 of UMRA because it contains no regulatory requirements that might significantly or uniquely affect small governments. As discussed earlier, this rule is expected to result in cost savings and an administrative burden reduction for all permitting authorities and permittees, including small governments.

7.5 Executive Order 13132 – Federalism

This action does not have federalism implications. It will not have substantial direct effects on the states, on the relationship between the national government and the states, or on the distribution of power and responsibilities among the various levels of government, as specified in Executive Order 13132. These final amendments will ultimately simplify and reduce the burden on state and local agencies associated with implementing the PSD and title V operating permits programs, by providing that a source whose GHG emissions are below the proposed levels will not have to obtain a PSD permit or title V permit. Thus, Executive Order 13132 does not apply to this action.

In the spirit of Executive Order 13132, and consistent with EPA policy to promote communications between EPA and state and local governments, EPA specifically solicited comment on the proposed rule from state and local officials.

7.6 Executive Order 13175 - Consultation and Coordination with Indian Tribal Governments

Subject to the Executive Order 13175 (65 FR 67249, November 9, 2000) EPA may not issue a regulation that has tribal implications, that imposes substantial direct compliance costs, and that is not required by statute, unless the federal government provides the funds necessary to pay the direct compliance costs incurred by tribal governments, or EPA consults with tribal officials early in the process of developing the proposed regulation and develops a tribal summary impact statement.

EPA has concluded that this action may have tribal implications. However, it will neither impose substantial direct compliance costs on tribal governments, nor preempt Tribal law. There are no tribal authorities currently issuing major NSR permits; therefore, it will not currently impose direct compliance costs on tribal governments.

EPA consulted with tribal officials early in the process of developing this regulation to allow them to have meaningful and timely input into its development by publishing an ANPR that included PSD GHG tailoring options for regulating GHGs under the CAA. (73 FR 44354, July 30, 2008) As a result of the ANPR, EPA received several comments from tribal officials on differing PSD GHG tailoring options presented in the ANPR which were considered in the proposal and this final rule. Additionally, we also specifically solicited comment from tribal officials on the proposed rule (74 FR 55292, October 27, 2009).

As required by section 7(a) of Executive Order 13175, EPA's Tribal Consultation Official has certified that the requirements of the Executive Order have been met in a meaningful and timely manner. A copy of the certification is included in the docket for this action.

7.7 Executive Order 13045 - Protection of Children from Environmental Health and Safety Risks

EPA interprets EO 13045 (62 FR 19885, April 23, 1997) as applying only to those regulatory actions that concern health or safety risks, such that the analysis required under section 5-501 of the EO has the potential to influence the regulation. This action is not subject to EO 13045 because it does not establish an environmental standard intended to mitigate health or safety risks.

7.8 Executive Order 13211 - Actions That Significantly Affect Energy Supply, Distribution, or Use

This action is not a "significant energy action" as defined in Executive Order 13211(66 FR 28355 (May 22, 2001)), because it is not likely to have a significant adverse effect on the supply, distribution, or use of energy. Further, we have concluded that this rule is not likely to have any adverse energy effects because this action would not create any new requirements for sources in the energy supply, distribution, or use sectors.

7.9 National Technology Transfer and Advancement Act

Section 12(d) of the National Technology Transfer and Advancement Act of 1995 ("NTTAA"), Public Law No. 104-113, 12(d) (15 U.S.C. 272 note) directs EPA to use voluntary consensus standards in its regulatory activities unless to do so would be inconsistent with applicable law or otherwise impractical. Voluntary consensus standards are technical standards (e.g., materials specifications, test methods, sampling procedures, and business practices) that are developed or adopted by voluntary consensus standards bodies. The NTTAA directs EPA to provide Congress, through OMB, explanations when the Agency decides not to use available and applicable voluntary consensus standards.

This action does not involve technical standards. Therefore, EPA did not consider the use of any voluntary consensus standards.

7.10 Executive Order 12898 – Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations

Executive Order (EO) 12898 (59 FR 7629 (Feb. 16, 1994)) establishes federal executive policy on environmental justice. Its main provision directs federal agencies, to the greatest extent practicable and permitted by law, to make environmental justice part of their mission by identifying and addressing, as appropriate, disproportionately high and adverse human health or environmental effects of their programs, policies, and activities on minority populations and low-income populations in the United States.

EPA has concluded that it is not practicable to determine whether there would be disproportionately high and adverse human health or environmental effects on minority and/or low income populations from this rule. This rule is necessary in order to allow for the continued implementation of permitting requirements established in the statute. Specifically, without this rule, the CAA permitting programs (PSD and Title V) would become overwhelmed and

unmanageable by the millions of GHG sources that would become newly subject to them. This would result in severe impairment of the functioning of these programs with potentially adverse human health and environmental effects nationwide. Under this rule and the legal doctrines of absurd results, administrative necessity, and one-step-at-a-time, EPA is ensuring that the CAA permitting programs continue to operate by limiting their applicability to the maximum number of sources the programs can possibly handle. This approach is consistent with congressional intent as it allows PSD applicability to at least the largest sources initially, at least to as many more sources as possible, and as promptly as possible over time. By doing so, this rule allows for the maximum degree of environmental protection possible while providing regulatory relief for the unmanageable burden that would otherwise exist. Therefore, we believe it is not practicable to identify and address disproportionately high and adverse human health or environmental effects on minority populations and low income populations in the United States under this final rule.

7.11 Congressional Review Act

The Congressional Review Act, 5 U.S.C. 801 et seq., as added by the Small Business Regulatory Enforcement Fairness Act of 1996, generally provides that before a rule may take effect, the agency promulgating the rule must submit a rule report, which includes a copy of the rule, to each House of the Congress and to the Comptroller General of the United States. EPA will submit a report containing this rule and other required information to the U.S. Senate, the U.S. House of Representatives, and the Comptroller General of the United States prior to publication of the rule in the Federal Register. A Major rule cannot take effect until 60 days after it is published in the Federal Register. This action is a "major rule" as defined by 5 U.S.C. 804(2).

Section 8
Limitations and Uncertainties

The benefits, costs and economic impacts estimated in this RIA are subject to limitations and uncertainties. The benefits of this rule are the regulatory relief provided to small sources of GHG and permitting authorities. Regulatory relief estimates are provided for the final rule Steps 1, 2 and 3 on an annual basis as well as for the full phase-in period. The benefits or avoided permitting are based upon the best data available currently regarding sources affected and burden cost estimates but are subject to uncertainties.

Benefit Estimate Limitations and Uncertainties

Uncertainties exist in the affected source counts at different thresholds used to estimate regulatory relief due to the absence of a comprehensive data set of facility-level GHG emissions across all sectors on which to base the number of facilities subject to title V and PSD permitting at alternative regulatory thresholds. These affected source counts are multiplied by the permit burden cost estimates to derive the benefits (regulatory relief) estimates for the rule. Specific uncertainties in the estimates of affected sources, burden estimates and other limitations of the benefits analysis are discussed below.

a. Uncertainties in Estimates of Affected Sources

In order to estimate the number of facilities that exceed a given GHG threshold (such as a 100 or 250 tpy CO2e emission threshold for baseline analysis), it is necessary to have emissions inventory data at the facility or building level, including, and particularly for lower threshold scenarios, numerous small sources in the residential and commercial sectors (e.g., apartment buildings and office buildings). Historically, however, EPA has not collected sector-wide, facility-level information for GHG emissions under the CAA (with the exception of information from electric generating units required to report CO2 emissions under the Acid Rain Program reporting requirements). To date, national EPA inventories of GHG sources have primarily focused on 'top-down' estimates of GHG emissions from sectors and sources, and not facility-level estimates. As a result, many of the uncertainties described here result from the absence of a comprehensive data set of facility-level GHG emissions across all sectors.

For residential, commercial, and smaller manufacturing operations, our current analysis relies on sample facility datasets and 'top-down' sector data (e.g., national fuel consumption statistics and/or building characteristics). There are inherent uncertainties in developing source

counts from the allocation of these nationally aggregated statistics. The allocation factors we used, based on U.S. Energy Information Administration statistical sampling procedures and energy consumption statistics, are likely the best available to estimate the population of residential, commercial, and small manufacturing sources exceeding different GHG thresholds. However, uncertainties may result in either overestimating or underestimating GHG emissions for a given individual facility. It is worth noting that our estimates for the largest GHG emitting sources, such as electric utilities and refineries, are derived from bottom-up calculations of individual facility/building emissions so that there is increased certainty in evaluating and comparing the facility counts at the higher GHG threshold scenarios where residential and commercial sources are not highly affected. Although there are different levels of uncertainty in our facility level estimates across sectors, we do believe that the data are sufficiently robust to use in the aggregate to assess national permitting level impacts.

EPA's estimate of affected sources is based on their potential to emit emissions, as opposed to actual emission levels. PTE is defined as the maximum capacity of a stationary source to emit a pollutant under its physical and operational design, including certain legal limitations, for example, on emissions or hours of operation. PSD and Title V programs both use PTE for defining and identifying major sources. Although we have attempted to identify reasonable adjustments to account for PTE in our methodology, there are significant uncertainties in our PTE-based estimates, particularly for the commercial, residential and small manufacturing sectors that have not traditionally been subject to any form of air permitting. In practice, for example, for the residential sector and for many of the facilities in the commercial sector, where CO2 emissions are primarily due to space heating/appliance usage, the combustion units are not likely to be used constantly at their maximum rated capacity because heating is not needed year-round and heating systems have thermostats. However, for our analysis we do assume full PTE-based estimates for the residential and commercial sectors, using PTE adjustment factors of 10 and 6.6, respectively to adjust actual emissions to PTE level. Absent industry specific data, for small manufacturing source categories we assume a PTE adjustment factor of 2; individual manufacturing facilities may operate their combustion equipment at levels above and below this capacity utilization rate, but we believe this PTE adjustment reflects a reasonable average rate across the variety of small manufacturing facilities included in the threshold analysis. Ultimately, the number of sources brought into either the PSD or Title V

programs due solely to their PTE would depend on how EPA interprets PTE for various types of emitting equipment (e.g., space-heating furnaces in residential and commercial buildings), and the extent to which streamlined mechanisms are made available for sources to obtain legal limits on their PTE so that the programs are not applicable. No such decisions or interpretations have been made at this point and, as mentioned in the preamble, they will require significant time to develop. As a result, our threshold analysis uniformly assumes that no PTE limits are in place for any of the affected sectors, which may likely be the case in the immediate stages of GHG permitting for affected sources.

There is significant uncertainty in both our modification rate for newly major GHG sources and in our estimate of modification activity at existing major sources that will become subject to PSD review for GHG emission increases. The general uncertainty results from predicting not only how many major sources will undergo physical or operational changes in any given year, but also which of those changes would result in GHG emissions increases that would exceed a proposed GHG significance level. First, information is not available across sectors and source categories on the types and numbers of specific physical and operational changes that would result in GHG emissions increases in amounts that can be estimated and that therefore can be compared to various GHG emissions significance levels. Second, there is uncertainty in how many project modifications will occur within any given year because decisions on these projects are driven by facility- and sector-based growth patterns and business planning decisions. Lastly, some source categories and units that emit GHGs have not previously been subject to any type of permitting or reporting requirements; as a result, for these sources, there is very little historical record for use in estimating the number and types of projects that would occur at these sources and, in turn, establish an appropriate significance level for GHGs.

b. Uncertainties in Permitting Costs

The permit burden cost estimates that are multiplied by the source counts to derive the benefits of the rule are also subject to uncertainty. As noted Attachment C to the RIA, the primary reference sources for our estimate of burden hours and costs for permitting GHGs are the most recent ICRs for the PSD and title V programs. There a number of uncertainties introduced in using these references for costing GHG permitting activities. First, we are assuming that the average, conventional pollutant per-permit costs will be similar for GHGs. We do recognize the likelihood that residential and commercial permits would be simpler and have a

lower per-permit burden than traditional industrial sources, and have made adjustments for this: however, for industrial sources we assume per-permit costs on par with what are estimated in the latest ICRs for PSD and title V programs. There is uncertainty in applying these average ICR-based costs to GHG permitting, even for industrial sources, because there is no historical track record for permitting these GHG sources and thus any cost efficiencies that have been realized over the years for conventional pollutant permitting, and thus reflected in the current ICRs, may not be initially realized for GHG permitting. For example, we assume the same public hearing estimate as included in the ICR for current PSD permits (i.e., that 1 in 50 major PSD permits require a hearing)—for GHG sources this number may be higher initially if there ends up being significantly more public interest in these permits. We do believe overall, however, that larger facilities, especially those affected at higher threshold levels, will have had sufficient permitting experience such that out ICR-based costs should reasonably reflect the added burden of including GHGs.

As mentioned above, in our burden scenario analyses we do discount the ICR-based per-permit costs for residential and commercial sources to reflect what we believe will generally be simpler permits, involving primarily uniform combustion type equipment. For PSD we discount the per-permit cost by 30%, and for title V we discount the per-permit cost by 50%. There is significant uncertainty in these estimated discounts since we have no track record for permitting these smaller commercial and residential sources. However, we do believe that, based solely on the type and uniformity of the GHG emission units that would be subject to permitting at these facilities under lower GHG threshold scenarios, that average per-permit costs would be less than those currently experienced by more complex industrial facilities, with numerous emission units, for currently regulated pollutants.

c. Additional uncertainties and limitations of the benefits analysis

Current avoided permitting cost or regulatory relief estimates also do not include the avoided costs to comply with PSD BACT requirements due to lack of available data. This omission will tend to reduce the amount of regulatory relief that smaller sources of GHG reported in this RIA will experience during the phase-in period. In addition to the avoided BACT costs we are unable to quantify, there are likely general economic costs associated with requiring permitting for these smaller sources of GHG. Numerous public comments on the proposed rule spoke to the economic burden permitting would place on sources above the actual

costs to obtain a permit. These costs might include delays or impediments to entering a new market or to expand existing facilities to accommodate economic growth. These avoided costs might be viewed as additional costs of doing business or barriers to entry for these smaller sources of GHG. The avoided economic costs of these possible additional costs or barriers to doing business have not been considered in the regulatory relief estimates provided for this final rule due to lack of available information on the nature and value of such avoided impacts. If such avoided cost estimates were available, these estimates would tend to increase the regulatory relief burden reported for the final rule.

For the multiple year regulatory relief estimates, we assume that the annual estimates can be extrapolated to multiple years without adjustment. This presumes that permitting activity would be constant over time. It is quite possible that permit activity for these smaller sources may grow over time with economic growth and will likely vary from year to year due to differences in business activity. However, we do not have sufficient information about these year-to-year variations nor expected growth in permitting to develop more precise estimates. Given the uncertainty in the annual relief estimates and the short time frame analyzed (five years), we feel it reasonable to not consider these potential yearly fluctuations for the phase-in period. Consideration of growth in permits over time would tend to increase the regulatory relief estimates reported for the final rule.

In a similar manner, we do not discount the phase-in regulatory relief to the present in this final report. Since the analytical time period evaluated varies from annual up to five years, we feel this is a reasonable approach. Discounting the regulatory relief estimates to present values would tend to lower the present value total amount of regulatory relief reported.

Social Cost Limitations and Uncertainties

The social costs of this rule are the foregone environmental benefits that might occur during the phase-in period absent this rulemaking. This subject is discussed in Section 4 of the RIA. We are unable to estimate the PSD BACT requirements that would likely occur for the smaller sources of GHG at this time. Because BACT is a case-by-case decision and evolves over time, because we do not at this time have historical experience with the available controls for small-source GHG emissions, and because of the inherent uncertainty in describing the types of sources that would have triggered BACT absent this rule, we cannot quantify the emission

reductions that might be feasible or the associated pollution control costs. For this reason, the social costs of this rule are discussed qualitatively in this RIA.

Economic Impact Limitations and Uncertainties

As previously discussed there is uncertainty in the estimates of sources affected by this final rule and the permitting burden costs used to estimate the benefits (regulatory relief) of this rule. These uncertainties also affect the economic impact analysis conducted. In the economic impact analysis, we compare the avoided permit burden cost estimates to average industry revenues in order to gauge the magnitude of regulatory relief for affected sources. We used average industry revenue, and average firm revenue estimates by firm size to estimate avoided-cost-to-sales ratios due to lack of data specific to the sources actually obtaining regulatory relief. The actual benefits to individual firms affected by this rule may differ from industry averages.

Section 9
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Attachment A
Source Categories Affected by the Rule with Industry Detail

Table A-1. Title V Sources Expected to Experience Regulatory Relief at Alternative Threshold Levels by Industry Category[1]

Title V	Sources Experiencing Regulatory Relief at Alternative Thresholds			
Source Category	25,000 tpy	50,000 tpy	Final Rule Step 2 100,000 tpy	Final Rule Step 1 Anyway
Electricity Generating Units	161	285	285	285
Adipic Acid Production	0	0	0	0
Aluminum Production	0	0	0	0
Ammonia Manufacturing	0	0	0	0
Cement Production	0	0	0	0
Electronics Manufacturing	134	145	177	190
Ferroalloy Production	0	0	0	0
Glass Production	247	247	247	247
HCFC-22 Production	0	0	0	3
Hydrogen Production	33	37	43	61
Iron and Steel Production	0	0	0	0
Lead Production	4	4	4	4
Lime Manufacturing	3	23	29	37
Magnesium Production	0	0	0	0
Nitric Acid Production	1	2	3	18
Petrochemical Production	0	0	0	0
Petroleum Refineries	3	3	3	3
Phosphoric Acid Production	0	0	0	0
Pulp and Paper Manufacturing	0	3	15	160
Silicon Carbide Production	0	0	0	0
Soda Ash Manufacturing	0	0	0	0
Titanium Dioxide Production	0	0	0	0
Zinc Production	3	3	3	3
Ethanol Production	54	54	97	119
Food Processing	3,438	3,438	3,438	3,438
Unspecified Industrial Stationary Combustion (Other Manufacturing and Industrial Facilities)	163,054	165,083	166,661	166,693
Underground Coal Mines	135	160	183	235
Oil and Natural Gas Systems	2,266	2,353	2,353	2,353
Landfills	1,430	2,447	3,164	3,357
MWCs	1	1	1	1

(continued)

Table A-1. Title V Sources Expected to Experience Regulatory Relief at Alternative Threshold Levels by Industry Category (continued)

Title V	Sources Experiencing Regulatory Relief at Alternative Thresholds			
Source Category	**25,000 tpy**	**50,000 tpy**	**Final Rule Step 2 100,000 tpy**	**Final Rule Step 1 Anyway**
Stationary Combustion Equipment (Generators)	37,351	37,351	37,351	37,351
All Commercial—Stationary Fuel Combustion	1,354,760	1,355,321	1,355,870	1,355,921
Multi-Family Fuel Combustion	610,340	610,480	610,500	610,500
Single-Family Fuel Combustion	3,925,000	3,925,000	3,925,000	3,925,000
Total	**6,098,352**	**6,102,374**	**6,105,361**	**6,105,913**

[1]Thresholds are shown as tpy CO_2e. Attachment B U.S. Environmental Protection Agency. April 2010. "Technical Support Document for Greenhouse Gas Emissions Threshold Evaluation." See docket at EPA-HQ-OAR-2009-0517.

[2]Modifying PSD sources are also expected to experience regulatory relief, but these estimates are not reflected in this table.

Table A-2. New PSD Sources Expected to Experience Regulatory Relief at Alternative Threshold Levels by Industry Category

New PSD Sources	Sources Experiencing Regulatory Relief at Alternative Thresholds[1,2]			
Source Category	25,000 tpy	50,000 tpy	Final Rule Step 2 100,000 tpy	Final Rule Step 1 Anyway
Electricity Generating Units	20	29	33	93
Adipic Acid Production	0	0	0	0
Aluminum Production	0	0	0	0
Ammonia Manufacturing	0	0	0	0
Cement Production	0	0	0	0
Electronics Manufacturing	0	0	0	0
Ferroalloy Production	0	0	0	0
Glass Production	1	1	1	1
HCFC-22 Production	0	0	0	0
Hydrogen Production	0	0	0	0
Iron and Steel Production	0	0	0	0
Lead Production	0	0	0	0
Lime Manufacturing	0	0	0	0
Magnesium Production	0	0	0	0
Nitric Acid Production	0	0	0	0
Petrochemical Production	0	0	0	0
Petroleum Refineries	0	0	0	0
Phosphoric Acid Production	0	0	0	0
Pulp and Paper Manufacturing	0	0	0	0
Silicon Carbide Production	0	0	0	0
Soda Ash Manufacturing	0	0	0	0

(continued)

Table A-2. New PSD Sources Expected to Experience Regulatory Relief at Alternative Threshold Levels by Industry Category (continued)

New PSD Sources	Sources Experiencing Regulatory Relief at Alternative Thresholds[1,2]			
Source Category	25,000 tpy	50,000 tpy	Final Rule Step 2 100,000 tpy	Final Rule Step 1 Anyway
Titanium Dioxide Production	0	0	0	0
Zinc Production	0	0	0	0
Ethanol Production	4	4	7	10
Food Processing	41	47	47	47
Unspecified Industrial Stationary Combustion (Other Manufacturing and Industrial Facilities)	529	534	544	546
Underground Coal Mines	0	0	0	0
Oil and Natural Gas Systems	23	38	44	48
Landfills	0	0	0	0
MWCs	0	1	1	2
Stationary Combustion Equipment (Generators)	299	299	299	299
All Commercial - Stationary Fuel Combustion	12,034	12,038	12,039	12,041
Multi-Family Fuel Combustion	6,397	6,400	6,400	6,400
Single-Family Fuel Combustion	515	515	515	515
All	19,863	19,906	19,930	20,002

[1]Regulatory alternatives reflect tons per year CO_2e potential to emit. Attachment B U.S. Environmental Protection Agency. April 2010. "Technical Support Document for Greenhouse Gas Emissions Threshold Evaluation." See docket at EPA-HQ-OAR-2009-0517.
[2]Modifying PSD sources are also expected to experience regulatory relief, but these estimates are not reflected in this table.

Attachment B

Technical Support Document for Greenhouse Gas Emissions Thresholds Evaluation

Air Quality Policy Division
Office of Air Quality Policy and Standards
U.S. Environmental Protection Agency

March 29, 2010

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Technical Support Document for Permit Thresholds for Greenhouse Gases

1. Purpose

The purpose of this document is to provide the background information that was used to support EPA's decision process on evaluating and selecting greenhouse gas (GHG) major source applicability thresholds for Prevention of Significant Deterioration (PSD) and Title V permitting for EPA's final rule "Prevention of Significant Deterioration and Title V Greenhouse Gas Tailoring Rule". The document describes the analysis used to estimate the number of existing and new facilities (e.g., industrial plant or commercial building) that would exceed different GHG emission threshold levels. The document also summarizes the results of this analysis for each sector. The results of this analysis served as one of the fundamental bases for evaluating administrative burdens at both existing permitting thresholds and for evaluating and selecting proposed alternative permitting thresholds to address administrative necessity concerns.

2. Overview

In order to support EPA's assessment of the administrative burden created by adding GHGs to existing Prevention of Significant Deterioration (PSD) and Title V permitting programs, it was necessary to develop information on the number of affected facilities at both the current permitting major source thresholds (generally, 100 tons per year for Title V and 100 or 250 tons per year for PSD depending on the source category classification) and at alternative higher thresholds. An affected facility would be one who's annual emissions of the GHG equal or exceed the major source threshold being evaluated.

Eight threshold levels ranging from 100 to 100,000 tons per year of GHG emissions were evaluated. Some of the alternative thresholds evaluated are the same as ones (e.g., 25,000 tons per year CO_2-equivalents) considered in previous studies and in support of EPA's proposed and final GHG mandatory reporting rules (GHG MRR, 74 FR 68, pp. 16447 – 16731 and 74 FR 209, pp. 56260-56519, respectively). One key difference between the emissions data developed for this analysis and the emissions data developed to support the proposed GHG MRR is that this analysis is based on a facility's "potential to emit" (PTE) while the proposed GHG reporting rule was based on "actual" emissions (i.e., the emissions a facility actually emits in a given year). PTE is defined as the maximum capacity of a stationary source to emit a pollutant under its physical and operational design, including certain legal limitations, for example, on emissions or hours of operation. NSR and Title V programs both use PTE for defining major sources. The end result is generally that more facilities will exceed a given threshold on a PTE basis than on an actual basis. This is an important differentiation in terms of both evaluating the thresholds under this rule and when comparing the results to other threshold analysis, such as the supporting data for the EPA's GHG MRR.

Although the primary focus of this analysis was on the potential administrative burden associated with different GHG permitting emission levels as represented in terms of number of facilities potentially subject to permitting, information on GHG emissions from affected facilities was also collected to assess the relative coverage of national stationary source GHG emissions at the different threshold levels. While the environmental impact associated with the different GHG permitting levels was not used as the basis for the GHG applicability thresholds identified in the final GHG tailoring rule, the information on national emissions coverage provides a useful measure to consider the potential scope of the proposed alternative thresholds, their coverage of key GHG emission source categories, and whether they promote the environmental purposes of the PSD and Title V programs.

3. Emissions-based Threshold Analysis

3.1 General Description of Overall Approach

This section presents a general description of the overall approach EPA used to evaluate a range of permitting thresholds in terms of the number of sources affected, and amount of emissions covered.

EPA made use of earlier analyses performed to develop emission thresholds for the proposed and final GHG MRR, or used the same data sources when additional analyses were required. EPA did not conduct primary research for this analysis, but instead relied on published research and publicly available government data, such as EPA's eGRID database of electric generating source emissions, Economic and Housing Census data, and Energy Information Agency (EIA) data on energy consumption.

3.1.1 Threshold Levels

EPA evaluated eight different GHG emission thresholds:

GHG Thresholds (tons per year)
100
250
1,000
5,000
10,000
25,000
50,000
100,000

The first two thresholds are the current Clean Air Act major source criteria pollutant thresholds for the federal operating permit program under Title V (generally, 100 tpy for major

source applicability), and the PSD construction permit program under Title I. Under PSD, a "major stationary source" is any source belonging to a specified list of 28 source categories which emits or has a PTE of 100 tpy or more, or any other source type which emits or has the potential to emit such pollutants in amounts equal to or greater than 250 tpy.

The six additional thresholds cover the range of thresholds evaluated for the proposed GHG MRR, and add two additional thresholds at 5,000 and 50,000 tons per year. Like the Clean Air Act, the permit thresholds are based on U.S. short tons (tons) instead of metric tons (mtons).

There is a three-orders-of-magnitude range in the thresholds which reflects the much higher quantity of GHG emissions compared to criteria pollutant emissions from the primary source of GHG emissions, fossil fuel combustion. For example, an uncontrolled natural gas-fired boiler that emits 100 tons of NO_x annually would at the same time emit about 100,000 tons of CO_2.

The threshold analysis of source counts and emissions was done on a "potential to emit" basis, because that is the basis that is relevant for the permitting requirements under PSD and title V. Potential emissions (in short tons) from each source were evaluated against the threshold levels in order to determine whether or not a source would be included in the threshold count. When a source was identified as being covered by a given threshold level, the actual emissions from that source were included to determine the emissions covered by the threshold. In other words, where summary tables present "Tg GHG Emissions Covered per Year" these are the actual emissions that would be covered by the threshold level, given the source count arrived at considering potential to emit emission levels.

3.1.2 Greenhouse Gases

EPA evaluated emissions of the major GHGs that are directly emitted by human activities at the eight threshold levels. The GHGs evaluated are shown below in Table 1. For purposes of this analysis emissions were evaluated on both an individual GHG mass basis and CO_2-equivalent basis (CO_2e). CO_2e normalizes the different heat trapping capacities of the different GHGs to that of CO_2. A quantity of a GHG is converted to a CO_2e basis by multiplying the mass of the compound emitted by its Global Warming Potential (GWP). The GWP is a metric that incorporates both the heat-trapping ability and atmospheric lifetime of each GHG relative to CO_2.

Table 1
Major GHGs Directly Emitted by Human Activities

Greenhouse Gas	Chemical Formula or Acronym	Global Warming Potential (GWP)*
Carbon dioxide	CO_2	1
Methane	CH_4	21
Nitrous oxide	N_2O	310
Perfluorocarbons	PFCs	Varies by compound
Hydrofluorocarbons	HFCs	Varies by compound
Sulfur hexafluoride	SF_6	23,900

* GWP values as codified in the EPA's final GHG mandatory reporting rule: Table A-1 to Subpart A of Part 98 – Global Warming Potentials, FR, Vol.74, No. 209, p. 56395.

Sector descriptions contained in this document include a discussion of GHGs evaluated for each sector. If the analysis included more than one GHG, the description includes gas-specific counts as well as a CO_2e count. The threshold analyses for stationary fossil fuel combustion were simplified by excluding CH_4 and N_2O emissions, because CO_2 comprises over 99 percent of GHG emissions from fossil fuel combustion.

3.1.3 Source Sectors

In this analysis EPA evaluated the same range of stationary source types with direct GHG emissions as identified in the proposed and final GHG MRR. The proposed GHG MRR source categories were based on a comprehensive review of all U.S. source categories with GHG emissions, to include the categories that emit the most significant amount of GHG emissions. The stationary sources evaluated in this analysis can be grouped in the sectors shown below:

- Electricity Generation (facilities with fossil fuel-fired electric generating units);
- Industry (range of industries with process and combustion GHG emissions);
- Energy (oil and gas extraction, transport, and processing; underground coal mining);
- Waste Treatment (landfills and municipal solid waste incinerators);
- Agriculture (stationary fuel combustion);
- Commercial (stationary fuel combustion); and
- Residential (stationary fuel combustion).

A number of direct emission source types included in the GHG MRR analysis were not included in the potential to emit analysis because the GHG emissions from these sources were primarily fugitive emissions. Fugitive emissions are emissions which are not released, or could not be reasonably released, through a stack or vent. Under the PSD rules, fugitive emissions are only included in potential to emit estimates if the source is one of 28 listed PSD source categories. Excluded fugitive emissions sources are listed below:

- Electrical equipment SF_6 emissions;
- Wastewater treatment plants not associated with one of 28 listed PSD source categories (combustion is captured in the commercial sector analysis); and
- Agricultural manure management.

3.1.4 Potential to Emit Methodology

As noted earlier, the potential to emit (PTE) is the amount of emissions that can be emitted from a source operating at full capacity. The annual PTE is based on operation at full equipment capacity, 24 hours per day, 365 days per year (8,760 hours per year). For example, if a boiler has a maximum rated heat input capacity of ten million Btu per hour, the annual PTE for that boiler is the amount of emissions from burning 87,600 million Btu of fuel:

10 mmBtu/hr x 8,760 hrs/yr = 87,600 mmBtu/yr

Capacity information and annual GHG emissions were available for some of the source categories from analyses performed to support the GHG MRR. In some cases the supporting analyses had already calculated GHG emissions on a full capacity basis, in which case EPA directly used those estimates as PTE estimates. Alternatively, some data from the supporting analysis estimated actual annual emissions using a baseline year. If capacity and baseline year production information was provided in the supporting data, EPA adjusted the source actual emissions estimate by the ratio of annual capacity to baseline production to estimate PTE. If capacity information was not available, EPA used capacity factors from other data sources to adjust actual emission estimates to PTE estimates. These capacity factors add varying uncertainty to the PTE estimate. Detailed descriptions of the different PTE calculation methodologies are included in the source descriptions in the following section.

Removal by pollution control equipment was considered in the PTE estimates, though control equipment removal was relevant in only a few cases (thermal oxidation of HPCs and CH_4). Also, as noted earlier, fugitive emissions, were only included in the PTE estimates if the source was one of the 28 listed PSD source categories. For example, fugitive CH_4 emissions from oil and gas transmission stations were not included in CH_4 or CO_2e emissions when comparing to the different thresholds, but were included for iron and steel plants.

3.1.5 New Construction

The source population data from the analyses supporting the GHG MRR, and other data sources provide information on existing sources and their emissions. The PSD and title V program requirements and applicability determinations, however, also apply to newly constructed sources.

The general approach for estimating the annual number of newly constructed sources was to apply growth rates in the number of units or facilities in a source category to the number of existing facilities at the different thresholds. Growth rates were available from a variety of sources including Economic Census data, EIA energy survey data, and various EPA regulatory impact analyses and information collection requests which require source population estimates. In some cases there was sufficient information to distribute new sources to different thresholds based on emission information specific to the new sources (electric generating, municipal solid waste combustors, and commercial stationary fuel combustion). Otherwise EPA assumed the same size and threshold distribution for new units as for existing units. For example, if the annual growth rate in a category was one percent, the number of existing facilities above a threshold were multiplied by the fractional growth rate to estimate the number of new facilities at that threshold per year.

EPA did not develop estimates for modifications to exsiting sources (which can be potentially subject to PSD requirements) as part of this threshold study; estimates for modifications were prepared under a separate burden analysis prepared for the final GHG tailoring rule and located in the final docket for the rulemaking[13].

3.2 Threshold Summary Results

The resulting counts of affected stationary source facilities and the amount of actual GHG emissions covered at different PTE thresholds for all sectors are shown in the tables below. GHG emissions covered at each threshold are in Tg, which is equivalent to million metric tons. SI units were used for the covered emissions to be consistent with the EPA's official U.S. GHG Inventory so that comparions could be made to the inventory in terms of emissions coverage at different applicability thresholds. The complete data for the sectors and subsectors are provided in supporting spreadsheets that accompany this report. These spreadsheets are identified in Appendices A and B.

[13] See "Summary of Methodology and Data Used to Estimate Burden Relief and Evaluate Resource Requirements at Alternative Greenhouse Gas (GHG) Permitting Thresholds" contained in the public docket for the final tailoring rule at EPA-HQ-OAR-2009-0517.

Table 2
CO_2e Threshold Summary -- All Stationary Source Sectors

GHG Threshold (tons per year)	Number of Existing Sources	Number of New Facilities Added per Year	CO_2e Emissions Covered (Tg per year)
100	6,118,252	67,469	3,867
250	1,079,483	19,755	3,786
1,000	302,863	4,430	3,723
5,000	59,140	549	3,622
10,000	30,341	313	3,564
25,000	16,564	140	3,493
50,000	9,980	96	3,387
100,000	5,326	72	3,267

Table 3
CO_2 Threshold Summary -- All Stationary Source Sectors

GHG Threshold (tons per year)	Number of Existing Sources	Number of New Facilities Added per Year	CO_2 Emissions Covered (Tg per year)
100	6,113,861	67,469	3,651
250	1,075,078	19,755	3,570
1,000	298,527	4,430	3,513
5,000	55,313	549	3,413
10,000	26,836	313	3,357
25,000	13,637	139	3,293
50,000	8,109	96	3,212
100,000	4,226	72	3,114

Table 4
CH_4 Threshold Summary -- All Stationary Source Sectors

GHG Threshold (tons per year)	Number of Existing Sources	Number of New Facilities Added per Year	CH_4 Emissions Covered (Tg per year)
100	4,201	0	7.807
250	3,851	0	7.759
1,000	2,887	0	7.321
5,000	1,042	0	4.740
10,000	466	0	3.697
25,000	138	0	2.234
50,000	34	0	1.185
100,000	3	0	0.211

Table 5
N_2O Threshold Summary -- All Stationary Source Sectors

GHG Threshold (tons per year)	Number of Existing Sources	Number of New Facilities Added per Year	N_2O Emissions Covered (Tg per year)
100	47	0	0.074
250	46	0	0.074
1,000	31	0	0.068
5,000	5	0	0.022
10,000	0	0	0
25,000	0	0	0
50,000	0	0	0
100,000	0	0	0

Table 6
High GWP Gases Threshold Summary -- All Stationary Source Sectors

GHG	GHG Threshold* (tons per year)	Number of Existing Sources	Number of New Facilities Added per Year	GHG Emissions Covered (Tg per year)
HFC	100	3	0	0.001
HFC	250	3	0	0.001
HFC	1,000	1	0	0.001
HFC	5,000 and above	0	0	0
PFC	100 and above	0	0	0
SF_6	100 and above	0	0	0

* Where a threshold is not listed for a particular GHG, threshold counts for that threshold and any higher thresholds can be assumed to be zero.

3.3 Electricity Generating Sector

Data Sources

The latest version of EPA's eGRID database (2006) was used to estimate the PTE of electricity generating facilities and counts of units above the different emission thresholds. The eGRID database includes year 2004 characteristics, operating information, and annual emissions (including CO_2) for U.S. facilities that have a generation capacity greater than one MW, and sell electric power to the grid.

A facility's PTE was estimated based on the eGRID generator table. The generator table, which is based on the 2004 EIA form 860 database, provides prime mover, generator nameplate capacity, and primary energy source (fuel type) for each generator down to 0.1 MW. To calculate PTE, we combined the nameplate capacity and primary fuel for each of the fossil-fired units with average fuel based prime mover heat rates (Btu/kWh) published by EIA (EIA, 2007).

Table 7
EGU Prime Mover Heat Rates
(EIA Electric Power Annual, Table A7, 2007)

Prime Mover	Fuel	Average Heat Rate (Btu/kWh)
Steam turbine	Coal	10,114
	Gas	10,466
	Oil	10,400
Simple combustion turbine	Gas	11,459
	Oil	13,216
Combined cycle combustion turbine	Gas	7,445
	Oil	11,015
Internal combustion engine	Gas	9,923
	Oil	10,149

The eGRID database includes cogeneration plants and generating units at industrial plants that primarily supply electric power and steam to a host facility. We eliminated these units from the electric generation facility population based on North American Industry Classification System (NAICS) code, so that the only facilities included were facilities with a NAICS code beginning with 22 (Utilities).

The generator-nameplate-heat-rate approach potentially underestimates PTE for cogeneration plants, where a portion of the burner heat input provides useful thermal energy in addition to electric output. This potential to underestimate PTE affects 321 of 2,237 or 14 percent of facilities evaluated.

Methodology for Existing Facilities

Fuel combustion was the only source of GHG emissions considered for the electricity generation sector. From the eGRID and EIA information EPA calculated a maximum annual fuel heat input based on 8,760 hours of operation for the combustors associated with the generator. This calculated maximum annual heat input was used with fuel combustion emission factors from the GHG MRR for the primary fuel, to calculate the facility PTE. The calculations covered 10,487 fossil fuel-fired generators with nameplate capacities down to 0.1 MW or 100,000 kW.

EPA also did not evaluate fugitive CH_4 emissions from facility coal piles. Fossil fuel-fired steam electric plants with heat input greater than 250 mmBtu/hr heat input are one of the 28 listed PSD source categories that include fugitive emissions when calculating PTE. However, the CO_2 PTE from combustion alone for this size facility is about 225,000 tons per year. This is

well over all of the emission thresholds considered in this analysis without consideration of the contribution of fugitive CH_4.

New Units

The eGRID generator table includes an online year field. To determine the number of new units per year at different thresholds EPA counted generators online each year and totaled the emissions associated with those generators at the facility level over the 15-year period from 1990 through 2004. Counts were made of the number of these facilities over the different PTE thresholds, and averaged over the 15 years to arrive at the number of new or modified facilities per year.

Threshold Summary

The table below shows the facilities and emissions covered at the different emission thresholds based on the described methodology. There were a total of 2,237 facilities in the electric generation population, so all facilities and all emissions are covered up to the 5,000 ton PTE threshold. Almost all emissions (99.9 percent), and about 75 percent of facilities are covered at the highest 100,000 ton PTE threshold.

Table 8
CO_2 Threshold Summary Results -- Electricity Generating Sector

GHG Threshold (tons per year)	Number of Existing Sources	Number of New Facilities Added per Year	CO_2Emissions Covered (Tg per year)
100	2,237	93	2,373
250	2,237	93	2,373
1,000	2,237	93	2,373
5,000	2,237	91	2,373
10,000	2,195	86	2,373
25,000	2,076	73	2,373
50,000	1,911	64	2,373
100,000	1,721	60	2,371

3.4 Industrial Sector

The industrial sector comprises establishments engaged in the mechanical, physical, or chemical transformation of materials, substances, or components into new products, and specifically includes businesses classified in Sectors 31 – 33 according to the North American

Industry Classification System (NAICS). Industrial source greenhouse gases result from manufacturing processes as well as combustion processes. Because there is a great deal of variability within the sector, this technical support document includes industry-specific discussions after a general sector overview.

For the industrial sector, EPA considered the six individual greenhouse gases separately, and also prepared an analysis considering CO_2e. In preparation of the GHG MRR, EPA identified 23 industrial sectors where the GHG emissions were significant; these sectors are listed in Table 9.

Table 9
Industrial Sectors and GHG Emissions

NAICS Code	Industrial Sector	CO_2	CH_4	N_2O	SF_6	HFC	PFC
325199	Adipic Acid Production	X		X			
331312	Aluminum Production	X					X
325311	Ammonia Production	X					
327310	Cement Production	X					
334	Electronics Manufacturing	X			X	X	X
325193	Ethanol Production	X					
331112	Ferroalloy Production	X	X				
3116	Food Processing	X					
327	Glass Production	X					
325120	HCFC-22 Production	X				X	
	Hydrogen Production	X					
331111	Iron and Steel Production	X	X				
3314	Lead Production	X					
327410	Lime Manufacturing	X					
3314	Magnesium Production	X			X		
325311	Nitric Acid Production	X		X			
3251	Petrochemical Production	X	X				
324110	Petroleum Refineries	X	X				
325312	Phosphoric Acid Production	X					
3221	Pulp and Paper Manufacturing	X					
327910	Silicon Carbide Production	X	X				
325181	Soda Ash Manufacturing	X					
325188	Titanium Dioxide Production	X					
3314	Zinc Production	X					

In addition, there are a large number of industrial establishments across all industrial sectors that emit less significant amounts of GHGs (primarily CO_2) from stationary source fuel combustion. Combustion emissions from these establishments were analyzed under the Unspecified Industrial Stationary Combustion source category.

3.4.1 Data Sources

There were several primary data sources used in preparation of the permit threshold analysis. EPA consulted analyses prepared in support of the GHG MRR for the 23 industrial sectors for which combustion, process and fugitive emissions were significant. These documents can be found in the docket numbered EPA-HQ-OAR-2008-0508. The TSDs contain industry-specific analyses of process, fugitive, and combustion emissions for industries. Supporting analyses used to prepare the TSDs are found in entries 0046.7 and 0046.8 of the GHG MRR docket. These emissions estimate details were helpful in breaking down TSD emission estimates to compare facility-specific emissions against the additional threshold levels considered in the permit threshold analysis, including 100, 250, 5,000, and 50,000 tons per year.

Combustion emissions analyses for the Unspecified Industrial Stationary Combustion sectors used data from the 2002 Manufacturing Energy Combustion Survey (MECS) and the U.S. Census Bureau's 2002 Economic Census. MECS is a survey of manufacturing and industrial energy uses and costs prepared by the EIA (EIA, 2007). Data is collected by manufacturing establishment through mailed questionnaires. The 2002 MECS data reflects responses accounting for approximately 98 percent of the manufacturing payroll, and reports separate energy use estimates for 48 NAICS industrial sector groups. The MECS provided information on the amount of fuel burned in 2002 by sector on an employment basis. The 2002 Economic Census data provided information on the number of establishments sorted by three-digit NAICS code and disaggregated into specific size categories based on employment (U.S. Census, 2004).

3.4.2 Potential to Emit

As mentioned earlier in this document, permit threshold analyses considered both actual emissions and PTE. When capacity information was not available, the analyses applied utilization rates from the Industrial Production and Capacity Utilization, Federal Reserve Statistical Release G-17 in order to adjust actual emissions to determine PTE emissions. These utilization rates are prepared quarterly with annual revisions, and are published on the web (http://www.federalreserve.gov/releases/g17). The main data source for the industrial production and capacity utilization rates is the U.S. Census Bureau's Census of Manufactures. Data introduced from other Census Bureau publications include the Census of Services and the Services Annual Survey (for publishing) and selected Current Industrial Reports. Additional government source data include new annual data on minerals from the U.S. Geological Survey (USGS) and updated deflators from the Bureau of Economic Analysis (BEA). In addition, the annual revisions include monthly production estimates that reflect updated seasonal factors and the inclusion of monthly source data that became available (or were revised) after the closing of the regular four-month reporting window.

3.4.3 Methodology for New Units

To determine the number of new units per year, EPA compared the number of establishments by three-digit NAICS code in 1998 to the number of establishments by three-digit NAICS code in 2002, and determined an average annual growth rate for each three-digit NAICS code. The growth rates were applied to each threshold count to determine the number of annual new establishments per industry per threshold. If the growth rate was determined to be negative, EPA assumed that no new establishments would be added; however, establishments were not reduced to reflect negative growth rates. EPA also supplemented these growth rates with agency estimates of expected new sources from various information collection requests (ICR) and regulatory impact analyses (RIA) efforts.

3.5 Methodology for Existing Unspecified Industrial Stationary Combustion Source Category Emissions

In order to determine establishment counts and emissions totals for the unspecified industrial stationary combustion sources, EPA used 2002 Economic Census data showing manufacturing employment by NAICS code and Manufacturing Energy Consumption Survey (MECS) data published by EIA. Calculating greenhouse gas emissions required determining energy consumption per employee by industry and applying emission factors specific to the consumption profile derived from MECS data.

The Economic Census data (2002) provide a count of establishments by employment category, where employment category is defined by number of employees (e.g., 1 – 4, 5 – 9,…,500 – 999,…,more than 2,500). The MECS energy consumption data provide energy consumption by industry. Both the employment data and the energy consumption data are organized according to the NAICS codes.

As part of this analysis, EPA calculated industry-specific GHG emission factors. The factors were calculated by considering actual fuel consumption in 2002, as determined by EIA. Actual fuel consumed was multiplied by fuel-specific GHG emission factors to determine GHG emissions by fuel type by industry. To simplify the analysis, EPA only included CO_2 emissions and ignored CH_4 and N_2O in the CO_2e calculations. CO_2 makes up between 99.3 and 99.7 percent of estimated CO_2e emissions. Emissions for each fuel type were combined to determine total emissions for a sector. Total emissions per sector were divided by total energy consumption per sector to determine a factor to calculate GHG emissions per mmBtu of energy consumption specific to the industrial sector.

The GHG emission factors were then multiplied by the energy consumption per employee in order to determine emissions per employee. Multiplying the result by the average number employees per establishment, EPA determined total GHG emissions per establishment. The total emissions numbers were used to determine number of establishments and volume of emissions that would be caught by each of the permit thresholds under consideration.

As discussed previously, a separate threshold analysis was conducted for 23 industrial sectors determined to have significant GHG emissions in the GHG MRR analysis. In order to quantify the unspecified industrial stationary combustion source emissions, the combustion emissions and establishment counts from 19 of these sectors were subtracted from the total industrial MECS analysis. For the remaining four industries, HCFC-22 production, hydrogen production, magnesium production, and nitric acid production, EPA could not readily isolate combustion emissions. For these industries, their establishment counts were subtracted from the unspecified industrial source threshold counts based on process emission threshold evaluations, assuming that any facility exceeding a threshold for process-based emissions would exceed the threshold regardless of their combustion CO_2 emissions.

Potential to Emit

In order to determine potential to emit from the MECS and Economic Census numbers, EPA assumed a capacity utilization factor of 50%. There is a wide variety of generally smaller manufacturing sources included under this general source category. Based on comments we received on the proposed GHG tailoring rule, we are using a 50% capacity utilization rate for this final analysis to better reflect what can be deemed reasonable operation under normal conditions for facilities in these source categories. Sources may operate their combustion equipment at levels above and below this capacity utilization rate, but we believe the 50% utilization rate reflects a reasonable average rate across the variety of facilities represented in this category.

New Units

EPA applied industry-specific growth rates to each sector and summed across sectors in order to determine number of new units.

Threshold Summary

Table 10
CO_2e Threshold Summary -- Unspecified Industrial Stationary Combustion

GHG Threshold (tons per year)	Number of Existing Sources	Number of New Facilities Added per Year	CO_2e Emissions Covered (Tg per year)
100	172,142	546	372.307
250	112,659	319	367.636
1,000	64,535	239	357.855
5,000	20,785	83	318.759
10,000	12,215	61	289.198
25,000	5,875	18	245.579
50,000	3,272	12	206.881
100,000	958	2	145.106

3.6 Methodology for Existing Specific Industrial Sectors Considering Combustion, Process, and Fugitive Emissions

These analyses were based primarily on the GHG MRR TSDs and the supporting analyses, including facility specific emission information. The estimates considered each greenhouse gas separately. The GHG MRR TSDs included threshold counts and emissions calculations for 1,000, 10,000, 25,000, and 100,000 metric tons per year. Two steps were required for permit threshold consideration. First, emissions were recalculated in order to conduct the analysis in short tons for comparison to the permit thresholds. Second, the emissions were considered against the finer threshold stratification considered in the permit threshold analysis.

For the permit threshold analysis, EPA determined that if the GHG MRR analysis showed all of the establishments exceeded a threshold, after adjustment for short tons, all of the establishments exceeded any lower thresholds. However, where fewer than 100 percent of the establishments exceeded a threshold, additional analysis was required to compare emissions to the permit thresholds of 100, 250, 5,000, and 50,000 tons per year. EPA used the supporting summaries for the GHG MRR which included facility-specific consumption, process, and fugitive emission reports in order to determine counts and emissions for each of the permit thresholds.

3.6.1 Adipic Acid Production

There are four Adipic Acid Production plants in the U.S., all of which are estimated to exceed the highest 100,000 metric tons per year emission threshold for CO_2e on an actual emissions basis. Therefore all plants will also exceed all PTE thresholds on a CO_2e basis. The CO_2e emission estimate includes N_2O process emissions that total about 5.9 million metric tons CO_2e, and 3.4 million metric tons of CO_2 from stationary fuel combustion sources.

N_2O

Individual plant production and emission estimates were not made available because of confidential business information (CBI) claims. However, from the *Technical Support Document for the Adipic Acid Production Sector: Proposed Rule for Mandatory Reporting of Greenhouse Gases* (EPA-HQ-OAR-2008-0508-0005), overall U.S. adipic acid production was estimated to total approximately one million metric tons in 2006. The smallest U.S. plant only produced about two percent of the total. This plant, however, is the only plant that is uncontrolled. The three larger plants with the bulk of production have control equipment with N_2O control efficiencies that range from 90 to 99 percent.

The uncontrolled N_2O emission factor is 300 kg N_2O/mton adipic acid. Based on the two percent production share, this uncontrolled plant emitted about 6,000 metric tons of N_2O (no GWP adjustment). This leaves about 13,100 metric tons of N_2O from the three larger controlled plants. Two plants representing about 64 percent of production have control efficiencies in the range of 90 to 95 percent, and one plant with about 34 percent of production has control close to 99 percent (EPA, 2001).

Assuming similar production shares today, the share of national production (which is assumed for this analysis to be equivalent to capacity) appears to range from 30 to 35 percent for the three plants. Therefore, emissions and PTE for the controlled plants range from to 4,000 metric tons to 4,700 metric tons of N_2O per year.

CO_2

The CO_2 emissions from fuel combustion can similarly be apportioned to the four plants. The smallest plant, with only two percent of national production, is estimated at CO_2 emissions of 67,500 metric tons, and the next smallest, with 30 percent of national production, is estimated at 101,300 metric tons.

Potential to Emit

The PTE for each facility was assumed to be equivalent to the emissions based on the apportionment described above.

New Units

EPA assumed that no new plants would be constructed for this sector.

Threshold Summary

Table 11
CO_2 Threshold Summary -- Adipic Acid Production

GHG Threshold (tons per year)	Number of Existing Sources	Number of New Facilities Added per Year	CO_2 Emissions Covered (Tg per year)
100	4	0	3.376
250	4	0	3.376
1,000	4	0	3.376
5,000	4	0	3.376
10,000	4	0	3.376
25,000	4	0	3.376
50,000	4	0	3.376
100,000	3	0	3.309

Table 12
N_2O Threshold Summary -- Adipic Acid Production

GHG Threshold (tons per year)	Number of Existing Sources	Number of New Facilities Added per Year	N_2O Emissions Covered (Tg per year)
100	4	0	0.019
250	4	0	0.019
1,000	4	0	0.019
5,000	1	0	0.006
10,000	0	0	0
25,000	0	0	0
50,000	0	0	0
100,000	0	0	0

Table 13
CO_2e Threshold Summary -- Adipic Acid Production

GHG Threshold (tons per year)	Number of Existing Sources	Number of New Facilities Added per Year	CO_2e Emissions Covered (Tg per year)
100	4	0	9.298
250	4	0	9.298
1,000	4	0	9.298
5,000	4	0	9.298
10,000	4	0	9.298
25,000	4	0	9.298
50,000	4	0	9.298
100,000	4	0	9.298

3.6.2 Aluminum Production

The primary aluminum production process results in emissions of CO_2 and PFCs. The reduction of the alumina occurs through electrolysis in a molten bath of natural or synthetic cryolite (Na_3AlF_6). The reduction cells contain a carbon lining that serves as the cathode. Carbon is also contained in the anode, which can be a carbon mass of paste, coke briquettes, or prebaked carbon blocks from petroleum coke. During reduction, most of the carbon in the anode is oxidized and released to the atmosphere as CO_2.

Potential to Emit

CO_2

The *Technical Support Document for Process Emissions from Primary Production of Aluminum: Proposed Rule for Mandatory Reporting of Greenhouse Gases* (EPA-HQ-OAR-2008-0508-0006) apportioned CO_2 emission estimates from the U.S. GHG inventory to the 13 operating smelters based on each smelters share of total capacity. Operating smelter emissions were all above 100,000 tons of CO_2, so no PTE estimate was required. Capacity information for the two idle smelters shows that these smelters are also capable of emitting over 100,000 tons of CO_2 per year.

PFCs

The reduction cells also emit two PFCs: perfluoromethane (CF_4) and perfluoroethane (C_2F_6). The GWPs of the two PFCs are 6,500 and 9,200 respectively. During the smelting

process, when the alumina ore content of the electrolytic bath falls below critical levels required for electrolysis, rapid voltage increases occur, which are termed "anode effects." Anode effects cause carbon from the anode and fluorine from the dissociated molten cryolite bath to combine, and produce fugitive emissions of CF_4 and C_2F_6.

Anode effects released approximately 2.5 million metric tons of CF_4 and C_2F_6 in 2006 as documented in the GHG MRR TSD. CF_4 made up at least 85 percent of the combined emissions in 2006 (Inventory of U.S. GHG Emissions and Sinks: 1990 – 2007). These emissions on a CO_2e basis are equivalent to about 410 short tons of combined emissions as PFC. The proposed GHG MRR TSD estimated CO_2e emissions from primary aluminum smelters at full capacity. The largest smelter has 11 percent of U.S. operating capacity. Therefore the largest smelter has a PTE of not more than 45 tons of PFC, and no facilities have a PTE greater than 100 tons.

New Units

No new primary aluminum facilities are expected to be built. The growth rate in primary metals from the Economic Census data is only about 0.4 percent.

Threshold Summary

Threshold summaries are displayed below for CO_2 and CO_2e. All facilities have a PFC PTE less than 100 tons per year on a PFC basis.

Table 14
CO_2 Threshold Summary -- Primary Aluminum

GHG Threshold (tons per year)	Number of Existing Sources	Number of New Facilities Added per Year	GHG Emissions Covered (Tg per year)
100	15	0	3.800
250	15	0	3.800
1,000	15	0	3.800
5,000	15	0	3.800
10,000	15	0	3.800
25,000	15	0	3.800
50,000	15	0	3.800
100,000	15	0	3.800

Table 15
CO_2e Threshold Summary -- Primary Aluminum

GHG Threshold (tons per year)	Number of Existing Sources	Number of New Facilities Added per Year	GHG Emissions Covered (Tg per year)
100	15	0	3.951
250	15	0	3.951
1,000	15	0	3.951
5,000	15	0	3.951
10,000	15	0	3.951
25,000	15	0	3.951
50,000	15	0	3.951
100,000	15	0	3.951

3.6.3 Ammonia Production

EPA reviewed the proposed *Supporting Data for Threshold Analysis Subpart E – W, Greenhouse Gas Mandatory Reporting Rulemaking*, March 10, 2009 (EPA-HQ-OAR-2008-0508-0046.7) to determine actual emissions and calculate the potential to emit for 24 ammonia plants in operation. The analysis spreadsheet details CO_2 actual emission calculations for each plant based on ammonia production and urea production, and CO_2, CH_4, and N_2O emission calculations for stationary fuel combustion based on 2006 data. For purposes of permit threshold analysis, the CH_4 and N_2O emissions from combustion were not significant.

Potential to Emit

Capacity information in the spreadsheet is based on the engineering design capacity adjusted for 340 days per year of effective production capability, using information provided by the United States Geological Survey (USGS). The PTE estimates were made by multiplying the actual emission estimates by the ratio of annual ammonia capacity to annual ammonia production adjusted to 365 days a year of operation instead of 340. EPA assumed that ratio also held for stationary combustion units at the plant.

New Units

EPA assumed that no new plants would be constructed for this sector.

Threshold Summary

Table 16
CO_2e Threshold Summary -- Ammonia Production

GHG Threshold (tons per year)	Number of Existing Sources	Number of New Facilities Added per Year	CO_2e Emissions Covered (Tg per year)
100	24	0	14.543
250	24	0	14.543
1,000	24	0	14.543
5,000	24	0	14.543
10,000	24	0	14.543
25,000	24	0	14.543
50,000	24	0	14.543
100,000	22	0	14.540

3.6.4 Cement Production

Process-related CO_2 emissions from cement production are the second largest source of industrial CO_2 emissions in the United States. Cement production is done in two stages. The first stage is clinker production. In clinker production, raw materials (primarily limestone) are heated to induce calcination and produce lime. Lime reacts with silica-containing materials and iron ore and aluminum to form clinker. During the process, CO_2 is generated as a byproduct and released to the atmosphere. Also during clinker production, some of the clinker raw materials form partially or fully calcinated cement kiln dust instead of forming clinker, resulting in additional process-related CO_2 emissions. In the second stage of the production process, the clinker is ground and mixed with gypsum and other materials to make cement.

Potential to Emit

The *Technical Support Document for Process Emissions from Cement: Proposed Rule for Mandatory Reporting of Greenhouse Gases* (EPA-HQ-OAR-2008-0508-0008) shows 107 cement facilities in the U.S., 106 of which exceed all permit thresholds for CO_2 (according to the TSD, the one facility that does not exceed the 100,000 tons per year threshold accounted for over 90,000 metric tons of CO_2e and approximately one-tenth of one percent of the cement industry emissions in 2006).

New Units

Growth for the industrial sector was estimated at 0.4 percent, and as such, no additional facilities were included in this analysis.

Threshold Summary

Table 17
CO_2e Threshold Summary -- Cement Production

GHG Threshold (tons per year)	Number of Existing Sources	Number of New Facilities Added per Year	CO_2e Emissions Covered (Tg per year)
100	107	0	86.83
250	107	0	86.83
1,000	107	0	86.83
5,000	107	0	86.83
10,000	107	0	86.83
25,000	107	0	86.83
50,000	107	0	86.83
100,000	106	0	86.74

3.6.5 Electronic Production

The *Technical Support Document for Process Emissions from Electronics Manufacture (Semiconductors, MEMs, Liquid Crystal Displays, and Photovoltaics)* (EPA-HQ-OAR-2008-0508-0009) examined emissions of high GWP gases for semiconductor and related industry plants. Emissions from stationary fuel combustion were not included in the source category analysis, but were instead captured by the unspecified industrial stationary combustion analysis. EPA has followed this approach here as well.

Approximately one million metric tons of SF_6 as CO_2e were emitted from the semiconductor industry in 2006 (Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990 – 2007). This is equivalent to 46 short tons of SF_6. The semiconductor industry uses multiple long-lived fluorinated gases in plasma etching and plasma enhanced chemical vapor deposition (PECVD) processes to produce semiconductor products. These include PFCs, which are also used as heat transfer fluids. Approximately 3.5 million metric tons of PFCs as CO_2e were emitted from the semiconductor industry in 2006 (Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990 – 2007).

Table 18
Electronic Production PFC Emissions

Semiconductor PFC	2006 CO_2e Emissions (million mtons)	PFC GWP	2006 PFC Emissions (tons)
CF_4	1.2	6,500	204
C_2F_6	2.2	9,200	264
C_4F_8	0.1	8,700	13
Total	3.5	--	481

Potential to Emit

The Federal Reserve capacity utilization factor for the electronics industry in 2006 was 79.8 percent. Based on this capacity utilization factor the PTE of all of the semiconductor plants combined is estimated at 56 tons of SF_6 and 600 tons of PFC.

EPA identified 216 facilities in the semiconductor-electronics sector. Of these, the largest facility emitted six percent of total semiconductor emissions on a CO_2e basis (includes non-PFCs), which is a maximum of 30 tons of PFC. On a PTE basis, the largest facility would emit 36 tons, based on an assumption that the industry capacity is distributed similarly to emissions. Therefore no facility exceeds 100 tons per year on an actual or PTE basis for PFC.

New Units

Growth for the industrial sector was estimated at -1.8 percent, and as such, no additional facilities were included in this analysis.

Threshold Summary

Electronics industry emissions from plant processes only exceed emission thresholds on a CO_2e basis. Facility stationary fuel combustion emissions are not included in the threshold comparisons for the industry.

Table 19
CO_2e Threshold Summary -- Electronics Production

GHG Threshold (tons per year)	Number of Existing Sources	Number of New Facilities Added per Year	CO_2e Emissions Covered (Tg per year)
100	199	0	5.948
250	191	0	5.947
1,000	159	0	5.934
5,000	109	0	5.819
10,000	88	0	5.701
25,000	65	0	5.399
50,000	54	0	5.100
100,000	22	0	3.417

3.6.6 Ethanol Production

In the proposed GHG MRR, EPA determined that the sources of GHG emissions at ethanol production facilities that must be reported under the proposed rule are stationary fuel combustion, onsite landfills, and onsite wastewater treatment. For the GHG MRR supporting analysis, data were unavailable to estimate facility emissions from these combined sources. Instead, data on stationary fuel combustion requirements for different plant capacities were used to estimate the minimum number of facilities that would meet each of the examined reporting rule facility-level thresholds. CO_2 emissions from combustion constitute the majority of the GHG emissions from ethanol production and therefore provide an adequate measure for determining threshold counts.

Table 20
Ethanol Fuel Combustion CO_2e Emissions by Plant Size
(from the Proposed GHG MRR TSD Spreadsheet)

Ethanol Produced (wet milling process) (million gallons)	Coal Combustion Emissions (mtons CO_2e/year)	Natural Gas Combustion Emissions (mtons CO_2e/year)
290	1,519,585	853,536
245	1,283,787	721,091
200	1,047,990	588,646
200	1,047,990	588,646
100	523,995	294,323
85	445,396	250,174
40	209,598	117,729
35	183,398	103,013
20	104,799	58,865
2.6	13,624	7,652

Table 21
Proposed Reporting Rule Threshold Analysis Results

Threshold CO_2e (tons per year)	Number of Existing Sources -- Actual Basis	Percent of Existing National Sources*
1,000	101	72%
10,000	93	66%
25,000	86	61%
100,000	43	31%

* National ethanol production source population was estimated at 140 plants nationwide.

Potential to Emit

The permit threshold PTE analysis relied on this same approach and data. Therefore CH_4 emissions from onsite landfills and wastewater treatment plant digesters were not included in the PTE analysis, and we did not estimate emission coverage at each threshold. Also, the analysis for the proposed GHG MRR did not evaluate thresholds of 100, 250, 5,000, and 50,000 tons per year. EPA assumed that all existing plants would exceed the 100 and 250 ton per year thresholds

based on fuel combustion associated with the wet milling process. For the 5,000 and 50,000 thresholds, EPA included the number of sources exceeding the next highest threshold. For example, the count of sources exceeding the 5,000 tons per year level only includes the sources exceeding the 10,000 ton threshold in the *Technical Support Document for Ethanol Facilities: Proposed Rule for Mandatory Reporting of Greenhouse Gases* (EPA-HQ-OAR-2008-0508-0010).

New Units

EPA estimates that ten new ethanol production facilities will be built per year.

Threshold Summary

Table 22
CO_2e Threshold Summary -- Ethanol

GHG Threshold (tons per year)	Number of Existing Sources	Number of New Sources Added per Year
100	140	10
250	140	10
1,000	101	7
5,000	101	7
10,000	93	7
25,000	86	6
50,000	86	6
100,000	43	3

3.6.7 Ferroalloy Production

In evaluating ferroalloy production in the U.S., EPA considered actual production at six facilities, as published in the U.S. Inventory of Greenhouse Gas Emissions and Sinks: 1990 – 2007 for 2006, and the capacity to produce at three facilities for which production information was not published due to competitive concerns.

Potential to Emit

EPA's PTE calculations consider the Federal Reserve's 2006 monthly industrial capacity utilization estimates for the primary metals industry classification which shows utilization at 85.9

percent for 2006. The PTE calculations do not affect the threshold analysis, because all facilities emit over 100,000 metric tons of CO_2e per year.

New Units

Applying the growth factor for the industrial sector, 0.4 percent, results in no additional facilities for the analysis.

Threshold Summary

Table 23
CO_2 Threshold Summary -- Ferroalloy Production

GHG Threshold (tons per year)	Number of Existing Sources	Number of New Facilities Added per Year	CO_2 Emissions Covered (Tg per year)
100	9	0	1.717
250	9	0	1.717
1,000	9	0	1.717
5,000	9	0	1.717
10,000	9	0	1.717
25,000	9	0	1.717
50,000	9	0	1.717
100,000	9	0	1.717

Table 24
CH_4 Threshold Summary -- Ferroalloy Production

GHG Threshold (tons per year)	Number of Existing Sources	Number of New Facilities Added per Year	CH_4 Emissions Covered (Tg per year)
100	3	0	0.0003
250	0	0	0

Table 25
CO_2e Threshold Summary -- Ferroalloy Production

GHG Threshold (tons per year)	Number of Existing Sources	Number of New Facilities Added per Year	CO_2e Emissions Covered (Tg per year)
100	9	0	1.726
250	9	0	1.726
1,000	9	0	1.726
5,000	9	0	1.726
10,000	9	0	1.726
25,000	9	0	1.726
50,000	9	0	1.726
100,000	9	0	1.726

3.6.8 Food Processing

Food processing includes meat, poultry and fruit and vegetable processing. Emissions derive from combustion and fugitive methane related to wastewater treatment. For purposes of this permit threshold analysis, EPA did not consider the fugitive methane from wastewater treatment because these are the only greenhouse gas emissions from the source category other than combustion, and food processing is not a listed PSD source category. Consequently, emissions from this subsector considered in this analysis were limited to combustion emissions and were calculated using the MECS approach.

Potential to Emit

EPA used the Federal Reserve's 2004 capacity utilization factor of 79.3 percent for the food industry to calculate PTE emissions.

New Units

In addition, new establishments were calculated assuming a continuation of the growth rate of 1.2 percent, as calculated using the methodology described earlier in this document.

Threshold Summary

Table 26
CO_2 Threshold Summary -- Food Processing

GHG Threshold (tons per year)	Number of Existing Sources	Number of New Facilities Added per Year	CO_2e Emissions Covered (Tg per year)
100	3946	47	16.848
250	2281	27	16.709
1,000	1499	18	16.379
5,000	1030	12	15.723
10,000	749	9	14.354
25,000	482	6	12.257
50,000	10	0	0.596
100,000	0	0	0

3.6.9 Glass Manufacturing

EPA used the *Supporting Data for Threshold Analysis Subpart E – W, Greenhouse Gas Mandatory Reporting Rulemaking*, March 10, 2009 (EPA-HQ-OAR-2008-0508-0046.7), to analyze emissions for permit thresholds from glass manufacturing. Annual fuel combustion and glass production are estimated for each plant based on 2004 estimated plant sales and 2002 MECS energy intensity (energy per sales dollars). The spreadsheet shows CO_2 emission estimates from industrial processes and stationary fuel combustion, as well as CH_4 and N_2O emission estimates from stationary fuel combustion.

Potential to Emit

Plant capacities are not available in the spreadsheet. To estimate PTE, EPA divided the actual annual emissions by a capacity utilization factor of 0.50 or 50 percent.

New Units

EPA used an estimated annual growth rate of 0.4 percent for the nonmetallic mineral product manufacturing sector to determine the number of new units for this analysis.

Threshold Summary

Table 27
CO_2e Threshold Summary -- Glass Manufacturing

GHG Threshold (tons per year)	Number of Existing Sources	Number of New Facilities Added per Year	CO_2e Emissions Covered (Tg per year)
100	369	1	4.425
250	364	1	4.425
1,000	222	1	4.341
5,000	201	1	4.302
10,000	175	1	4.162
25,000	104	0	3.277
50,000	21	0	1.208
100,000	3	0	0.366

3.6.10 HCFC-22 Production

Chlorodifluoromethane (HCFC-22) is produced for use in refrigeration and air conditioning systems and as a chemical feedstock for manufacturing synthetic polymers. Because HCFC-22 depletes stratospheric ozone, its production for non-feedstock uses is scheduled to be phased out by 2020 under the U.S. Clean Air Act. Feedstock production, however, is permitted to continue indefinitely.

A high global warming potential (GWP) greenhouse gas, trifluoromethane (HFC-23), is generated as a byproduct during the manufacture of HCFC-22. Emissions of HFC-23 in 2006 were estimated to be 13.8 million metric tons on a CO_2e basis from three HCFC-22 production plants. Estimates were based on the plants operating at capacity. Annual emissions in terms of both metric tons CO_2e and tons HFC-23 are summarized in Table 30 below.

Table 28
HCFC-22 Production HFC-23 Emissions

HCFC-22 Production	2006 CO_2e Emissions (million metric tons)	HFC GWP	2006 HFC Emissions (short tons)
HFC-23	13.8	11,700	1,300

Source: Reporting Rule TSD

Potential to Emit

Confidential business information (CBI) claims on production information limited EPA's PTE analysis. The *Technical Support Document for Emissions of HFC-23 from Production of HCFC-22: Proposed Rule for Mandatory Reporting of Greenhouse Gases* (EPA-HQ-OAR-2008-0508-0015) estimated that all three plants emit over 100,000 metric tons CO_2e on a capacity basis by a factor of 85 or more, or a minimum of 800 short tons of HFC-23. These estimates did not account for HFC-23 capture and destruction at two of the three plants. Therefore, actual emissions at two of the plants will be lower, and can be limited through permitting. We assumed that all three plants exceed the 100 and 250 ton actual and PTE thresholds, and that one plant (uncontrolled) exceeds the 1,000 ton PTE threshold.

Because the TSD did not include estimates of CO_2 emissions from fuel combustion, and the CBI claims noted above, the PTE analysis does not quantify fuel combustion emissions specifically for the three plants. Stationary fuel combustion emissions from the plants were instead captured under the analysis for unspecified industrial stationary combustion.

New Units

U.S. production between 1990 and 2006 increased by 11 percent while emissions declined by 62 percent. The declines in emissions from control equipment and process changes offset the production increases. Therefore we did not estimate any new facilities or modifications that would increase facility emissions more than 100 tons per year.

Threshold Summary

Table 29
HFC Threshold Summary -- HCFC-22 Production

GHG Threshold (tons per year)	Number of Existing Sources	Number of New Facilities Added per Year	HFC Emissions Covered (Tg per year)
100	3	0	0.001
250	3	0	0.001
1,000	1	0	0.001
5,000	0	0	0

Table 30
CO_2e Threshold Summary -- HCFC-22 Production

GHG Threshold (tons per year)	Number of Existing Sources	Number of New Facilities Added per Year	CO_2e Emissions Covered (Tg per year)
100	3	0	13.848
250	3	0	13.848
1,000	3	0	13.848
5,000	3	0	13.848
10,000	3	0	13.848
25,000	3	0	13.848
50,000	3	0	13.848
100,000	3	0	13.848

3.6.11 Hydrogen Production

EPA estimated CO_2 emissions from merchant hydrogen production using the process and combustion ratio of 8.62 tons of CO_2 emissions per ton of hydrogen production. About 95 percent of all hydrogen (not just merchant hydrogen) produced in the U.S. today is made from natural gas via steam methane reforming. In steam methane reforming fueled by natural gas combustion, the process and combustion emissions go up the same stack from the boiler/reformer unit. Because the emissions are predominately process emissions and because

the natural gas combustion products are emitted from the same stack, EPA has treated all the emissions as process emissions.

Potential to Emit

EPA developed estimates assuming hydrogen production at capacity level. Therefore, no adjustment to the emissions estimates is needed to account for PTE emissions.

New Units

Based on the industry growth factor of -0.1 percent for chemical manufacturing, EPA assumed that no new plants would be constructed.

Threshold Summary

Table 31
CO_2 Threshold Summary -- Hydrogen Production

GHG Threshold (tons per year)	Number of Existing Sources	Number of New Facilities Added per Year	CO_2e Emissions Covered (Tg per year)
100	75	0	15.227
250	75	0	15.227
1,000	74	0	15.226
5,000	62	0	15.202
10,000	51	0	15.130
25,000	42	0	15.007
50,000	38	0	14.890
100,000	32	0	14.441

3.6.12 Iron and Steel Production

EPA used the *Supporting Data for Threshold Analysis Subpart E – W, Greenhouse Gas Mandatory Reporting Rulemaking*, March 10, 2009 (EPA-HQ-OAR-2008-0508-0046.7) for the proposed GHG MRR threshold analysis to determine process and combustion CO_2 and process CH_4. The iron and steel production source category includes taconite iron ore processing facilities, integrated iron and steel making facilities, electric arc furnace (EAF) steelmaking facilities that are not located at integrated iron and steel facilities, and coke oven facilities that

are not located at integrated iron and steel facilities. Facility processes and facilities covered in the spreadsheet are shown in the table below.

Table 32
Iron and Steel Processes, Facilities, and Capacity Information

Iron and Steel Process	Number of Facilities	Capacity Information
Basic oxygen furnace (BOF)	18	Yes
Blast Furnace (BF)	17	Yes
Sintering	5	Yes
Coke ovens	18	Yes
Electric arc furnace (EAF)	92	No
Taconite furnace	8	Yes
Integrated steel plant fuel combustion*	19	No
Coke oven gas combustion*	9	No
EAF steel plant fuel combustion	92	No

* Six plants had emissions from coke oven gas combustion was included in integrated steel plant fuel combustion.

Potential to Emit

The analysis covered 130 plants, and in all cases, except for EAF plants, GHG emissions were estimated based on operations at plant capacity. For EAF plants, EPA used the 2007 Federal Reserve industrial capacity utilization percentage of 86.6 percent for primary metal -- iron and steel production, to adjust estimated actual emissions to PTE.

The spreadsheet contained emission CO_2e estimates which included CO_2, CH_4, and N_2O emissions. Process CH_4 emissions were backed out of the CO_2e totals using the process CH_4 emissions reported in the U.S. GHG Inventory, and apportioning these emissions to the different plants based on their capacity in those processes. N_2O emissions are primarily related to fuel combustion and were not backed out for separate treatment.

New Units

No new iron and steel facilities are expected to be built. The growth rate in primary metals from the Economic Census data is only about 0.4 percent.

Threshold Summary

Table 33
CO_2 Threshold Summary -- Iron and Steel Production

GHG Threshold (tons per year)	Number of Existing Sources	Number of New Facilities Added per year	CO_2 Emissions Covered (Tg per year)
100	130	0	85.150
250	130	0	85.150
1,000	130	0	85.150
5,000	129	0	85.148
10,000	128	0	85.141
25,000	123	0	85.057
50,000	116	0	84.831
100,000	113	0	84.655

Table 34
CH_4 Threshold Summary -- Iron and Steel Production

GHG Threshold (tons per year)	Number of Existing Sources	Number of New Facilities Added per Year	CH_4 Emissions Covered (Tg per year)
100	18	0	0.034
250	17	0	0.033
1,000	17	0	0.033
5,000	3	0	0.011
10,000	0	0	0

Table 35
CO_2e Threshold Summary -- Iron and Steel Production

GHG Threshold (tons per year)	Number of Existing Sources	Number of New Facilities Added per Year	CO_2e Emissions Covered (Tg per year)
100	130	0	85.151
250	130	0	85.151
1,000	130	0	85.151
5,000	130	0	85.151
10,000	128	0	85.141
25,000	123	0	85.058
50,000	116	0	84.832
100,000	114	0	84.656

3.6.13 Lead Production

According to the 2006 U.S. Geological Survey (USGS), lead production in the U.S. includes both the primary, direct smelting (one facility) and secondary lead production (16 facilities). Process emissions of CO_2 are a byproduct of the coke consumed during the smelting or reforming processes. EPA calculated total process emissions based on lead production as reported in the USGS.

In the *Supporting Data for Threshold Analysis Subpart E – W, Greenhouse Gas Mandatory Reporting Rulemaking* (EPA-HQ-OAR-2008-0508-0046.7), combustion emissions are combined with process emissions to determine total actual emissions.

Potential to Emit

In order to determine PTE emissions, EPA considered the Federal Reserve's 2006 monthly industrial capacity utilization estimates for primary metals industry classification which shows utilization at 85.9 percent for 2006, and adjusted to achieve 100 percent utilization.

New Units

EPA assumed no new facilities would be added for the industry, given an expected growth rate of 0.4 percent per year for primary metal manufacturing industry.

Threshold Summary

Table 36
CO_2e Threshold Summary -- Lead Production

GHG Threshold (tons per year)	Number of Existing Sources	Number of New Facilities Added per Year	CO_2e Emissions Covered (Tg per year)
100	17	0	0.861
250	17	0	0.861
1,000	17	0	0.861
5,000	17	0	0.861
10,000	16	0	0.855
25,000	13	0	0.799
50,000	12	0	0.761
100,000	1	0	0.089

3.6.14 Lime

The *Supporting Data for Threshold Analysis Subpart E – W, Greenhouse Gas Mandatory Reporting Rulemaking*, March 10, 2009 (EPA-HQ-OAR-2008-0508-0046.7) was also used to estimate GHG PTE for lime plants.

Potential to Emit

To estimate PTE, EPA divided annual actual CO_2 emissions from the calcining process and fuel combustion emissions of CO_2, CH_4, and N_2O by regional capacity factors available in the spreadsheet for each plant. The capacity factors ranged from 43 to 136 percent.

New Units

EPA assumed no new facilities would be added for the industry.

Threshold Summary

Table 37
CO_2 Threshold Summary -- Lime Production

GHG Threshold (tons per year)	Number of Existing Sources	Number of New Facilities Added per Year	CO_2 Emissions Covered (Tg per year)
100	89	0	27.262
250	89	0	27.262
1,000	89	0	27.262
5,000	89	0	27.262
10,000	89	0	27.262
25,000	86	0	27.237
50,000	66	0	26.533
100,000	60	0	26.180

3.6.15 Magnesium Production and Processing

The magnesium metal production (primary and secondary) and casting industry typically uses SF_6 as a cover gas to prevent the rapid oxidation and burning of molten magnesium in the presence of air. A dilute gaseous mixture of SF_6 with dry air and/or CO_2 is blown over molten magnesium metal to induce and stabilize the formation of a protective crust. A small portion of the SF_6 reacts with the magnesium to form a thin molecular film of mostly magnesium oxide and magnesium fluoride. The amount of SF_6 reacting in magnesium production and processing is being studied but presently assumed to be negligible, and therefore all SF_6 used is assumed to be emitted into the atmosphere.

For the proposed GHG MRR *Technical Support Document for Process Emissions from Magnesium Production and Processing: Proposed Rule for Mandatory Reporting of Greenhouse Gases*, EPA reported that national annual SF_6 emissions from magnesium production and processing totaled approximately 3.2 million metric tons CO_2e in 2006. The facility population totaled 13 facilities that emitted 3.0 million metric tons CO_2e. The SF_6 emissions (no GWP adjustment) were 148 and 138 short tons respectively. Ten magnesium die casting facilities accounted for 29 percent (44 tons), and primary and secondary production accounted for 64 percent (96 tons) of the total emissions. Other small casting activities accounted for the remaining 7 percent (ten tons).

Potential to Emit

EPA used the analysis in the TSD for the proposed GHG MRR, where EPA had evaluated thresholds of 1,000, 10,000, 25,000, and 100,000 metric tons per year. Facility-level information is not made publicly available because of confidential business information (CBI) claims. From that earlier analysis EPA estimated that the same number of facilities exceeded the 100, 250, and 1,000 tons CO_2e per year PTE threshold as determined in the GHG MRR TSD for the 1,000 metric tons per year threshold. In a similar fashion, EPA used the GHG MRR TSD facility counts at 10,000 metric tons CO_2e per year to estimate facilities at the 5,000 tons per year PTE threshold, and 100,000 metric tons per year for the 50,000 tons CO_2e per year PTE threshold. The permit threshold analysis did not include CO_2 emissions from fuel combustion. That information was not available in the TSD for the proposed GHG MRR.

On an SF_6 mass basis, the average emissions per facility are only 11 tons of SF_6, well below 100 tons per year. Therefore we assumed that none of the facilities have a potential to emit more than 100 tons per year of SF_6.

New Units

EPA assumed no new units would be added for the sector.

Threshold Summary

Table 38
CO_2e Threshold Summary -- Magnesium Production

GHG Threshold (tons per year)	Number of Existing Sources	Number of New Facilities Added per Year	CO_2e Emissions Covered (Tg per year)
100	13	0	2.955
250	13	0	2.955
1,000	13	0	2.955
5,000	11	0	2.94
10,000	11	0	2.94
25,000	11	0	2.94
50,000	9	0	2.781
100,000	9	0	2.781

3.6.16 Nitric Acid Production

EPA used the 2006 nameplate capacity (metric tons of HNO_3 100 percent acid basis) for 45 nitric acid plants and 2006 acid production from the GHG MRR TSD supporting spreadsheet (EPA-HQ-OAR-2008-0508-0046.7) to determine N_2O emissions.

Potential to Emit

The GHG PTE was calculated by multiplying actual N_2O emissions as CO_2e by the ratio of nameplate capacity to 2006 production. The permit threshold analysis, based on the GHG MRR TSD, does not include GHG emissions from co-located stationary combustion units. Also the permit threshold analysis does not account for overlap between facilities in the Nitric Acid and Ammonia categories, which have both ammonia and nitric acid production processes.

New Units

EPA assumed no new units would be constructed for this sector.

Threshold Summary

Table 39
N_2O Threshold Summary -- Nitric Acid Production

GHG Threshold (tons per year)	Number of Existing Sources	Number of New Facilities Added per Year	N_2O Emissions Covered (Tg per year)
100	43	0	0.055
250	42	0	0.055
1,000	27	0	0.049
5,000	4	0	0.016
10,000	0	0	0
25,000	0	0	0
50,000	0	0	0
100,000	0	0	0

Table 40
CO_2e Threshold Summary -- Nitric Acid Production

GHG Threshold (tons per year)	Number of Existing Sources	Number of New Facilities Added per Year	CO_2e Emissions Covered (Tg per year)
100	45	0	17.732
250	45	0	17.732
1,000	45	0	17.732
5,000	45	0	17.732
10,000	45	0	17.732
25,000	44	0	17.724
50,000	43	0	17.706
100,000	42	0	17.667

3.6.17 Petrochemical Production

EPA determined that the portion of the petrochemical production sector most relevant for permit threshold analysis includes the manufacture and production of acrylonitrile, carbon black, ethylene, ethylene dichloride, ethylene oxide, and methanol, because the IPCC considers production of greenhouse gases from these processes significant compared to other petrochemical processes.

Emissions from the manufacturing processes vary significantly and process emissions take many forms. Process emissions include direct oxidation of CO_2, off-gassing of CH_4 and CO_2, and the direct release of CO_2 and CH_4 from equipment leaks. Process emissions are the primary consideration for acrylonitrile, ethylene, and ethylene oxide processes. In addition, some processes require combustion of supplemental fuel. Both process and combustion emissions are significant for carbon black and methanol processes.

Potential to Emit

EPA's analysis assumed petrochemical production at the capacity level. Therefore, no adjustment to the emissions estimates is needed to account for PTE.

New Units

Based on an industry growth factor of -0.1 percent for chemical manufacturing, EPA assumed that no new plants would be constructed.

Threshold Summary

Table 41
CO_2 Threshold Summary -- Petrochemical Production

GHG Threshold (tons per year)	Number of Existing Sources	Number of New Facilities Added per Year	CO_2 Emissions Covered (Tg per year)
100	98	0	52.081
250	98	0	52.081
1,000	98	0	52.081
5,000	97	0	52.080
10,000	96	0	52.073
25,000	96	0	52.073
50,000	94	0	52.005
100,000	91	0	51.806

Table 42
CH_4 Threshold Summary -- Petrochemical Production

GHG Threshold (tons per year)	Number of Existing Sources	Number of New Facilities Added per Year	CH_4 Emissions Covered (Tg per year)
100	55	0	0.130
250	52	0	0.129
1,000	37	0	0.121
5,000	5	0	0.035
10,000	1	0	0.010
25,000	0	0	0
50,000	0	0	0
100,000	0	0	0

Table 43
CO_2e Threshold Summary -- Petrochemical Production

GHG Threshold (tons per year)	Number of Existing Sources	Number of New Facilities Added per Year	CO_2e Emissions Covered (Tg per year)
100	98	0	54.826
250	98	0	54.826
1,000	98	0	54.826
5,000	97	0	54.825
10,000	96	0	54.818
25,000	96	0	54.818
50,000	94	0	54.748
100,000	91	0	54.595

3.6.18 Petroleum Refineries

In developing the permit threshold analysis for petroleum refineries, EPA quantified CH_4 process emissions from wastewater, fugitive, flares, and storage tanks. Process CO_2 emissions derived from flares, hydrogen plant emissions, and sulfur plant emissions. In addition, on-site combustion emissions were calculated considering fuel consumed by type.

Potential to Emit

EPA assumed that petroleum refineries were operating at capacity level. Therefore, no adjustment to the emissions estimates was needed to account for PTE.

New Units

According to the ICR prepared for the New Source Performance Standard (NSPS), EPA expects that no new refineries will be built over the next few years.

Threshold Summary

Table 44
CO_2 Threshold Summary -- Petroleum Refineries

GHG Threshold (tons per year)	Number of Existing Sources	Number of New Facilities Added per Year	CO_2 Emissions Covered (Tg per year)
100	150	0	202.947
250	150	0	202.947
1,000	150	0	202.947
5,000	150	0	202.947
10,000	149	0	202.938
25,000	146	0	202.887
50,000	137	0	202.575
100,000	129	0	202.065

Table 45
CH_4 Threshold Summary -- Petroleum Refineries

GHG Threshold (tons per year)	Number of Existing Sources	Number of New Facilities Added per Year	CH_4 Emissions Covered (Tg per year)
100	129	0	0.083
250	109	0	0.080
1,000	31	0	0.042
5,000	0	0	0

Table 46
CO_2e Threshold Summary -- Petroleum Refineries

GHG Threshold (tons per year)	Number of Existing Sources	Number of New Facilities Added per Year	CO_2e Emissions Covered (Tg per year)
100	150	0	204.897
250	150	0	204.897
1,000	150	0	204.897
5,000	150	0	204.897
10,000	149	0	204.888
25,000	146	0	204.835
50,000	137	0	204.513
100,000	129	0	203.988

3.6.19 Phosphoric Acid Production

Phosphoric acid is produced by combining sulfuric acid and phosphate rock. CO_2 is emitted when the limestone component of phosphate rock reacts with the sulfuric acid.

Potential to Emit

When these process emissions are combined with combustion emissions, all 14 plants have emissions that exceed the highest threshold level; consequently, no PTE analysis was required.

New Units

Based on an industry growth factor of -0.1 percent for chemical manufacturing, EPA assumed that no new plants would be constructed.

Threshold Summary

Table 47
CO_2 Threshold Summary -- Phosphoric Acid Production

GHG Threshold (tons per year)	Number of Existing Sources	Number of New Facilities Added per Year	CO_2e Emissions Covered (Tg per year)
100	14	0	3.838
250	14	0	3.838
1,000	14	0	3.838
5,000	14	0	3.838
10,000	14	0	3.838
25,000	14	0	3.838
50,000	14	0	3.838
100,000	14	0	3.838

3.6.20 Pulp and Paper Manufacturing

Permit threshold analysis for this sector is focused on the energy intensive, fugitive emitting pulp, paper, and paperboard manufacturing subsectors. Process emissions include CO_2 which is emitted in the recovery cycle at kraft and soda facilities associated with the chemical pulp process. The CO_2 emitted from kraft mill lime kilns originates from two sources: (1) fossil fuels burned in the kiln; and (2) conversion of calcium carbonate (or "lime mud") generated in the recovery process to calcium oxide.

The bulk of the emissions considered derive from combustion. Many boilers use biomass fuel, and the burning of spent pulping liquors to produce steam for facility processes is considered biomass combustion for the GHG MRR. The emissions numbers considered for the permit threshold analysis are non-biogenic (net of any biogenic emissions). Considering only non-biogenic emissions, 96.5 percent of the facilities and 99.7 percent of the emissions are captured by all of the thresholds proposed for consideration of the permit threshold rule.

Potential to Emit

Because 99.7 percent of emissions were captured at even the highest threshold, no additional PTE estimate was calculated in this analysis.

New Units

Based on an industry growth factor of -2.5 percent for paper manufacturing, and previous EPA analysis for the pulp and paper NSPS ICR, EPA assumed that no new plants would be constructed.

Threshold Summary

Table 48
CO_2e Threshold Summary -- Pulp and Paper Manufacturing

GHG Threshold (tons per year)	Number of Existing Sources	Number of New Facilities Added per Year	CO_2e Emissions Covered (Tg per year)
100	425	0	57.700
250	425	0	57.700
1,000	425	0	57.700
5,000	425	0	57.700
10,000	425	0	57.700
25,000	425	0	57.700
50,000	422	0	57.688
100,000	410	0	57.527

3.6.21 Silicon Carbide Manufacturing

In 2006, one facility produced silicon carbide in the U.S. Silicon carbide is primarily an industrial abrasive manufactured from silica sand or quartz and petroleum coke. Approximately 35 percent of the carbon from the petroleum coke is retained with the silicon carbide, and the rest is emitted as both CO_2 and CH_4. In addition, emissions from combustion account for approximately ten percent of total emissions.

Potential to Emit

Emissions from this plant exceed all permit threshold levels; as a result, EPA did not consider PTE calculations.

New Units

EPA assumed there would be no new facilities constructed.

Threshold Summary

Table 49
CO_2 Threshold Summary -- Silicon Carbide Manufacturing

GHG Threshold (tons per year)	Number of Existing Sources	Number of New Facilities Added per Year	CO_2 Emissions Covered (Tg per year)
100	1	0	0.101
250	1	0	0.101
1,000	1	0	0.101
5,000	1	0	0.101
10,000	1	0	0.101
25,000	1	0	0.101
50,000	1	0	0.101
100,000	1	0	0.101

Table 50
CH_4 Threshold Summary -- Silicon Carbide Manufacturing

GHG Threshold (tons per year)	Number of Existing Sources	Number of New Facilities Added per Year	CH_4 Emissions Covered (Tg per year)
100	1	0	0.0004
250	1	0	0.0004
1,000	0	0	0

Table 51
CO_2e Threshold Summary -- Silicon Carbide Manufacturing

GHG Threshold (tons per year)	Number of Existing Sources	Number of New Facilities Added per Year	CO_2e Emissions Covered (Tg per year)
100	1	0	0.109
250	1	0	0.109
1,000	1	0	0.109
5,000	1	0	0.109
10,000	1	0	0.109
25,000	1	0	0.109
50,000	1	0	0.109
100,000	1	0	0.109

3.6.22 Soda Ash Production

Soda Ash production emissions were nearly evenly split between process and combustion emissions. Process emissions result from calcining trona ore to produce soda ash.

Potential to Emit

PTE emissions were calculated based on the capacities of the production units.

New Units

In 2006, there was a glut of soda ash in the domestic market; EPA assumed no new units would be constructed.

Threshold Summary

Table 52
CO_2e Threshold Summary -- Soda Ash Production

GHG Threshold (tons per year)	Number of Existing Sources	Number of New Facilities Added per Year	CO_2e Emissions Covered (Tg per year)
100	5	0	3.121
250	5	0	3.121
1,000	5	0	3.121
5,000	5	0	3.121
10,000	5	0	3.121
25,000	5	0	3.121
50,000	5	0	3.121
100,000	5	0	3.121

3.6.23 Titanium Dioxide Production

EPA used USGS as the source for production capacity for the eight facilities that produced titanium dioxide in 2006.

Potential to Emit

Emissions were assumed to represent PTE operating levels.

New Units

EPA assumed that no new plants would be constructed.

Threshold Summary

Table 53
CO_2e Threshold Summary -- Titanium Dioxide Production

GHG Threshold (tons per year)	Number of Existing Sources	Number of New Facilities Added per Year	CO_2e Emissions Covered (Tg per year)
100	8	0	3.686
250	8	0	3.686
1,000	8	0	3.686
5,000	8	0	3.686
10,000	8	0	3.686
25,000	8	0	3.686
50,000	8	0	3.686
100,000	7	0	3.628

3.6.24 Zinc Production

The Zinc production emissions and facility count estimates include process and combustion emissions associated with primary smelting and secondary recycling facilities.

Potential to Emit

For PTE estimates, EPA considered the Federal Reserve's 2006 monthly industrial capacity utilization estimates for primary metals industry classification which shows utilization at 85.9 percent for 2006, and adjusted to achieve 100 percent utilization.

New Units

EPA assumed that no new units would be constructed.

Threshold Summary

Table 54
CO_2e Threshold Summary -- Zinc Production

GHG Threshold (tons per year)	Number of Existing Sources	Number of New Facilities Added per Year	CO_2e Emissions Covered (Tg per year)
100	9	0	0.852
250	9	0	0.852
1,000	9	0	0.852
5,000	9	0	0.852
10,000	8	0	0.843
25,000	5	0	0.802
50,000	5	0	0.802
100,000	5	0	0.802

3.7 Energy Sector

3.7.1 Oil and Gas Systems

In consideration of the permit thresholds, EPA considered the *Fugitive Emissions Reporting from the Petroleum and Natural Gas Industry: Background Technical Support Document* (EPA-HQ-OAR-2008-0508-0023). This document details combustion emissions and fugitive emissions from offshore petroleum and natural gas facilities, onshore natural gas processors, onshore natural gas transmission, underground natural gas storage, and liquid natural gas storage. EPA determined that oil and gas exploration, development, transmission, and distribution are not listed PSD source categories, and therefore fugitive emissions from these activities were not considered for PSD applicability as it relates to major source thresholds. EPA's analysis focused on combustion emissions from these sources.

Potential to Emit

EPA used a capacity utilization figure of 50 percent to determine PTE emission estimates and counts. This rate is meant to reasonably represent an average utilization rate across a variety of combustion equipment types used in the oil and gas industry subsectors described above.

New Units

EPA determined new units based on a growth factor of 1.0 percent for the sector.

Threshold Summary

Table 55
CO_2e Threshold Summary -- Oil and Gas Systems

GHG Threshold (tons per year)	Number of Existing Sources	Number of New Facilities Added per Year	CO_2e Emissions Covered (Tg per year)
100	4762	48	88.264
250	4762	48	88.264
1,000	4762	48	88.264
5,000	3722	37	86.192
10,000	3095	31	83.619
25,000	2496	25	79.386
50,000	1045	10	56.949
100,000	387	4	32.750

3.7.2 Underground Coal Mining

GHG emissions from underground coal mining include CH_4 fugitive emissions released from the coal seam and surrounding rock during mining and post-mining activities (coal bed CH_4), and fuel combustion emissions of CO_2, CH_4, and N_2O. Fugitive CH_4, emissions are captured and vented by ventilation systems and degassing systems. Captured and vented CH_4 emissions from active mines were considered in the PTE analysis. Because underground coal mining is not one of the 28 PSD source categories for which fugitive emissions were required to be included in the emissions determination, fugitive emissions from post mining operations, surface mines, and inactive mines were not included in the permit thresholds analysis.

The *Technical Support Document for Underground Coal Mines: Proposed Rule for Mandatory Reporting of Greenhouse Gases* (EPA-HQ-OAR-2008-0508-0032) identified 612 active underground coal mining facilities but analysis of CH_4 emissions was limited to 128 "gassy" mines where CH_4 monitoring was already in place (due to existing CH_4 emissions above Mine Safety and Health Administration (MSHA) threshold levels). The U.S. GHG Inventory (EPA, 2008) reports that 233 underground coal mines (including 133 gassy mines) ventilated CH_4 in 2007. Fuel combustion emission estimates for the GHG MRR TSD from all underground coal mines, based on U.S. Census energy use data, were found to comprise between one and

three percent of total CO_2e emissions, with coal bed CH_4 accounting for the bulk of GHG emissions.

In addition to the emissions data on the 128 gassy mines contained in the GHG MRR TSD, EPA considered combustion emissions from 289 bituminous underground coal mines, using U.S. Census data from 2002.

Potential to Emit

CH_4

CH_4 emission estimates that were developed for the GHG MRR TSD were used for both actual emissions and PTE emissions permit threshold analysis. EPA assumed that venting and degassing were continuous throughout the year; therefore, actual emission estimates equal PTE emission estimates. The estimates considered 128 gassy mines, which were assumed to be the largest emitters of vented CH_4. The smallest mine of this group had annual CH_4 emissions of 26 tons; therefore EPA assumed that the annual CH_4 emissions from the 105 vented mines that were not included in the TSD analysis were less than 26 tons.

CO_2

CO_2 emissions were estimated in the same manner as for other Unspecified Industrial Stationary Combustion categories, based on the ICF analysis (ICF, 2007) using the MECS approach. Emissions were estimated based on Census information including fuel consumption per employee and the distribution of establishments by the number of employees. PTE was estimated by using a capacity utilization factor of 86.3 percent as published by the Federal Reserve.

New Units

The number of underground bituminous coal mines in the U.S. is on the decline. EIA data show that only Colorado had an increase in the number of underground coal mines between 2006 and 2007 (EIA, 2008). The EIA data show that overall the number of underground coal mines decreased from 2006 to 2007 by eight percent; consequently, EPA assumed no new underground mines would be built. http://www.eia.doe.gov/cneaf/coal/page/acr/table1.html.

Threshold Summaries

Threshold summary tables are shown below for CH_4 (vented fugitive emissions), CO_2 (fuel combustion), and CO_2e (vented fugitive CH_4 and combustion CO_2).

Table 56
CO_2 Threshold Summary -- Underground Coal Mining

GHG Threshold (tons per year)	Number of Existing Sources	Number of New Facilities Added per Year	CO_2e Emissions Covered (Tg per year)
100	238	0	0.783
250	202	0	0.778
1,000	63	0	0.692
5,000	30	0	0.577
10,000	30	0	0.577
25,000	0	0	0

Table 57
CH_4 Threshold Summary -- Underground Coal Mining

GHG Threshold (tons per year)	Number of Existing Sources	Number of New Facilities Added per Year	CO_2e Emissions Covered (Tg per year)
100	110	0	1.586
250	110	0	1.586
1,000	110	0	1.586
5,000	53	0	1.420
10,000	38	0	1.361
25,000	24	0	1.147
50,000	13	0	0.784
100,000	1	0	0.105

Table 58
CO_2e Threshold Summary -- Underground Coal Mining

GHG Threshold (tons per year)	Number of Existing Sources	Number of New Facilities Added per Year	CO_2e Emissions Covered (Tg per year)
100	238	0	39.520
250	238	0	39.520
1,000	126	0	33.945
5,000	124	0	33.943
10,000	123	0	33.936
25,000	103	0	33.606
50,000	78	0	32.800
100,000	55	0	31.241

3.8 Waste Sector

3.8.1 Landfills

The landfill PTE analysis includes both municipal solid waste (MSW) landfills and onsite industrial landfills associated with pulp and paper and food processing. The analysis used a modification of the landfill emission modeling approach used for the proposed GHG MRR threshold analysis. Like the GHG MRR analysis, the permit threshold PTE analysis did not include onsite industrial landfills for ethanol processing facilities or industrial land application systems.

GHG Emissions

Decomposition of waste in landfills generates CH_4 and CO_2. The amount of CH_4 generated from a given landfill is a function of several factors: the total amount of waste disposed in the landfill; the characteristics of the waste; and the climatic conditions. The amount of CH_4 emitted is the amount of CH_4 generated minus the amount of CH_4 oxidized by aerobic microorganisms in the landfill cover material. Also subtracted from the total is the amount of CH_4 that is destroyed by combustion of the vented gas. The CO_2 produced by decaying waste is not considered an anthropogenic emission, and is not counted in GHG emission totals. Likewise, CO_2 resulting from the combustion of landfill CH_4 is not accounted for as an anthropogenic emission under international accounting guidance.

According to the 2008 U.S. Inventory, MSW landfills emitted 111.2 million metric tons CH_4 (CO_2e basis) in 2006. The majority of the CH_4 emissions from on-site industrial landfills occurs at pulp and paper facilities and food processing facilities. In 2006, these landfills emitted 14.6 million metric tons CO_2e

Potential to Emit

The methodology used for the proposed GHG MRR threshold analysis was also used to estimate CH_4 generation rates and emissions in 2006 for the PTE analysis. A landfill-specific model developed by EPA to support its proposed GHG MRR was used to estimate CH_4 generation and potential generation from municipal landfills. The generation estimate was adjusted with assumptions on oxidation in landfill cover, and destruction by combustion for energy recovery or flaring. The industrial landfill generation and emission estimates are based on the U.S. GHG Inventory. Industrial landfills were assumed not to have energy recovery or flaring, so there was no difference between generation and emissions.

New Units

EPA did not estimate the number of new facilities added each year with CH_4 emissions above the different thresholds due to the time delay between landfill construction and emission generation.

Threshold Summary

Table 59
CO_2e Threshold Summary -- Landfills

GHG Threshold (tons per year)	Number of Existing Sources	CO_2e Emissions Covered (Tg per year)
100	4,131	125.621
250	4,117	125.619
1,000	4,053	125.592
5,000	3,564	124.552
10,000	3,265	122.788
25,000	2,701	115.937
50,000	1,684	92.340
100,000	967	72.722

Table 60
CH_4 Threshold Summary -- Landfills

GHG Threshold (tons per year)	Number of Existing Sources	CH_4 Emissions Covered (Tg per year)
100	3,885	5.973
250	3,562	5.931
1,000	2,692	5.539
5,000	981	3.274
10,000	427	2.326
25,000	114	1.087
50,000	21	0.401
100,000	2	0.106

3.8.2 Municipal Solid Waste Combustors

The threshold analysis for the proposed GHG MRR included municipal solid waste combustors (MWC) in the general stationary fuel combustion category. The analysis used the eGRID database, which is discussed in the PTE methodology description for electric generating units.

Data and Methodology

EPA used the latest version of the eGRID database (2006) to estimate the PTE of MWC facilities and counts of facilities above the different emission thresholds. The eGRID database includes year 2004 characteristics, operating information, and annual CO_2 emissions for U.S. facilities that have a generation capacity greater than one MW and sell electric power to the grid. By using eGRID, EPA assumed that all MWC facilities sell power to the grid.

Potential to Emit

EPA identified 75 MWC facilities based on the generator primary fuel in the generator table (primary fuel equals MSW) in the eGRID database. The eGRID database contains CO_2 annual emissions estimates for the facilities. For CO_2 emissions, eGRID uses a standard assumption that 70 percent of the heat value of the waste stream comes from renewable materials and 30 percent comes from nonrenewable materials. The renewable fraction has a CO_2 emission rate of zero; therefore, the PTE threshold analysis is based on the nonrenewable or fossil fraction assumption. EPA estimated PTE by dividing the annual emissions from eGRID by the eGRID plant capacity factor.

New Units

To determine the number of new per year at different thresholds, EPA counted the number of generators online each year, and totaled the nameplate capacity for each online year. This information was compared to the total facility nameplate capacity, and the PTE for the increased capacity was calculated by multiplying the facility PTE by the fraction of nameplate capacity associated with the new generators. EPA counted the facilities that exceeded the PTE thresholds during each period, and computed a 15-year average to determine the number of new or modified facilities per year.

Threshold Summary

Table 61
CO_2 Threshold Summary -- Municipal Solid Waste Combustors -

GHG Threshold (tons per year)	Number of Existing Sources	Number of New Facilities Added per Year	CO_2 Emissions Covered (Tg per year)
100	75	2	6.255
250	75	2	6.255
1,000	75	2	6.255
5,000	75	2	6.255
10,000	75	2	6.255
25,000	74	2	6.24
50,000	67	1	6.071
100,000	40	1	4.958

3.9 Agriculture (Stationary Fuel Combustion)

The analysis for the Agriculture sector was limited to stationary fuel combustion CO_2 emissions from internal combustion diesel engine generators. Fugitive emissions of CH_4 from enteric fermentation, and CO_2, CH_4, and N_2O from manure management were not included because farms and related operations are not in the 28 PSD source categories that require quantification of fugitive emission PTE for determining major source status, and because of the large uncertainties and lack of information on determining what component of the non-combustion emissions at agricultural operations would be defined as non-fugitive for PSD purposes. Fuel combustion for building space heating and other farm purposes were not included in the estimates, but would be a component of farm PTE.

Data and Methodology

EPA used the 2007 ICF analysis to estimate the number of farms covered by the different thresholds (ICF, 2007). Emissions from diesel generators on farms were estimated using data on the average generator size in Delaware (EEA, 2004), and data on energy use on farms for non-transport/non-machinery motors (Brown and Neal 2005). Using these data, EPA estimated the number of diesel generators on farms and apportioned the generators across farm sizes, assuming no farm has more than one generator.

Potential to Emit

EPA assumed that a high proportion of farms would run the generators infrequently, and a smaller proportion would have a generator as the only power source, requiring nearly constant operation. EPA used this distribution to determine actual and potential emissions, with PTE emissions based on the assumption that the generators ran 24 hours per day, 365 days per year.

EPA recognizes that this approach underestimates the PTE for all farm stationary fuel combustion sources, because it is limited to diesel engine generators used primarily to run pumps and motors, and does not include additional sources such as fuel combustion for drying and curing, space heating, and water heating.

New Units

New generator installations were estimated based on information in the Regulatory Impact Analysis (RIA) for the spark ignition stationary combustion engine NSPS and area NESHAPS (EPA, 2007). The on-farm engine population of diesel generators used for irrigation increased four percent between 1998 and 2003, or about 0.8 percent annually.

Threshold Summary

Table 62
CO_2 Threshold Summary -- Farm Stationary IC Engines

CO_2 Threshold (tons per year)	Number of Existing Sources	Number of New Engines Added per Year	CO_2 Emissions Covered (Tg per year)
100	37,351	299	0.512
250	37,351	299	0.512
1,000	0	0	0
5,000	0	0	0
10,000	0	0	0
25,000	0	0	0
50,000	0	0	0
100,000	0	0	0

3.10 Commercial Stationary Fuel Combustion

Data Source

EPA used EIA's Commercial Building Energy Consumption Survey (CBECS) to estimate commercial sector stationary fuel combustion GHG emissions and PTE. CBECS is a national sample survey that collects information on the stock of U.S. commercial buildings, their energy-related building characteristics, and their energy consumption and expenditures. Commercial buildings include all buildings in which at least half of the floor space is used for a purpose that is not residential, industrial, or agricultural; thus, the source category includes building types that might not traditionally be considered "commercial," such as schools, correctional institutions, and buildings used for religious worship. The CBECS survey is conducted every four years and the most recent survey was completed for 2003.

The CBECS survey sample was designed so that survey responses could be used to estimate characteristics of the entire nationwide commercial building stock. The 2003 survey selected 6,955 potential case buildings for sampling. The sampling procedures resulted in 5,215 completed building interviews for a response rate of 82 percent. To make national estimates from the sample data, EIA calculated base sampling weights for each building (the reciprocal of the probability of that building being selected into the sample). In other words, the base sampling weight is the number of national buildings represented by the sampled building. The base weight was further adjusted to account for nonresponsive bias.

EIA publishes summary tables from the survey, and posts "microdata" files on the EIA website. The CBECS microdata consist of the 5,215 sampled building records, which each correspond to a single sampled building. For each building, these files contain information such as the building size, climatic region, census region, year constructed, types of energy used, and energy consumption and expenditures. These individual building microdata records are also the basis for the summary tables published by EIA.

Emissions Methodology

EPA used the CBECS microdata to estimate commercial building emissions and populations above emission thresholds. Each of the 5,215 microdata records corresponds to a single sampled building. EIA has made available 20 different data files of the microdata records which contain a wide range of information on characteristics and energy use for each building.

EPA's analysis relied on guidance provided by EIA on how to use the data. As noted above, the CBECS sample was designed so that survey responses could be used to estimate characteristics of the entire commercial building stock nationwide. The table below provides examples from EIA on how to calculate national commercial building characteristics from the sample building data.

Table 63
EIA Website Examples

To Find the National Estimate for:	Do This...	And You Should Get...
Total number of buildings	Sum ADJWT8 (weight factor)	4,858,749.82 (or 4,859 thousand)
Total number of office buildings	Sum ADJWT8 for cases where PBA8 (building code) = "02"	823,805.47 (or 824 thousand)
Total floor space	Create a new variable (weighted square footage) by multiplying ADJWT8 by SQFT8 (floor space) for each case, then sum this new variable	71,657,900,522 (or 71,658 million ft^2)
Total floor space in buildings with air conditioning	Sum the new weighted square footage variable (see above) for cases where COOL8 (air conditioning) = "1"	63,559,999,624 (or 63,560 million ft^2)
Total electricity consumption in KWh	Create a new variable (weighted electricity consumption) by multiplying ADJWT8 by ELCNS8 (electricity consumption) for each case, then sum this new variable	1,043,175,710,751 (or 1,043 billion kWh)

Source: http://www.eia.doe.gov/emeu/cbecs/cbecs2003/public_use_2003/cbecs_pudata2003.html.

EIA calculated base sampling weights for each surveyed building (these are the reciprocal of the probability of that building being selected into the sample). Therefore, a building with a base weight of 1,000 represents itself and 999 similar but unsampled buildings in

the total building stock. The base weight is further adjusted to account for non-response bias. The variable "ADJWT8" in the data file is the final weight. The ADJWT8 weight factor is used as described in Table 63 to extrapolate the survey sample to a national scale for any value. In order to obtain a national value each sample building's value must be multiplied by the building's weight (ADJWT8). All of the weighted values are then summed.

2003 CO_2 Emissions

EPA calculated the CO_2 emissions for each of the 5,215 buildings based on the annual natural gas and oil consumption reported for the building. For national emission estimates and counts of buildings with annual CO_2 emissions over any threshold, EPA multiplied the base weights by the sample emission totals to determine the national estimate of buildings with emissions over the threshold.

Potential to Emit

EPA estimates that commercial buildings operate at 15 percent of capacity. EPA considered several sources in making the PTE factor determination:

- A report prepared by Energy and Environmental Analysis, Inc. for Oak Ridge National Laboratory describing the industrial and commercial boiler population in the United States (EEA, 2005). The report estimated an average commercial boiler capacity factor of 16 percent.

- Reports on cooking equipment energy use by the Food Service Technology Center in California suggesting that the cooking equipment in food service establishments operate at about ten percent of a theoretical maximum capacity based on 8,760 hours per year (Pechan, et.al, 2008).

- A study of Los Angeles dry cleaners performed by the Pollution Prevention Education and Research Center (PPERC) in 2004 which demonstrates that dry cleaners operate boilers at about 10 to 15 percent of maximum capacity over a normal year (Pechan, et al., 2008).

New Buildings

The CBECS data identifies the year the sampled buildings were constructed. We used the construction year information to identify the number of new buildings built each year in the 1990 to 2003 period. Counts of the average number of these buildings built per year were then made at the different emissions and PTE thresholds.

Threshold Summary

The count of buildings and emissions at the threshold levels for the entire sector are shown in the table below. Threshold results by commercial building categories (e.g., offices, public assembly, schools) are provided in Appendix B.

Table 64
CO_2 Threshold Summary -- Commercial Sector Stationary Fuel Combustion

CO_2 Threshold (tons per year)	Number of Existing Sources	Number of New Facilities Added per Year	CO_2 Emissions Covered (Tg per year)
100	1,355,921	22,123	119.262
250	731,477	12,041	105.306
1,000	172,654	2,922	69.885
5,000	18,167	196	29.384
10,000	5,660	96	17.765
25,000	1,161	7	8.790
50,000	600	3	6.003
100,000	51	2	1.012

3.11 Residential Buildings

Data Sources

EPA used residential fuel consumption data from EIA's Residential Energy Consumption Survey, and multi-family building and unit data from U.S. Census (Census) surveys to estimate CO_2 emissions and PTE for fuel combustion at single and multi-family residential properties. The RECS is a national area-probability sample survey that collects energy-related data for occupied primary housing units. The most recent 2005 survey collected data from 4,382 households in housing units statistically selected to represent the 111.1 million housing units in the United States. RECS data are tabulated for the four Census regions, the nine Census divisions, and for the four most populous States -- California, Florida, New York, and Texas.

The RECS sample was designed so that survey responses could be used to estimate characteristics of the national stock of occupied housing units. In order to arrive at national estimates from the RECS sample, EPA calculated base sampling weights for each housing unit as the reciprocal of the probability of that building being selected into the sample. Therefore, a housing unit with a base weight of 10,000 represents itself and 9,999 similar, but not sampled housing units in the total stock of occupied residential housing units. The base weight is further adjusted to account for non-response bias. Ratio adjustments were also used to ensure that the RECS weights add up to Census Current Population Survey estimates of the number of households.

The RECS data are provided at the housing unit level, and not at the building level. EPA used additional data from the Census on multi-family building population characteristics to estimate total property emissions and PTE for multi-unit properties. Census data were from two

sources: the Property Owner and Manager Survey (POMS, 1996) and the American Housing Survey (AHS, 2005).

3.11.1 Single-Family Homes

The RECS data was used directly to estimate CO_2 emissions from fossil fuel combustion at single-family housing units for space heating, water heating, and appliances. EPA assumed that each unit in an attached single-family building was a separate source, with combustion equipment under different ownership.

The annual energy consumption by fuel (1,000 Btus) for the surveyed unit was multiplied by the fuel CO_2 emission factor to estimate annual emissions. Total single-family unit emissions for the entire country were calculated by multiplying CO_2 emissions for each units by the base sampling weight.

Potential to Emit

The PTE for a single-family unit was calculated by dividing the CO_2 emissions from the unit by a capacity factor of 0.1. This factor was estimated by comparing the average annual CO_2 emissions per heated floor space area per hour by climate zone, to required heat input capacity. The required heat input capacity was based on rule of thumb heating system requirements for the different climate zones. The table below shows the average Btu/ft^2-hour from the RECS data and Heating Requirement (Btu/ft^2) by climate zone. A heating system efficiency of 80 percent was used to estimate the required space heating capacity.

Table 65
Single-Family Detached and Attached
Households with Fossil Fuel-Fired Space Heating
(from RECS, 2005)

Households (millions)	Climate Zone(s)	Heating Degree Day Range	Average Annual Fuel Consumption (Btu/ft^2-hour)	Space Heating Requirement* (Btu/ft^2)
6.8	5	> 7,000	4.8	50 – 60
16.7	4	5,500 – 7,000	5.4	45 – 50
17.0	3	4,000 – 5,499	4.6	40 – 45
18.9	1 and 2	< 4,000	3.8	Zone 2: 35 – 40 Zone 1: 30 – 35

* Heating requirement ranges are from www.acdirect.com/systemsize.php.

3.11.2 Multi-Family Residential Buildings

Emission Rates

As noted earlier in the Data Source section**,** the RECS data are on an individual unit basis, not building or property basis, so a different approach was required for multi-family units where EPA assumed common ownership of the property fuel combustion equipment. In order to estimate property emissions and the number of properties above different emission and PTE thresholds, EPA combined the RECS data with data from the POMS and AHS.

From the RECS data, EPA first calculated average residential unit CO_2 emissions for the two most common fuels (natural gas and oil) by multi-family category. These are shown in the table below.

Table 66
Multi-Family Residential Unit -- Average Annual CO_2 Emissions
(from RECS, 2005)

Multi-Family Category (number of units)	Natural Gas Space Heating (tons CO_2/residential unit-year)	Fuel Oil Space Heating (tons CO_2/residential unit-year)
2 to 4 units	4.8	8.3
5 or more units	3.0	8.9

EPA also obtained annual CO_2 emission rates from an EPA analysis that was based on Lawrence Berkeley National Lab (LBNL) modeling studies. Those rates were estimated for old and new building units (see Table 67). The pre-1980 building estimate compares with the overall average from the RECS data. The post-1980 building estimates are much lower, particularly for units burning fuel oil.

Table 67
Multi-Family Residential Unit -- Average Annual CO_2 Emissions
(from 2008 EPA Analysis based on LBNL, 1997)

Multi-Family Category (building age)	Gas Serviced Units (tons CO_2/residential unit-year)	Fuel Oil Serviced Units (tons CO_2/residential unit-year)
Pre-1980 building	4.75	7.17
Post-1980 building	2.65	3.87

Existing Property Characteristics

Information on the distribution of multi-family properties by number of units per property was taken from the 1995 – 1996 POMS. The data are aggregated by different housing unit ranges. The table below shows the property size distribution from unpublished POMS data (NMHC Quick Facts -- Apartment Stocks (http://www.nmhc.org)). The POMS data were for privately owned housing only and excluded public housing projects (about 13,500 buildings and 1,326,000 units). For our estimates, the building numbers were adjusted to current (2005) levels based on the RECS unit data (unit ratio of RECS to POMS). EPA assumed the same unit distribution in the adjustment.

Table 68
Multi-Family Residential Property Size Distribution
(from National Multi-Housing Council tabulation of unpublished POMS data 1995 – 1996)

Number of Rental Units on Property	Number of Properties (1995 – 1996)	Number of Units (1995 – 1996)	Average Number of Units per Property
2	1,558,700	3,093,200	2
3	336,030	1,025,900	3
4	341,350	1,436,800	4
5 – 9	281,500	1,897,700	7
10 – 14	70,390	862,280	12
15 – 19	36,780	602,260	16
20 – 29	38,000	916,750	24
30 – 39	18,166	604,240	33
40 – 49	14,431	702,790	49
50 – 99	26,694	2,009,400	75
100 – 199	19,804	2,952,300	149
200 – 299	7,775	1,948,400	251
300 – 399	2,966	1,058,800	357
400 – 499	1,307	605,130	463
500 – 749	723	431,360	597
Over 750	307	437,670	1,426
Total	**2,754,923**	**20,584,980**	

The adjusted POMS size distribution and average number of units in each category were combined with information from RECS on the percentage of units that use gas or oil for space heating. The gas and oil emission factors from the previous tables were applied to the average number of units in each property size category by fuel to estimate property annual CO_2 emissions.

For our final estimates we used the LBNL based emission factors for post-1980 buildings, over the RECS based factor. We found that these lower emission factors resulted in total emissions more in line with the total based on all RECS units and residential sector estimates in the U.S. Greenhouse Gas Inventory. The RECS-based factors combined with the POMS property distribution data resulted in a larger overestimate in overall category annual emissions. The lack of information on the building population over 50 units, and lack of information on the correlation between unit emissions and the building/property size are large sources of uncertainty in the estimates at thresholds above 1,000 tons.

Potential to Emit

PTE was estimated using the same ten percent capacity factor as used for the single family residential units

New Properties

The AHS data provided information on new construction used to estimate the number of new buildings and new units with natural gas space heating that were constructed in the 1999 – 2005 period. To simplify the analysis, EPA ignored the limited use of fuel oil for space heating in new units.

The AHS data provided separately the number of new buildings with gas space heating per year, and a size distribution for all new buildings per year. The AHS size distribution stopped at 50 and larger, and was slightly different in other categories from the POMS data. EPA adjusted the distribution based on the POMS distribution and then used the same emission and capacity factor approach as used for existing units.

Table 69
American Housing Survey New Building Data

Building Size: Number of Units per Building	Number of New Buildings per Year (1999 – 2005) (thousands)	Fraction of All New Buildings per Year (1999 – 2005)	New Gas Buildings per Year (1999 – 2005) (thousands)	Number of New Gas Buildings per Year
2	6.3	0.22	16.0	3,468
3 – 4	5.4	0.19		2,995
5 – 9	6.1	0.21		3,389
10 – 19	6.0	0.21		3,310
20 – 29	3.1	0.11		1,734
30 – 49	1.0	0.03		552
50 or more	1.0	0.03		552
Total	**29.0**	**1.00**	**16.0**	**16,000**

Threshold Summary

Table 70
CO_2 Threshold Summaries -- Residential Sectors

Threshold (tons per year)	Number of Existing Sources	Number of New Facilities Added per Year	CO_2 Emissions Covered (Tg per year)
Multi-Family Residential			
100	610,500	11,300	54.285
250	137,000	6,400	42.192
1,000	51,200	1,100	32.399
5,000	7,800	120	14.934
10,000	1,400	20	4.933
25,000	160	3	1.392
50,000	20	0	0.006
100,000	0	0	0
Single-Family Residential			
100	3,925,000	33,000	51.408
250	45,350	515	1.670
1,000	0	0	0
Total Residential Sector			
100	4,535,500	44,300	105.693
250	182,350	6,915	43.862
1,000	51,200	1,100	32.399
5,000	7,800	120	14.934
100,00	1,400	20	4.933
25,000	160	3	1.392
50,000	20	0	0.006
100,000	0	0	0

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Appendix A

Sector Permit Threshold Counts and Emissions by GHG

The listed electronic spreadsheet files contain the permit threshold counts and emissions for each sector and subsector by GHG. These listed files are included in separate files in the docket (EPA-HQ-OAR-2009-0517). Please refer to the following file names for additional information on specific sectors and GHGs:

- GHG Data for Final Tailoring Rule Development - CO2e.xls
- GHG Data for Final Tailoring Rule Development - CO2.xls
- GHG Data for Final Tailoring Rule Development - CH4.xls
- GHG Data for Final Tailoring Rule Development - N2O.xls
- GHG Data for Final Tailoring Rule Development - HFC.xls
- GHG Data for Final Tailoring Rule Development - PFC.xls
- GHG Data for Final Tailoring Rule Development - SF6.xls

Appendix B

Commercial Building Sector -- Permit Threshold Results by Commercial Category

Please refer to the electronic file "Commercial Building Category CO_2 Permit Threshold Results.xls." in the docket for EPA-HQ-OAR-2009-0517

Attachment C

Summary of Methodology and Data Used to Estimate Burden Relief and Evaluate Resource Requirements at Alternative Greenhouse Gas (GHG) Permitting Thresholds

March 2010

1. Introduction

This paper summarizes an assessment of the estimated resource requirements for permitting authorities to include GHG at several possible major source permitting thresholds and the burden reduction and costs savings for permitting authorities and sources as a result of requiring the inclusion of GHG in the title V and Prevention of Significant Deterioration (PSD) permitting programs at thresholds greater than the current statutory requirements. A preliminary analysis to support the tailoring rule proposal resulted in an earlier version of this Technical Support Document, found at EPA-HA-OAR-2009-0517.[14] Based on comments received on the proposal and updates to key assumptions, this revised summary presents the updated methodology and burden reduction estimates resulting from several permitting threshold alternatives considered for the final tailoring rule. The analysis was performed considering GHG emissions on a carbon dioxide equivalent (CO_2e) basis, which represents the sum of the six primary GHG with their respective global warming potentials (GWP) applied. Time and costs associated with permit activities are derived from existing Information Collection Requests (ICRs) for the title V and PSD programs. Estimates for the number of affected sources used in

[14] "Summary of ICR-based Data Used to Estimate Avoided Burden and Evaluate Resource Requirements at Alternative GHG Permitting Thresholds;" Prepared by EPA Staff; August 2009.

this analysis were obtained from the GHG thresholds evaluation, which can be found at EPA-HQ-OAR-2009-0517.[15]

2. Methodology for Estimating Permitting Burden Due to GHG Emission Sources

This section describes the basic methodology we used to estimate the different types and quantities of permitting actions that would be affected by addressing GHGs under the PSD and title V permitting programs. The final burden results summarized in Section 3 are based on the methodologies described in this section. In developing our methodology, we established different applicability options under which GHG emission sources would be regulated. These GHG applicability thresholds range from the statutory threshold levels (100 and 250 tpy) to different combinations of major source and significance levels based on GHG emissions, and finally, applicability based on GHG-related additions to otherwise occurring permitting actions for non-GHGs (also referred to here and in the preamble for this action as the 'anyway' source approach). We considered several different major source/major modification threshold combinations. We chose the combinations to reflect representative, incremental steps along the possible range. Because it is time- and resource- intensive to develop estimates for a given step, we chose intervals that best reflect representative points within the range given those time and resource constraints. For example, as it became evident from the analysis that the 100,000 tpy CO_2e major source threshold would be a viable option under one of the phase-in steps in the GHG tailoring rule, we needed to then evaluate different GHG significance level options in combination with the 100,000 tpy CO_2 major source level to determine the ultimate impact on PSD and title V permitting activity.

[15] "Technical Support Document for Greenhouse Gas Emissions Thresholds Evaluation;" Office of Air Quality Policy and Standards; March 29, 2010.

PSD Permits

Table 2-1 summarizes EPA's estimate of modifications and new construction PSD permitting actions potentially affected by the addition of GHG as a regulated air pollutant at different GHG threshold options for PSD applicability. These actions are broken down by type of modification and new construction activity. Three types of modifications are included in this analysis: major modifications at major sources that are triggered by increased conventional pollutant emissions, but also exceed the significance level for GHG; modifications previously considered minor that become major modifications due to GHG emissions occurring at existing major sources; and modifications at newly major GHG sources due solely to emissions exceeding the significance level threshold for GHG. For new construction, two types of sources are listed – those that are major sources due solely to the emissions of GHG, and those which are classified as major due to conventional pollutant emissions, but also exceed the GHG significance level (or 'anyway' sources).

The first line items in Table 2-1 for modifications and new construction present estimates of GHG-related permitting actions that would occur at 'anyway' sources ; these are labeled in the table as "Current Modifications – Add Additional GHG" and "Newly Constructed Major Sources – Add Additional GHG." The August 2008 ICR for the New Source Review (NSR) program estimates that 282 PSD and 519 non-attainment NSR permits are issued annually.[16] EPA's initial

[16] Prevention of Significant Deterioration and Non-Attainment Area New Source Review (Renewal), EPA ICR Number 123.23, OMB Control Number 2060-0003, 2008. A copy of this document is available in the docket for the final Tailoring Rule.

burden analysis concentrated solely on the 282 annual PSD actions. If a source is major for a pollutant for which an area is designated non-attainment, all significant emissions or significant emissions increases of pollutants for which the area is in attainment are still subject to

Table 2-1. Estimated Number of PSD Permit Actions Exceeding GHG[17] Threshold Options							
Threshold	**100/250 tpy major; 100/250 tpy sig. level**	**25,000 tpy major; 25,000 tpy sig. level**	**50,000 tpy major; 50,000 tpy sig. level**	**100,000 tpy major; 50,000 tpy sig. level**	**100,000 tpy major; 75,000 tpy sig. level**	**100,000 tpy major; 100,000 tpy sig. level**	**Non-GHG**
Current Modifications – Add Additional GHG	448	448	448	448	448	448	448
Minor Modifications Becoming Newly Major	17,894	8,947	1,789	1,789	895	0	0
Modifications at Newly Major Sources	43,942	250	117	20	20	20	0
Modifications Total	**62,284**	**9,645**	**2,354**	**2,257**	**1,363**	**468**	**448**
Newly Constructed Major Sources - Add Additional GHG	240	240	240	240	240	240	240
Newly Constructed Major Sources	19,649	10	3	2	2	2	0
Newly Constructed Sources Total	**19,889**	**250**	**243**	**242**	**242**	**242**	**240**
Total	**82,173**	**9,895**	**2,597**	**2,499**	**1,605**	**710**	**688**

[17] GHG threshold options are all based on tpy CO_2e. The Non-GHG option is based on a PSD action being triggered for a non-GHG, conventional pollutant (e.g., nitric oxides), where a GHG-related PSD review is only necessary when associated GHG emissions for the project exceed 75,000 tpy CO_2e.

PSD review. Thus, some of the facilities applying for nonattainment permits may also undergo PSD actions at the same time. Although there is no way of accurately predicting which of the 519 nonattainment actions might also coincide with a PSD action related to GHG emissions, we believe it is likely that most will since they typically involve large emission sources; thus, it is assumed all nonattainment actions from the ICR annual estimate will also need a PSD permit. Therefore, in this final analysis, to more accurately depict the number of PSD permitting actions occurring annually, it is assumed that all 801 permitting actions above involve a PSD action. We estimate that 70% of these permit actions are modifications, or 560 of the 801, based on feedback received from the National Association of Clean Air Agencies (which estimated that some 65% of these permitting actions involve modifications); other commenters on the proposed tailoring rule (who generally said that most permitting actions involve modifications); and EPA program staff experience.[18] Further, 80% of these modifications are expected to involve combustion activities with GHG emission levels exceeding the statutory thresholds and any of the significance levels we considered, up to an including the 100,000 tpy CO_2e level, thus requiring the inclusion of GHG related requirements in a PSD permit.[19] This equates to 448 modifications annually. We believe that any of the modifications that would be subject to PSD due to the conventional emissions would also be large enough to increase GHGs by at least 100,000 tpy of CO_2e.

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[18] "NACAA Summary on Permitting GHGs Under the Clean Air Act"; Memorandum from Mary Stewart Douglas, National Association of Clean Air Agencies to Juan Santiago, EPA/OAQPS, September 3, 2009.

[19] The 80% estimate was obtained by reviewing a sample of PSD modification permits to determine the number involving combustion that would emit GHGs. This review showed that approximately 80% of PSD permitting actions involve combustion units of all types. These permitting actions are being permitted for, or taking limits for, NOx or some other combustion-related emission. These run the gamut of industrial activity, from power generators to manufacturing facilities, and many other types.

The 240 remaining annual permit actions—labeled in Table 2-1 as "Newly Constructed Major Source- Add Additional GHG"—are assumed to be construction of new major sources as determined by emissions of one or more NAAQS pollutants. Due to the size and emissions of sources currently subject to the PSD permitting program, it is believed all of these newly constructed major sources will exceed each of the GHG thresholds we considered, including the 100,000 tpy CO_2e, and will also need to include GHG-related requirements in the PSD permit. In total, all 688 major permitting actions mentioned above will need to factor in GHG requirements as indicated in Table 2-1. For permitting authorities, 50 additional burden hours are estimated to include the GHG requirements in a permit.[20] For affected sources, approximately 222 additional burden hours are needed, based on the two line items in the current NSR ICR we expect to be impacted by the addition of GHG – approximately 120 hours to "obtain guidance on data needs" and 102 hours for the "preparation of BACT analysis." That is, the current NSR ICR indicates that on average, affected sources spend 222 hours for these two activities for their conventional pollutants. We expect that they will need to spend an equal amount of time for these two activities for their GHG emissions. The sources will need to "obtain guidance on data needs" because they will be analyzing their emissions from GHG units and will need to prepare a separate BACT analysis for their GHG emissions, or else expand the BACT analysis they would otherwise do for their conventional pollutants to account for their GHG emissions. We believe

[20] A well-known gas with a familiar BACT process, such as NOx, requires an average of 20-30 burden hours to be included in a permit. As less is known regarding GHGs and the BACT decision process, expert staff judgment set the burden for permitting authorities to add GHG to permits at 50 hours. This is because determining BACT entails review and analysis of the available control techniques. For a well-known pollutant, the experience of the permitting authority allows it to efficiently consider the various options and narrow them down promptly to the one that should be considered BACT. Because no BACT determinations have ever been made, permitting authorities will need to invest additional time into reviewing the available technologies and selecting which one should be considered the best for the particular source. In the absence of any previous experience selecting BACT for GHG sources, we estimate that twice as much time will be necessary as for conventional pollutants.

that the remaining activities that the affected sources must undertake would not be appreciably lengthened by their need to include GHG emissions.

According to the NSR ICR, approximately 74,591 minor permitting actions occur annually, including the following: 30% involve new minor sources, new synthetic minor sources, and synthetic-based modifications; 30% involve true minor modifications; 20% involve netting-based minor modifications; and 20% involve minor/administrative permit revisions.[21] We believe that a number of projects that could have taken limits or netted out of PSD review and thereby obtain a minor permit will now be required to apply for a major PSD permit, depending on the significance threshold set for GHG. These projects are identified in Table 2-1 under "Minor Modifications Becoming Newly Major." Combining the number of synthetic-based modifications (7,459) and netting-based modifications (14,909) identified in the ICR, approximately 22,368 of these actions could potentially become major modifications subject to PSD review if their associated GHG emissions increases exceed the selected GHG significance level option. We did not count 'new minor sources' and 'new synthetic minors' because we have already accounted for them as potential major GHG sources if their PTE emissions exceed the selected GHG major source threshold option.

Based on staff review of samples of minor source permits, it is estimated that 80% of the current minor modification actions likely involve combustion sources – totaling 17,894 actions of the total 22,368 minor modification actions.[22] Some of these actions may trigger the requirements of the PSD program depending on their GHG emission increases and the selected GHG significance threshold. In the absence of any experience involving GHG sources and any sufficient quantitative data from commenters, we determined the number of these actions on the

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[21] *See NSR ICR at page 11.*
[22] See footnote 6, above (basis for 80% calculation).

following basis: We assumed the following percentage of the total 17,984 actions would move to a major modification status due to GHG increases for each of the GHG significance level options considered in this analysis: 50% at 25,000 tpy CO_2e; 10% at 50,000 tpy CO_2e; 5% at 75,000 tpy CO_2e; and zero at 100,000 tpy CO_2e. To determine these percentages, we considered the relative emissions of CO_2 emissions to NOx emissions at the current major modification significance level threshold for NOx (40 tpy). For example, for an average natural gas combustion boiler (a common industrial combustion unit that is part of many modification projects), a 40 tpy NOx emissions would coincide with a 56,000 tpy CO_2e level. Since many combustion related projects keep just under the 40 tpy NOx level to avoid major modification status, we assume that the CO_2e emissions for a similar project will be around the 50,000 tpy CO_2e level. Based on the relationship in combustion-related emission levels between NOx and CO_2e just described, we believe it is reasonable to expect that all these currently minor modification projects involving combustion units will exceed the 100 tpy GHG significance level under the baseline scenario. This is because we do not believe that the sources at which these projects occur will be able to structure their operations so as to limit their GHG emissions to less than 100 tpy GHGs. However, at higher GHG significance level options, we assume that a decreasing proportion of projects will be significantly large enough, or they may emit GHGs close enough to the GHG significance level to be able to limit their operations or net-out for GHGs like they can for NOx. In the absence of experience and quantitative information from commenters we made the following assumptions regarding how many of these formerly minor modification projects would be subject to major PSD review at the different GHG significance level options: at the 25,000 tpy CO_2e significance level, we estimate that half of the modifications will be able to limit their operations to avoid PSD ; at the 50,000 tpy CO_2e

significance level, we estimate that 10% of these previously minor now major modifications will be covered by PSD; at the 75,000 tpy CO_2e significance level we estimate that only 5% of these currently minor modification projects move into a major modification status for GHGs; and lastly, at the 100,000 tpy CO_2e significance level, we assume that none of these projects will be large enough by themselves to trigger major PSD review.

In addition to sources becoming subject to PSD requirements because of GHG emissions related to modifications, new construction will occur that will require a PSD permit solely due to the source's potential GHG emission levels, identified in Table 2-1 as "Newly Constructed Major Sources." Based on the source data obtained from the GHG thresholds evaluation, these newly constructed major sources involve both industrial and commercial/residential facilities.[23] The current NSR ICR notes that permitting authorities spend approximately 300 hours processing and issuing a new construction industrial source PSD permit. Sources spend almost 870 hours on average preparing for the same permit. In the previous burden analysis, commercial/residential permits were assumed to require only 20% of the time necessary for an industrial permit. While it is still believed that these sources are less complex than their industrial counterparts in terms of numbers and types of emissions sources and control requirements, EPA now estimates the commercial/residential permits to take 70% of the time required to complete an industrial permit, resulting in approximately 210 hours and 866 hours for permitting authorities and sources respectively.[24] This is based on comments received, which stated that we had significantly underestimated the amount of time needed. These commenters emphasized that commercial and residential sources will generally be located in populated areas, and therefore

[23] "Technical Support Document for Greenhouse Gas Emissions Thresholds Evaluation;" Office of Air Quality Policy and Standards; March 29, 2010.
[24] See Tables 2-2 and 2-3.

may elicit significant amounts of public input, which in turn will increase the amount of time needed compared to our initial estimates. However, the commenters generally did not provide quantitative information. As a result, we conducted further evaluation of the additional support and outreach activities for permitting authorities to assist with applicability determinations and emissions calculations, as virtually all commercial/residential sources will have no experience with the PSD permitting process. There are also many permit preparation activities that represent a fixed cost, such as preparation of notices and public hearings. Of the sources falling in this category, the number requiring PSD permitting will vary depending on where the thresholds for triggering PSD review (both major source and modifications thresholds) are established.

Table 2-2. Average Permitting Authority Burden per GHG PSD Permit Type

Activity	Burden Hours per Permit - Industrial	Burden Hours per Permit - Commercial/ Residential[a]
Attend Preapplication Meetings	36	27
Answer Respondent Questions	20	15
Log In and Review Data Submissions	16	12
Request Additional Information	8	6
Analyze for and Provide Confidentiality Protection	24	2
Prepare Completed Applications for Processing	38	29
File and Transmit Copies	8	6
Prepare Preliminary Determination	36	27
Prepare Notices for and Attend Public Hearings	40	30
Application Approval	48	36
Notification of Applicant of PA Determination	8	6
Submittal of Information on BACT/LAER to RBLC	19	14
Total Burden Hours per Permit	**301**	**210**

[a] In general, to process commercial/residential permits, permitting authorities will have to spend 75% of the amount of time they spend on industrial permits, except they will have to spend even less time on confidentiality due to the fact that most residential sources are not likely to be concerned about confidentiality. Commercial/residential permits will be much simpler than industrial permits, but a large part of the permitting costs are fixed costs. For example, organizing and holding a hearing for a much simpler permit, compared to a more complex permit, nevertheless take almost as long because of the document preparation, travel, and organizational details.

Table 2-3. Average Source Burden per GHG PSD Permit Type		
Activity	**Burden Hours per Permit - Industrial**	**Burden Hours per Permit - Commercial/ Residential[a]**
Preparation and Planning		
Determination of Compliance Requirements	170	170
Obtain Guidance on Data Needs	120	120
Preparation of BACT Analysis	102	102
Data Collection and Analysis		
Air Quality Modeling	200	40
Determination of Impact on Air Quality Related Values	100	30
Post-construction Air Quality Monitoring	50	20
Permit Application		
Preparation and Submittal of Permit Application	60	60
Public Hearings	24	24
Revisions to Permit	40	40
Total Burden	866	606

[a]PSD permit applications for commercial/residential sources will be significantly simpler than industrial source PSD permit applications. However, due to their inexperience, we estimate commercial/residential sources will take as long to complete their steps for their permit application as it will for industrial sources to complete their steps. Commercial/residential sources will, on average, have much less work for data collection and analysis. We estimate that they will have approximately 25% as much work in these areas (90 hours) compared to industrial sources (350 hours). However, commercial/residential sources will have to spend some time on data collection analysis is because some of them will have conventional pollutants that they emit in amounts that exceed the "significance" levels, but not the "major" levels, and they will have to analyze those conventional pollutants. Our 25% estimate is based, in the absence of actual experience or quantitative data from commenters, on our judgment that significantly less than 50% of commercial/residential sources emit conventional pollutants in amounts that equal or exceed the significance levels, but those that do may have to spend more time than industrial sources on data collection because they are unfamiliar with the tasks and therefore will face a learning curve.

Finally, an existing, but newly classified major source for GHG, may undergo a modification for which it will then be subject to PSD permitting requirements. This category of PSD permitting activity is listed on Table 2-1 as "Modifications at Newly Major Sources." With this new major source status, these facilities must apply for and be issued a PSD permit, if they undergo a major modification. See Appendix A for a list of newly major sources at different

major source GHG thresholds. We estimate that 4% of these newly major sources will undergo modifications. This rate was obtained by dividing the current 560 annual PSD modification-related permit actions (i.e., 70% of 801 actions identified in the NSR ICR) by the existing major source population of 14,700 major source title V permits. This represents our best available estimate of the rate of PSD modification activity at major sources, and we make the assumption that this rate will also apply for newly major GHG sources. We recognize that there is some level of uncertainty in applying this rate to GHG-only sources, particularly for sources in unconventional sectors such as commercial and residential categories, however we believe at higher GHG threshold levels, where large industrial sources predominate, that this modification rate provides a reasonable estimate of modification activity. As no data are yet available for commercial/residential sources and because we cannot conclude that they will differ from industrial sources, we select the same 4% rate for modification activity.

Title V Permits

Title V programs also complete several types of permitting actions annually, including processing and issuing new permits, permit revisions, and permit renewals. Newly constructed major sources or sources designated newly major due to a modification are required to apply for and be issued a title V permit in order to operate. In addition to sources new to title V, permitting authorities must add GHG terms to permits for sources exceeding the threshold set for GHG emissions. Permitting authorities may face burdens to update existing title V permits for GHG under two possible scenarios: (1) EPA promulgates or approves any applicable requirements for GHGs that would apply to such a source, which would generally require a permit reopening or renewal application, or (2) the source makes a change that would result in an applicable requirement for GHG to newly apply to the source, such as PSD review, which would generally require an application for a permit revision. Permitting authorities will also need to process permit

renewal applications, generally on a five-year cycle, and such renewals would need to assure that the permit properly addresses GHG.

The April 2007 Title V ICR estimates that 50 permits are completed every year for new sources.[25] For this analysis, it is assumed that all 50 of these typically large industrial-type sources will be capable of potentially emitting GHG and will need to add GHG-related requirements to the permit. The estimated burden per title V permit in the ICR represents an average of multiple pollutants; we estimate the addition of GHGs will add an additional 10% of the time currently estimated for a new title V permit. We believe that 10% is the appropriate amount because for the most part, these sources will simply need to add information concerning inventory, reporting, or monitoring of their GHG emissions, as appropriate, which they can readily do.

The ICR also identifies 3,267 permit renewals conducted on an annual basis. As not all sources potentially emit GHG above a determined threshold, this analysis examines the estimated 80% involving combustion activities that most likely have the potential to emit GHG above the series of potential thresholds evaluated.[26] Therefore, approximately 2,614 sources will need to address GHG in the new version of the permit.

Revisions to title V permits will also be necessary based on the number of modifications calculated for this analysis. Revisions occurring specifically due to GHG may involve significant revisions, minor revisions, or administrative actions to operating permits. EPA estimates that this activity will require 40 hours per permit on average for permitting authorities to complete.[27] The

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[25] Information Collection Request for State Operating Permit Regulations (Renewal), EPA ICR Number 1587.07, OMB Control Number 2060-0243, 2007. A copy of this document is available in the docket for the final Tailoring Rule.

[26] The 80% estimate was obtained through a review of existing title V permit source categorization.

[27] The Title V ICR indicates the burdens associated with revisions are as follows: 90 hours for a significant revision, 30 hours for a minor revision, and 5 hours for an administrative action. *See Table 8 at 23*. It is not known which

number of operating permit revisions will vary based on the number of previously minor modifications now qualifying as major modifications, and modifications at newly major sources, both listed in Table 2-1. At any level, it is assumed that the 448 modifications involving combustion that occur annually will need to include any GHG requirements in the revision of their respective title V permits. EPA estimates that permitting authorities will spend, in addition to the current burden to issue a title V permit revision, an additional 10% of the 40 hours needed to complete this process, or four hours per action.

Finally, new industrial and commercial/residential sources will be entering title V permitting programs annually due solely to their GHG emissions. These commercial/residential sources that exceed the major source threshold solely due to their GHG emissions will not likely have substantial applicable requirements in the near term and/or will not require as much time to process as those for industrial sources, which have other applicable requirements in addition to those related to their GHG emissions. However, upon further evaluation and in response to comments from permitting authorities, EPA believes its initial estimate of one-tenth of the burden hours required was considered too low. Permitting authorities would confront substantial challenges as they have little experience with such sources and their GHG emissions. Commercial/residential sources themselves will have no experience with the title V permitting process, which will increase the time needed to assess GHG emissions, complete the application, and respond to permitting authority comments. We also expect that in many cases the draft permits will undergo high levels of public participation through public comment periods, public hearings, and petitions for reconsideration. Therefore, EPA assumes preparing a permit for

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revision will be required for any modification that exceeds the GHG significance level threshold; therefore, EPA averages the three permitting burdens to obtain a value of 40 hours per permit.

affected commercial/residential sources will take 50% of the time a permitting authority currently spends on issuing a title V permit for an industrial source.

Table 2-4. Average Permitting Authority Burden per GHG Title V Permit

Activity	Burden Hours per Permit - Industrial	Burden Hours per Permit - Commercial/ Residential[a]
Permit Application Review	100	33
Draft Permits Preparation	150	50
Comment Period Notification	10	10
Hold Public Hearings	100	90
Interaction with EPA	20	5
Analyze Public Comments	40	20
Permits Issuance	8	6
Total Burden	**428**	**214**

[a]Commercial/residential permits will be simpler, so that it would take the permitting authority about 1/3 of the time to review the permit application and draft the permit than it would for an industrial source permit. The comment period notification and time for public hearings, however, would be about the same because of the fixed time burdens necessary to provide notice and hold hearings. The amount of time interacting with EPA would be much less because of the relative simplicity of the permits. Analyzing public comments would take half as long as for an industrial permit because although the permits are much simpler, there could be a fair amount of public interest because of the location of the source. Permit issuance would take a less time than for an industrial source because most of the costs are fixed, although the permit is simpler.

Table 2-5. Average Source Burden per GHG Title V Permit

Activity	Burden Hours per Permit - Industrial	Burden Hours per Permit - Commercial/ Residential[a]
Prepare Application	300	150
Draft Permits Interaction	40	20
Public Hearing Participation	10	10
Total Burden	350	180

[a]Commercial/residential permit applications will be significantly simpler than industrial source title V permit applications. However, due to their inexperience, we estimate commercial/residential sources will take half as long to complete their steps for their permit application as it will for industrial sources to complete their steps. Less interaction, again 50% less time, will be needed with permitting authorities during the permit drafting process. However, public hearing participation will likely require the same amount of time because of the fixed time burdens necessary to complete hearings.

Uncertainties in Estimates of Affected Sources

In order to estimate the number of facilities that exceed a given GHG threshold (such as a 100 or 250 tpy CO_2e emission threshold for baseline analysis), it is necessary to have emissions inventory data at the facility or building level, including, and particularly for lower threshold scenarios, numerous small sources in the residential and commercial sectors (e.g., apartment buildings and office buildings). Historically, however, EPA has not collected sector-wide, facility-level information for GHG emissions under the CAA (with the exception of information from electric generating units required to report CO_2 emissions under the Acid Rain Program reporting requirements). To date, national EPA inventories of GHG sources have primarily focused on 'top-down' estimates of GHG emissions from sectors and sources, and not facility-level estimates. As a result, many of the uncertainties described here result from the absence of a comprehensive data set of facility-level GHG emissions across all sectors. A full description of the methodology used for determining facility level emissions is provided in our GHG thresholds evaluation study, which can be found at EPA-HQ-OAR-2009-0517.[28]

For residential, commercial, and smaller manufacturing operations, our current analysis relies on sample facility datasets and 'top-down' sector data (e.g., national fuel consumption statistics and/or building characteristics). There are inherent uncertainties in developing source counts from the allocation of these nationally aggregated statistics. The allocation factors we used, based on U.S. Energy Information Administration statistical sampling procedures and energy consumption statistics, are likely the best available to estimate the population of residential, commercial, and small manufacturing sources exceeding different GHG thresholds.

[28] "Technical Support Document for Greenhouse Gas Emissions Thresholds Evaluation;" Office of Air Quality Policy and Standards; March 29, 2010.

However, uncertainties may result in either overestimating or underestimating GHG emissions for a given individual facility. It is worth noting that our estimates for the largest GHG emitting sources, such as electric utilities and refineries, are derived from bottom-up calculations of individual facility/building emissions so that there is increased certainty in evaluating and comparing the facility counts at the higher GHG threshold scenarios where residential and commercial sources are not highly affected. Although there are different levels of uncertainty in our facility level estimates across sectors, we do believe that the data are sufficiently robust to use in the aggregate to assess national permitting level impacts.

EPA's estimate of affected sources is based on their potential to emit (PTE) emissions, as opposed to actual emission levels. PTE is defined as the maximum capacity of a stationary source to emit a pollutant under its physical and operational design, including certain legal limitations, for example, on emissions or hours of operation. NSR and Title V programs both use PTE for defining and identifying major sources. Although we have attempted to identify reasonable adjustments to account for PTE in our methodology, there are significant uncertainties in our PTE-based estimates, particularly for the commercial, residential and small manufacturing sectors that have not traditionally been subject to any form of air permitting. In practice, for example, for the residential sector and for many of the facilities in the commercial sector, where CO_2 emissions are primarily due to space heating/appliance usage, the combustion units are not likely to be used constantly at their maximum rated capacity because heating is not needed year-round and heating systems have thermostats. However, for our analysis we do assume full PTE-based estimates for the residential and commercial sectors, using PTE adjustment factors of 10 and 6.6, respectively to adjust actual emissions to PTE level. Absent industry specific data, for small manufacturing source categories we assume a PTE adjustment

factor of 2; individual manufacturing facilities may operate their combustion equipment at levels above and below this capacity utilization rate, but we believe this PTE adjustment reflects a reasonable average rate across the variety of small manufacturing facilities included in the threshold analysis. Ultimately, the number of sources brought into either the NSR or Title V programs due solely to their PTE would depend on how EPA interprets PTE for various types of emitting equipment (e.g., space-heating furnaces in residential and commercial buildings), and the extent to which streamlined mechanisms are made available for sources to obtain legal limits on their PTE so that the programs are not applicable. No such decisions or interpretations have been made at this point and, as mentioned in the preamble, they will require significant time to develop. As a result, our threshold analysis uniformly assumes that no PTE limits are in place for any of the affected sectors, which may likely be the case in the immediate stages of GHG permitting for affected sources.

There is significant uncertainty in both our modification rate for newly major GHG sources and in our estimate of modification activity at existing major sources that will become subject to PSD review for GHG emission increases. The general uncertainty results from predicting not only how many major sources will undergo physical or operational changes in any given year, but also which of those changes would result in GHG emissions increases that would exceed a proposed GHG significance level. First, information is not available across sectors and source categories on the types and numbers of specific physical and operational changes that would result in GHG emissions increases in amounts that can be estimated and that therefore can be compared to various GHG emissions significance levels. Second, there is uncertainty in how many project modifications will occur within any given year because decisions on these projects are driven by facility- and sector-based growth patterns and business planning decisions. Lastly,

some source categories and units that emit GHGs have not previously been subject to any type of permitting or reporting requirements; as a result, for these sources, there is very little historical record for use in estimating the number and types of projects that would occur at these sources and, in turn, establish an appropriate significance level for GHGs.

Uncertainties in Permitting Costs

The primary reference sources for our estimate of burden hours and costs for permitting GHGs are the most recent ICRs for the PSD and title V programs. There a number of uncertainties introduced in using these references for costing GHG permitting activities. First, we are assuming that the average, conventional pollutant per-permit costs will be similar for GHGs. We do recognize the likelihood that residential and commercial permits would be simpler and have a lower per-permit burden than traditional industrial sources, and have made adjustments for this: however, for industrial sources we assume per-permit costs on par with what are estimated in the latest ICRs for PSD and title V programs. There is uncertainty in applying these average ICR-based costs to GHG permitting, even for industrial sources, because there is no historical track record for permitting these GHG sources and thus any cost efficiencies that have been realized over the years for conventional pollutant permitting, and thus reflected in the current ICRs, may not be initially realized for GHG permitting. For example, we assume the same public hearing estimate as included in the ICR for current PSD permits (i.e., that 1 in 50 major PSD permits require a hearing)—for GHG sources this number may be higher initially if there ends up being significantly more public interest in these permits. We do believe overall, however, that larger facilities, especially those affected at higher threshold levels, will

have had sufficient permitting experience such that out ICR-based costs should reasonably reflect the added burden of including GHGs.

As mentioned above, in our burden scenario analyses we do discount the ICR-based per-permit costs for residential and commercial sources to reflect what we believe will generally be simpler permits, involving primarily uniform combustion type equipment. For PSD we discount the per-permit cost by 30%, and for title V we discount the per-permit cost by 50%. There is significant uncertainty in these estimated discounts since we have no track record for permitting these smaller commercial and residential sources. However, we do believe that, based solely on the type and uniformity of the GHG emission units that would be subject to permitting at these facilities under lower GHG threshold scenarios, that average per-permit costs would be less than those currently experienced by more complex industrial facilities, with numerous emission units, for currently regulated pollutants.

3. Evaluation of ICR-based Resource Requirements for Permitting Authorities at Different Possible GHG Permitting Thresholds

For the proposal, EPA examined resource requirements at the statutory-based 100/250 tpy CO_2e emission levels—referred to as the 'baseline' analysis in the following tables—as well as at 10,000 tpy, 25,000 tpy, and 50,000 tpy CO_2e levels. Due to comments received on the proposal and this improved burden analysis, the 10,000 tpy threshold was eliminated as not being a viable alternative since it did not adequately address administrative necessity concerns. In this analysis, in addition to the baseline analysis, EPA broadened the options to consider thresholds ranging from a 25,000 tpy CO_2e major source applicability level for PSD and title V up to a 100,000 tpy CO_2e level, with associated PSD GHG significant levels of equal magnitude. EPA

also considered the impact on burden of different PSD GHG significance levels combined with the 100,000 tpy major source level, including 50,000 CO_2e, 75,000 CO_2e, and 100,000 CO_2e. The choice of a PSD significance level also has a direct impact on title V burdens since a greater number of PSD permit requirements that result from modification activities will result in a greater number of necessary title V revisions.

PSD Permits

Table 3-1 presents the estimated burden for permitting authorities at different possible PSD GHG major source applicability thresholds. Descriptions of the different thresholds selected are provided below. Burden estimates for the PSD program are calculated based on listed values obtained from Tables 6-1 and 6-2 the NSR ICR. The ICR does not distinguish between new construction and modification actions; therefore, Table 3-1 combines the actions into permit preparation issuance based solely on GHG emissions or the addition of GHG requirements to permits being issued for conventional sources, or "anyway" permits. PSD permit preparation and issuance is further divided into industrial and commercial/residential sources since less time is required for commercial/residential sources.

Baseline

After receiving comments on the proposal and reevaluating the initial estimates, EPA has determined the impact of regulating GHG emissions under current PSD statutory thresholds for applicability. Baseline burden and cost were calculated at the 100 tpy and 250 tpy major source permitting threshold (the 100 tpy threshold applies to the 28 source categories identified in the

Clean Air Act section 169(1)). At these thresholds, the additional annual permitting burden for permitting authorities is estimated at 19.5 million hours at a cost of $1.5 billion.

Table 3-1. Additional Permitting Authority PSD Burden with GHG (Annual)					
	Activity	**Burden Hours per Permit**	**Affected Permits**	**Total Burden (hours)**	**Total Cost ($2007)[a]**
100/250 tpy Major /100 tpy Significance Threshold ("Baseline")					
	PSD Permit Preparation and Issuance - Industrial	301	26,089	7,852,789	$606,392,367
	PSD Permit Preparation and Issuance - Commercial/Residential[b]	210	55,509	11,656,890	$900,145,046
	Additions to Current PSD Applications[c]	50	688	34,400	$2,656,368
	Total Additional Burden			**19,544,079**	**$1,509,193,780**
25,000 tpy Major/ 25,000 tpy Significance Threshold					
	PSD Permit Preparation and Issuance - Industrial	301	9197	2,768,297	$213,767,894
	PSD Permit Preparation and Issuance - Commercial/Residential	210	63	13,230	$1,021,621
	Additions to Current PSD Applications	50	688	34,400	$2,656,368
	Total Additional Burden			**2,815,927**	**$217,445,883**
50,000 tpy Major/ 50,000 Significance Threshold					
	PSD Permit Preparation and Issuance - Industrial	301	1906	573,706	$44,301,577
	PSD Permit Preparation and Issuance - Commercial/Residential	210	28	5,880	$454,054
	Additions to Current PSD Applications	50	688	34,400	$2,656,368
	Total Additional Burden			**613,986**	**$47,411,999**
100,000 tpy Major/ 50,000 tpy Significance Threshold					
	PSD Permit Preparation and Issuance - Industrial	301	1809	544,509	$42,046,985
	PSD Permit Preparation and Issuance - Commercial/Residential	210	4	840	$64,865
	Additions to Current PSD Applications	50	688	34,400	$2,656,368
	Total Additional Burden			**579,749**	**$44,768,218**
100,000 tpy Major/ 75,000 tpy Significance Threshold					
	PSD Permit Preparation and Issuance - Industrial	301	915	275,415	$21,267,546
	PSD Permit Preparation and Issuance - Commercial/Residential	210	4	840	$64,865
	Additions to Current PSD Applications	50	688	34,400	$2,656,368
	Total Additional Burden			**310,655**	**$23,988,779**
100,000 tpy Major/ 100,000 tpy Significance Threshold					
	PSD Permit Preparation and Issuance - Industrial	301	20	6020	$464,864
	PSD Permit Preparation and Issuance - Commercial/Residential	210	4	840	$64,865
	Additions to Current PSD Applications	50	688	34,400	$2,656,368
	Total Additional Burden			**41,260**	**$3,186,097**
Non-GHG-Based Threshold					
	PSD Permit Preparation and Issuance - Industrial	301	0	0	$0
	PSD Permit Preparation and Issuance - Commercial/Residential	210	0	0	$0
	Additions to Current PSD Applications	50	688	34,400	$2,656,368

	Total Additional Burden			**34,400**	**$2,656,368**

[a]Labor cost of $77.22/hr from Prevention of Significant Deterioration and Non-Attainment Area New Source Review (Renewal), EPA ICR Number 1230.23, OMB Control Number 2060-0003, 2008.

[b]Assume permit preparation and issuance for commercial/residential permits takes 70% the amount of time needed to prepare and issue an industrial permit.

[c]For current permit applications, assume it takes an additional 50 hours to include GHG requirements in the permit.

Alternate Threshold Scenarios

After determining the baseline, additional annual burden was determined at six different major stationary source threshold levels in order to evaluate the relative differences in impacts to permitting authorities. Estimates represent the additional burden and costs due to GHG permitting beyond to the burden currently experienced by permitting authorities and sources.

The first scenario is the threshold proposed in the GHG Tailoring Rule of 25,000 tpy CO_2e. Results of this analysis indicate a total of 9,260 new permits, plus 688 permit actions to include GHG related requirements into current PSD permitting actions (including both new construction and modifications). This additional workload equates to 2.8 million hours for permitting authorities at a cost of $217 million. Note this is an increase over our initial results at proposal of over 185,000 burden hours and $8.7 million. Again, increases are due to more accurate estimates of annual modifications and burden associated with commercial/residential permits.

Increasing the emission threshold to 50,000 tpy will lead to an estimated 614,000 hours additional burden at a cost of $47.4 million. This scenario estimates 1,934 new construction or modification activities will be subject to PSD permitting annually due to GHG.

Setting a threshold of 100,000 tpy with a significance level of 50,000 tpy, permitting authorities will spend an estimated 580,000 hours preparing and issuing permits, at a cost of $44.8 million. At this level, EPA estimates 1,813 new actions require PSD permits.

Next, at the 100,000 tpy threshold with a 75,000 tpy significance level, the annual permitting authority burden will increase by 311,000 hours at a cost of $24 million. In this scenario, 919 new permit actions will occur annually.

At a 100,000 tpy threshold, with a 100,000 tpy significance level for modifications, EPA estimates there are 20 new industrial PSD permit actions and four commercial/residential. Permitting authorities will spend an estimated 41,000 additional hours on permits at a cost of $3.2 million.

The final scenario involves only sources that are required to get a PSD permit due to their non-GHG emissions and then are further required to add GHG related requirements as a result of GHG emissions increases from modifications, or GHG emissions at newly constructed facilities, exceeding a significance threshold of 75,000 tpy GHG. In this scenario, only the annual 688 PSD permit actions derived from the NSR ICR are expected to need the inclusion of GHG related requirements to the permits. The additional burden to permitting authorities under this scenario is estimated at 34,000 hours at a cost of $2.7 million.

Title V Permits

Table 3-2 presents the estimated burden for permitting authorities at different possible title V GHG major source applicability thresholds. Descriptions of the different thresholds selected are provided below. Burden estimates are calculated and annual values derived from Tables 7 and 8 of the current Title V ICR.[29]

[29] For consistency, the permitting authority labor costs are updated to 2007 dollars utilizing the *2007 General Schedule Salary Table* from the Office of Personnel Management.

Baseline

EPA reevaluated our estimates of the additional administrative burden and cost of including GHG emitters in the title V program at the current 100 tpy statutory threshold level. To determine the impact of regulating GHG emissions under current title V program, baseline

Table 3-2. Additional Permitting Authority Title V Burden with GHG (Annual)				
Activity	**Burden Hour per Permit**	**Affected Permits**	**Total Burden (hours)**	**Total Cost ($2007)[b]**
100 tpy (associated with PSD 100/250 tpy maj./100 tpy sig.)				
New Permit Preparation and Issuance – Industrial	428	71,829	30,742,812	$1,414,169,352
Add GHG component to new Non-GHG Permit[b]	43	50	2,150	$98,900
New Permit Preparation and Issuance - Commercial/Residential[c]	214	1,985,948	424,992,872	$19,549,672,112
Permit Revisions - due to GHG		61,836	2,473,440	$113,778,240
Permit Revisions - add GHG to Current Non-GHG Permits	4	448	1,792	$82,432
Permit Renewals[d]	9	2,614	23,526	$1,082,196
Total Additional Burden			**458,236,592**	**$21,078,883,232**
25,000 tpy (associated with PSD 25,000 tpy maj./25,000 tpy sig.)				
New Permit Preparation and Issuance – Industrial	428	2,103	899,941	$41,397,301
Add GHG component to new Non-GHG Permit	43	50	2,150	$98,900
New Permit Preparation and Issuance - Commercial/Residential	214	444	94,945	$4,367,455
Permit Revisions - due to GHG	40	9,197	367,880	$16,922,480
Permit Revisions - add GHG to Current Non-GHG Permits	4	448	1,792	$82,432
Permit Renewals	9	2,614	23,526	$1,082,196
Total Additional Burden			**1,390,234**	**$63,950,764**
50,000 tpy (associated with PSD 50,000 tpy maj./50,000 tpy sig.)				
New Permit Preparation and Issuance – Industrial	428	981	419,868	$19,313,928
Add GHG component to new Non-GHG Permit	43	50	2,150	$98,900
New Permit Preparation and Issuance - Commercial/Residential	214	208	44,441	$2,044,271
Permit Revisions - due to GHG	40	1,906	76,240	$3,507,040
Permit Revisions - add GHG to Current Non-GHG Permits	4	448	1,792	$82,432
Permit Renewals	9	2,614	23,526	$1,082,196
Total Additional Burden			**568,017**	**$26,128,767**
100,000 tpy (associated with PSD 100,000 tpy maj./50,000 tpy sig.)				
New Permit Preparation and Issuance – Industrial	428	172	73,473	$3,379,773
Add GHG component to new Non-GHG Permit	43	50	2,150	$98,900
New Permit Preparation and Issuance - Commercial/Residential	214	18	3,781	$173,911
Permit Revisions - due to GHG	40	1,809	72,360	$3,328,560
Permit Revisions - add GHG to Current Non-GHG Permits	4	448	1,792	$82,432
Permit Renewals	9	2,614	23,526	$1,082,196
Total Additional Burden			**177,082**	**$8,145,772**

Table 3-2 cont'd. Additional Permitting Authority Title V Burden with GHG (Annual)				
Activity	**Burden Hour per Permit**	**Affected Permits**	**Total Burden (hours)**	**Total Cost ($2007)[b]**
100,000 tpy (associated with PSD 100,000 tpy maj./75,000 tpy sig.)				
New Permit Preparation and Issuance – Industrial	428	172	73,473	3,379,773
Add GHG component to new Non-GHG Permit	43	50	2,150	$98,900
New Permit Preparation and Issuance - Commercial/Residential	214	18	3,781	$173,911
Permit Revisions - due to GHG	40	915	36,600	$1,683,600
Permit Revisions - add GHG to Current Non-GHG Permits	4	448	1,792	$82,432
Permit Renewals	9	2,614	23,526	$1,082,196
Total Additional Burden			**141,322**	**$6,500,812**
100,000 tpy (associated with 100,000 tpy maj./ 100,000 tpy sig.)				
New Permit Preparation and Issuance – Industrial	428	172	73,473	$3,379,773
Add GHG component to new Non-GHG Permit	43	50	2,150	$98,900
New Permit Preparation and Issuance - Commercial/Residential	214	18	3,781	$173,911
Permit Revisions - due to GHG	40	20	800	$36,800
Permit Revisions - add GHG to Current Non-GHG Permits	4	448	1,792	$82,432
Permit Renewals	9	2,614	23,526	$1,082,196
Total Additional Burden			**105,522**	**$4,854,012**
Non-GHG Based Threshold				
New Permit Preparation and Issuance – Industrial	428	0	0	0
Add GHG component to new Non-GHG Permit	43	50	2,150	$98,900
New Permit Preparation and Issuance - Commercial/Residential	21	0	0	$0
Permit Revisions - due to GHG	40	0	0	$0
Permit Revisions - add GHG to Current Non-GHG Permits	4	448	1,792	$82,432
Permit Renewals	9	2,614	23,526	$1,082,196
Total Additional Burden			**27,468**	**$1,263,528**

[a]Salaries from Title V ICR adjusted to 2007 dollars using 2007 OPM General Schedule Salary Table available at: http://www.opm.gov/oca/07tables/index.asp

[b]Incorporating GHG information/requirements into significant revisions and permit renewals adds an additional 10% of the current time (90 hours each)

[c]New commercial/residential permits require half the time needed for new industrial permits

[d]The Title V ICR estimates that 3,267 permits annually undergo renewal - assume 80% of these involve combustion

burden and cost are calculated at the 100 tpy threshold level, which is the generally applied major source applicability level under title V. At the statutory threshold level, it is estimated that over six million sources will become newly subject to title V. A source generally must apply for a title V permit within one year of becoming subject to permitting, then the permitting authority must take final action (issue or deny) on the permit applications within 18 months of receipt. We expect these new permits will not be issued all at once, but rather will come in over a three-year time frame based on the statutory requirements listed above. Therefore, we assume that one-third of the newly subject sources will apply for and obtain a permit annually, requiring almost 460 million burden hours to prepare and issue over two million new operating permits at an additional cost of $21.1 billion.

Alternate Threshold Scenarios

After determining the baseline, additional burden was determined at six different major stationary source threshold levels in order to evaluate the relative differences in impacts to permitting authorities. Estimates represent the additional annual burden and costs due to GHG permitting beyond the burden and costs currently experienced by permitting authorities and sources.

The first scenario is the threshold proposed in the GHG Tailoring Rule of 25,000 tpy CO_2e. Results of this analysis indicate a total of 2,547 new permits, as well as 50 permits that would need to include GHG requirements in their permits. This additional workload equates to 1.4 million hours for permitting authorities at a cost of $64 million. Note that this is an increase over our initial results at proposal of approximately 985,000 burden hours and $45 million. As

with PSD programs, increases are due to more complete estimates of annual modifications and the revised burden associated with commercial/residential permits.

Increasing the emission threshold to 50,000 tpy will lead to an estimated 568,000 hours additional burden at a cost of $26.1 million. This scenario estimates 1,189 new sources will be subject to title V permitting annually due to GHG.

To examine the impact of significance levels on the overall burden, EPA considered the impact on burden of different PSD GHG significance levels of 50,000 CO_2e, 75,000 CO_2e, and 100,000 CO_2e combined with the 100,000 tpy major source level The choice of a PSD significance level has a direct impact on title V burdens since a greater number of PSD permit requirements that result from modification activities will result in a greater number of necessary title V revisions. This effect is apparent in Table 3-2. Note that for all three scenarios, EPA estimates there are 172 industrial and 18 commercial/residential new title V permit actions due to GHG.

Setting a threshold of 100,000 tpy with a PSD significance level of 50,000 tpy, permitting authorities will spend an estimated 177,000 hours preparing and issuing permits, at a cost of $8.1 million. Note that under this scenario, 1,809 revisions are estimated annually to update existing operating permits due to modification activities. Utilizing a 75,000 tpy PSD significance level, the annual permitting authority burden is estimated to increase by 161,000 hours at a cost of $7.4 million. At this significance level, 915 operating permit revisions will be necessary due to GHG. This decrease from the previous scenario is due to fewer modifications exceeding the higher significance level threshold and requiring revisions to an operating permit. At a 100,000 tpy threshold, with a 100,000 tpy PSD significance level for modifications, EPA estimates there are

only 20 permit revisions annually. Permitting authorities will spend an estimated 106,000 additional hours on permits at a cost of $4.9 million.

The final scenario involves only sources that are required to get a title V permit for emissions other than GHG and that are required to add GHG related requirements. Under this scenario, only the annual issuance of 50 permits noted in the Title V ICR are expected to need the inclusion of GHG related requirements to the permits. The additional burden to permitting authorities under this scenario is estimated at 27 million hours at a cost of $1.3 million.

4. Burden Relief Estimates for Permitting Authorities and Sources at Several Possible GHG Major Source Applicability Thresholds for Title V and PSD

The following tables indicate the estimated burden relief when comparing the baseline levels with several threshold levels for GHG applicability as described in the previous sections. In Tables 4-1 through 4-4, the first three columns indicate the cost per permit and total cost to permitting authorities at a GHG threshold level equal to the statutory threshold levels for title V and PSD (100 and 100/250 tpy, respectively). The next three columns reflect the estimated costs for permitting authorities with the permitting thresholds (both for PSD and title V) set at the specified levels. In the final three columns, the burden relief is estimated – the time and costs alleviated relative to the baseline levels by establishing several GHG permitting thresholds as previously described.

The burden relief for sources at the different permitting thresholds is presented in Tables 4-5, 4-6, and 4-7 below. Table 4-8 estimates the cost savings if a non-GHG based related trigger is used. This information on burden relief was used to compile the final Regulatory Impact Analysis (RIA) for the final GHG tailoring rule. Please see the final RIA contained in the public

docket for this GHG tailoring rule for a full explanation and description of the burden relief provided by the final GHG tailoring rule actions.

Table 4-1. Estimated Burden Relief for Permitting Authorities Utilizing a 25,000 tpy Major/ 25,000 tpy PSD Significance Threshold									
	All Title V 100tpy and PSD 250 tpy			25,000 tpy or Greater			Avoided Burden		
Activity	**Cost per Permit (2007$)**	**Number of Permits**	**Total Cost (2007$)**	**Cost per Permit (2007$)**	**Number of Permits**	**Total Cost (2007$)**	**Cost per Permit (2007$)**	**Number of Permits**	**Total Cost (2007$)**
Title V Permits									
New Industrial - Due to GHG	$19,688	71,829	$1,414,175,915	$19,688	2,103	$41,403,864	$19,688	69,726	$1,372,772,051
Current Industrial - Add GHG	$1,978	50	$98,900	$1,978	50	$98,900	$1,978	0	$0
New Commercial/Residential	$9,844	1,985,948	$19,549,672,112	$9,844	444	$4,370,736	$9,844	1,985,504	$19,545,301,376
Permit Revisions - Due to GHG	$1,840	61,836	$113,778,240	$1,840	9,197	$16,922,480	$1,840	52,639	$96,855,760
Permit Revisions - Add GHG	$184	448	$82,432	$184	448	$82,432	$184	0	$0
Permit Renewals	$414	2,614	$1,082,196	$414	2,614	$1,082,196	$414	0	$0
Total Permits Affected		2,122,725			14,856			2,107,869	
PSD Permits									
New Industrial	$23,243	26,089	$606,386,627	$23,243	9,197	$213,765,871	$23,243	16,892	$392,620,756
New Commercial/Residential	$16,216	55,509	$900,133,944	$16,216	63	$1,021,608	$16,216	55,446	$899,112,336
Current Applications - Add GHG	$3,861	688	$2,656,368	$3,861	688	$2,656,368	$3,861	0	$0
Total Permits Affected		82,286			9,948			72,338	
Total Permitting Authority Costs			**$22,588,066,734**			**$281,404,455**			**$22,306,662,279**

Table 4-2. Estimated Burden Relief for Permitting Authorities Utilizing a 50,000 tpy Major/50,000 tpy PSD Significance Threshold									
	All Title V 100tpy and PSD 250 tpy			50,000 tpy or Greater			Avoided Burden		
Activity	**Cost per Permit (2007$)**	**Number of Permits**	**Total Cost (2007$)**	**Cost per Permit (2007$)**	**Number of Permits**	**Total Cost (2007$)**	**Cost per Permit (2007$)**	**Number of Permits**	**Total Cost (2007$)**
Title V Permits									
New Industrial - Due to GHG	$19,688	71,829	$1,414,175,915	$19,688	981	$19,313,928	$19,688	70,848	$1,394,861,987
Current Industrial - Add GHG	$1,978	50	$98,900	$1,978	50	$98,900	$1,978	0	$0
New Commercial/Residential	$9,844	1,985,948	$19,549,672,112	$9,844	208	$2,047,552	$9,844	1,985,740	$19,547,624,560
Permit Revisions - Due to GHG	$1,840	61,836	$113,778,240	$1,840	1,906	$3,507,040	$1,840	59,930	$110,271,200
Permit Revisions - Add GHG	$184	448	$82,432	$184	448	$82,432	$184	0	$0
Permit Renewals	$414	2,614	$1,082,196	$414	2,614	$1,082,196	$414	0	$0
Total Permits Affected		2,122,725			6,207			2,116,518	
PSD Permits									
New Industrial	$23,243	26,089	$606,386,627	$23,243	1,906	$44,301,158	$23,243	24,183	$562,085,469
New Commercial/Residential	$16,216	55,509	$900,133,944	$16,216	28	$454,048	$16,216	55,481	$899,679,896
Current Applications - Add GHG	$3,861	688	$2,656,368	$3,861	688	$2,656,368	$3,861	0	$0
Total Permits Affected		82,286			2,622			79,664	
Total Permitting Authority Costs			**$22,588,066,734**			**$73,543,622**			**$22,514,523,112**

Table 4-3. Estimated Burden Relief for Permitting Authorities Utilizing a 100,000 tpy Major/75,000 tpy PSD Significance Threshold									
	All Title V 100tpy and PSD 250 tpy			100,000 tpy; 75,000 tpy or Greater			Avoided Burden		
Activity	**Cost per Permit (2007$)**	**Number of Permits**	**Total Cost (2007$)**	**Cost per Permit (2007$)**	**Number of Permits**	**Total Cost (2007$)**	**Cost per Permit (2007$)**	**Number of Permits**	**Total Cost (2007$)**
Title V Permits									
New Industrial - Due to GHG	$19,688	71,829	$1,414,175,915	$19,688	172	$3,386,336	$19,688	71,657	$1,410,789,579
Current Industrial - Add GHG	$1,978	50	$98,900	$1,978	50	$98,900	$1,978	0	$0
New Commercial/Residential	$9,844	1,985,948	$19,549,672,112	$9,844	18	$177,192	$9,844	1,985,930	$19,549,494,920
Permit Revisions - Due to GHG	$1,840	61,836	$113,778,240	$1,840	915	$1,683,600	$1,840	60,921	$112,094,640
Permit Revisions - Add GHG	$184	448	$82,432	$184	448	$82,432	$184	0	$0
Permit Renewals	$414	2,614	$1,082,196	$414	2,614	$1,082,196	$414	0	$0
Total Permits Affected		2,122,725			4,217			2,118,508	
PSD Permits									
New Industrial	$23,243	26,089	$606,386,627	$23,243	915	$21,267,345	$23,243	25,174	$585,119,282
New Commercial/Residential	$16,216	55,509	$900,133,944	$16,216	4	$64,864	$16,216	55,505	$900,069,080
Current Applications - Add GHG	$3,861	688	$2,656,368	$3,861	688	$2,656,368	$3,861	0	$0
Total Permits Affected		82,286			1,607			80,679	
Total Permitting Authority Costs			**$22,588,066,734**			**$30,499,233**			**$22,557,567,501**

Table 4-4. Estimated Burden Relief for Permitting Authorities Utilizing a Non-GHG Trigger									
	All Title V 100tpy and PSD 250 tpy			Non-GHG Trigger			Avoided Burden		
Activity	**Cost per Permit (2007$)**	**Number of Permits**	**Total Cost (2007$)**	**Cost per Permit (2007$)**	**Number of Permits**	**Total Cost (2007$)**	**Cost per Permit (2007$)**	**Number of Permits**	**Total Cost (2007$)**
Title V Permits									
New Industrial - Due to GHG	$19,688	71,829	$1,414,175,915	$19,688	0	$0	$19,688	71,829	$1,414,175,915
Current Industrial - Add GHG	$1,978	50	$98,900	$1,978	50	$98,900	$1,978	0	$0
New Commercial/Residential	$9,844	1,985,948	$19,549,672,112	$9,844	0	$0	$9,844	1,985,948	$19,549,672,112
Permit Revisions - Due to GHG	$1,840	61,836	$113,778,240	$1,840	0	$0	$1,840	61,836	$113,778,240
Permit Revisions - Add GHG	$184	448	$82,432	$184	448	$82,432	$184	0	$0
Permit Renewals	$414	2,614	$1,082,196	$414	2,614	$1,082,196	$414	0	$0
Total Permits Affected		2,122,725			3,112			2,119,613	
PSD Permits									
New Industrial	$23,243	26,089	$606,386,627	$23,243	0	$0	$23,243	26,089	$606,386,627
New Commercial/Residential	$16,216	55,509	$900,133,944	$16,216	0	$0	$16,216	55,509	$900,133,944
Current Applications - Add GHG	$3,861	688	$2,656,368	$3,861	688	$2,656,368	$3,861	0	$0
Total Permits Affected		82,286			688			81,598	
Total Permitting Authority Costs			**$22,588,066,734**			**$3,919,896**			**$22,584,146,838**

Table 4-5. Estimated Burden Relief for Sources Utilizing a 25,000 tpy Major/25,000 tpy PSD Significance Threshold									
	All Title V 100tpy and PSD 250 tpy			25,000 tpy or Greater			Avoided Burden		
Activity	**Cost per Permit (2007$)**	**Number of Permits**	**Total Cost (2007$)**	**Cost per Permit (2007$)**	**Number of Permits**	**Total Cost (2007$)**	**Cost per Permit (2007$)**	**Number of Permits**	**Total Cost (2007$)**
Title V Permits									
New Industrial - Due to GHG	$46,350	71,829	$3,329,289,600	$46,350	2,103	$97,474,050	$46,350	69,726	$3,231,815,550
Current Industrial - Add GHG	$4,440	50	$222,000	$4,440	50	$222,000	$4,440	0	$0
New Commercial/Residential	$23,175	1,985,948	$46,024,344,900	$23,175	444	$10,289,700	$23,175	1,985,504	$46,014,055,200
Permit Revisions - Due to GHG	$1,677	61,836	$103,698,972	$1,677	9,197	$15,423,369	$1,677	52,639	$88,275,603
Permit Revisions - Add GHG	$156	448	$69,888	$156	448	$69,888	$156	0	$0
Permit Renewals	$780	2,614	$2,038,920	$780	2,614	$2,038,920	$780	0	$0
Total Permits Affected		2,122,725			14,856			2,107,869	
PSD Permits									
New Industrial	$84,530	26,089	$2,205,303,170	$84,530	9,197	$777,422,410	$84,530	16,892	$1,427,880,760
New Commercial/Residential	$59,152	55,509	$3,283,468,368	$59,152	63	$3,726,576	$59,152	55,446	$3,279,741,792
Current Applications - Add GHG	$21,669	688	$14,908,272	$21,669	688	$14,908,272	$21,669	0	$0
Total Permits Affected		82,286			9,948			72,338	
Total Source Costs			**$54,963,344,090**			**$921,575,185**			**$54,041,768,905**

Table 4-6. Estimated Burden Relief for Sources Utilizing a 50,000 tpy Major/50,000 tpy PSD Significance Threshold									
	All Title V 100tpy and PSD 250 tpy			50,000 tpy or Greater			Avoided Burden		
Activity	**Cost per Permit (2007$)**	**Number of Permits**	**Total Cost (2007$)**	**Cost per Permit (2007$)**	**Number of Permits**	**Total Cost (2007$)**	**Cost per Permit (2007$)**	**Number of Permits**	**Total Cost (2007$)**
Title V Permits									
New Industrial - Due to GHG	$46,350	71,829	$3,329,289,600	$46,350	981	$45,469,350	$46,350	70,848	$3,283,820,250
Current Industrial - Add GHG	$4,440	50	$222,000	$4,440	50	$222,000	$4,440	0	$0
New Commercial/Residential	$23,175	1,985,948	$46,024,344,900	$23,175	208	$4,820,400	$23,175	1,985,740	$46,019,524,500
Permit Revisions - Due to GHG	$1,677	61,836	$103,698,972	$1,677	1,906	$3,196,362	$1,677	59,930	$100,502,610
Permit Revisions - Add GHG	$156	448	$69,888	$156	448	$69,888	$156	0	$0
Permit Renewals	$780	2,614	$2,038,920	$780	2,614	$2,038,920	$780	0	$0
Total Permits Affected		2,122,725			6,207			2,116,518	
PSD Permits									
New Industrial	$84,530	26,089	$2,205,303,170	$84,530	1,906	$161,114,180	$84,530	24,183	$2,044,188,990
New Commercial/Residential	$59,152	55,509	$3,283,468,368	$59,152	28	$1,656,256	$59,152	55,481	$3,281,812,112
Current Applications - Add GHG	$21,669	688	$14,908,272	$21,669	688	$14,908,272	$21,669	0	$0
Total Permits Affected		82,286			2,622			79,664	
Total Source Costs			**$54,963,344,090**			**$233,495,628**			**$54,729,848,462**

Table 4-7. Estimated Burden Relief for Sources Utilizing a 100,000 tpy Major/75,000 tpy PSD Significance Threshold									
	All Title V 100tpy and PSD 250 tpy			100,000 tpy; 75,000 tpy or Greater			Avoided Burden		
Activity	**Cost per Permit (2007$)**	**Number of Permits**	**Total Cost (2007$)**	**Cost per Permit (2007$)**	**Number of Permits**	**Total Cost (2007$)**	**Cost per Permit (2007$)**	**Number of Permits**	**Total Cost (2007$)**
Title V Permits									
New Industrial - Due to GHG	$46,350	71,829	$3,329,289,600	$46,350	172	$7,972,200	$46,350	71,657	$3,321,317,400
Current Industrial - Add GHG	$4,440	50	$222,000	$4,440	50	$222,000	$4,440	0	$0
New Commercial/Residential	$23,175	1,985,948	$46,024,344,900	$23,175	18	$417,150	$23,175	1,985,930	$46,023,927,750
Permit Revisions - Due to GHG	$1,677	61,836	$103,698,972	$1,677	915	$1,534,455	$1,677	60,921	$102,164,517
Permit Revisions - Add GHG	$156	448	$69,888	$156	448	$69,888	$156	0	$0
Permit Renewals	$780	2,614	$2,038,920	$780	2,614	$2,038,920	$780	0	$0
Total Permits Affected		2,122,725			4,217			2,118,508	
PSD Permits									
New Industrial	$84,530	26,089	$2,205,303,170	$84,530	915	$77,344,950	$84,530	25,174	$2,127,958,220
New Commercial/Residential	$59,152	55,509	$3,283,468,368	$59,152	4	$236,608	$59,152	55,505	$3,283,231,760
Current Applications - Add GHG	$21,669	688	$14,908,272	$21,669	688	$14,908,272	$21,669	0	$0
Total Permits Affected		82,286			1,607			80,679	
Total Source Costs			**$54,963,344,090**			**$104,744,443**			**$54,858,599,647**

Table 4-8. Estimated Burden Relief for Sources Utilizing a Non-GHG Trigger									
	All Title V 100tpy and PSD 250 tpy			Non-GHG Trigger			Avoided Burden		
Activity	**Cost per Permit (2007$)**	**Number of Permits**	**Total Cost (2007$)**	**Cost per Permit (2007$)**	**Number of Permits**	**Total Cost (2007$)**	**Cost per Permit (2007$)**	**Number of Permits**	**Total Cost (2007$)**
Title V Permits									
New Industrial - Due to GHG	$46,350	71,829	$3,329,289,600	$46,350	0	$0	$46,350	71,829	$3,329,289,600
Current Industrial - Add GHG	$4,440	50	$222,000	$4,440	50	$222,000	$4,440	0	$0
New Commercial/Residential	$23,175	1,985,948	$46,024,344,900	$23,175	0	$0	$23,175	1,985,948	$46,024,344,900
Permit Revisions - Due to GHG	$1,677	61,836	$103,698,972	$1,677	0	$0	$1,677	61,836	$103,698,972
Permit Revisions - Add GHG	$156	448	$69,888	$156	448	$69,888	$156	0	$0
Permit Renewals	$780	2,614	$2,038,920	$780	2,614	$2,038,920	$780	0	$0
Total Permits Affected		2,122,725			3,112			2,119,613	
PSD Permits									
New Industrial	$84,530	26,089	$2,205,303,170	$84,530	0	$0	$84,530	26,089	$2,205,303,170
New Commercial/Residential	$59,152	55,509	$3,283,468,368	$59,152	0	$0	$59,152	55,509	$3,283,468,368
Current Applications - Add GHG	$21,669	688	$14,908,272	$21,669	688	$14,908,272	$21,669	0	$0
Total Permits Affected		82,286			688			81,598	
Total Source Costs			**$54,963,344,090**			**$17,239,080**			**$54,946,105,010**

APPENDIX A

Table A-1. Newly Major Affected Source Estimates Based on Threshold Level					
Source Type	**100/250 tpy PSD**	**100 tpy Title V**	**25,000 tpy**	**50,000 tpy**	**100,000 tpy**
EGUs	285	285	124	0	0
Industrial	141,160	170,910	4,002	1,934	256
Oil/Gas/Coal production	2,588	2,588	187	75	52
Waste Treatment	3,344	3,358	1,927	910	193
Commercial	731,477	1,355,921	1,161	600	51
Residential	182,350	4,535,500	160	20	0
Total	**1,061,204**	**6,068,562**	**7,561**	**3,539**	**552**

Based on information contained in the "Technical Support Document for Greenhouse Gas Emissions Thresholds Evaluation;" Office of Air Quality Policy and Standards; March 29, 2010 and information retrieved from EPA's enforcement and compliance history online (ECHO) database during January 2010. ECHO is a computer-data based created and maintained by the EPA that contains source-specific data submitted primarily by state and local environmental agencies. See http://www.epa-echo.gov/echo/index.html.

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