



DEPARTMENT OF
ECOLOGY
State of Washington

Concise Explanatory Statement

Chapter 173-485 WAC

**Petroleum Refinery Greenhouse Gas
Emission Requirements**

Summary of rule making and response to comments

May 2014

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Publication and Contact Information

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Concise Explanatory Statement

Chapter 173-485 WAC Petroleum Refinery Greenhouse Gas Emission Requirements

Air Quality Program
Washington State Department of Ecology
Olympia, Washington 98504-7600

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Table of Contents

Introduction.....	3
Reasons for Adopting the Rule.....	3
Public Involvement Process.....	3
Differences Between the Proposed Rule and Adopted Rule	4
Commenter Index.....	6
Response to Comments.....	7
Appendix A: Transcript from public hearing.....	39
Appendix B: Copies of all written comments.....	40

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Introduction

The purpose of a Concise Explanatory Statement is to:

- Meet the Administrative Procedure Act (APA) requirements for agencies to prepare a Concise Explanatory Statement (RCW 34.05.325).
- Provide reasons for adopting the rule.
- Describe any differences between the proposed rule and the adopted rule.
- Provide Ecology's response to public comments.

This Concise Explanatory Statement provides information on the Washington State Department of Ecology's (Ecology) rule adoption for:

Title: Petroleum Refinery Greenhouse Gas Emission Requirements
WAC Chapter(s): 173-485
Adopted date: May 28, 2014
Effective date: June 28, 2014

To see more information related to this rule making or other Ecology rule makings please visit our web site: <http://www.ecy.wa.gov/laws-rules/index.html>

Reasons for Adopting the Rule

The purpose of this rule is to set reasonably available control technology (RACT) to limit greenhouse gas (GHG) emissions from petroleum refineries.

This rule was developed under court order. In 2011, a federal district court decided that state regulations in Washington's federally approved Air Quality State Implementation Plan require us to establish RACT for petroleum refinery GHG emissions. In 2012, the district court issued an order requiring Ecology, NWCAA, and PSCAA (the Agencies) to make this RACT determination by May 2014. Because the new standards affect three or more refineries, state law requires Ecology to establish the new standards in a rule. On February 12, 2014, the District Court's order was vacated with the mandate issued dismissing the case for lack of standing. Ecology has chosen to finish the rule under existing agency regulatory authority.

This rule helps protect Washington's air quality environment. The rule is intended to limit or reduce GHG emissions. It will provide some limited help toward meeting the state's statutory GHG reduction goal.

Public Involvement Process

To help inform and educate the affected persons, Ecology is doing or has done the following:

During the rule-making process:

- Sent out public notices
- Used a distribution list created for this rule making to send updates
- Posted information on Ecology's agency and Air Quality web pages, including WAC Track
- Held three public stakeholder meetings to gather stakeholder input prior to rule proposal filing
- Held public meetings for specific stakeholder groups upon request
- Held a public hearing with a public workshop
- Met with focus groups of stakeholders to work through specific issues

Once rule is adopted:

- Issue a press release announcing the adoption of the rule
- Email stakeholders who have requested to be on our distribution list for this rule making
- Post the adopted rule, Concise Explanatory Statement, Cost Benefit Analysis, Rule Implementation Plan, and Rule Adoption Notice on the internet for public access
- Inform and educate the public when they contact Ecology

Differences Between the Proposed Rule and Adopted Rule

RCW 34.05.325(6)(a)(ii) requires Ecology to describe the differences between the text of the proposed rule as published in the *Washington State Register* and the text of the rule as adopted, other than editing changes, stating the reasons for the differences.

There are some differences between the proposed rule filed on December 18, 2013 and the adopted rule filed on May 28, 2014. Ecology made these changes for all or some of the following reasons:

- In response to comments we received
- To ensure clarity and consistency
- To meet the intent of the authorizing statute

Section	Change(s)	Purpose/Effect
010	No change	
020 (2)	Rephrased first part of (2) and changed "adopted as they exist" to "to the version in effect"	Improve usability for reader and clarification.
030	Changed CO _{2e} to CO ₂ e throughout section	Formatting consistency
030	Made minor changes to definition for "Baseline greenhouse gas emissions"	Combined definition of "Baseline greenhouse gas emissions" and "Typical refinery operation", simplifying the definition and eliminating a

Section	Change(s)	Purpose/Effect
		definition used only once.
030	Deleted definition for “Typical refinery operation”	Not needed because of revision to “Baseline greenhouse gas emissions”
040	Changed CO _{2e} to CO _{2e}	Formatting consistency
050 (1)(c)	Changed “was” to “were”	Corrected grammar
060 (1)(b)	Changed CO _{2e} to CO _{2e}	Formatting consistency
060(2)(c)	Added words “for credit” into second sentence.	Clarification of intent
060 (3)	Added words “at the refinery”	Clarifies that the electrical equipment upgrade is at the refinery and not some distant power plant. This is consistent with original intent.
060 (5)	Changed “occurred” to “completed”	Clarification that the reduction projects must have been completed after 2010 for GHG reductions to count.
070 (1)	Added clarifying language to first part of sentence	Improve usability for reader
080 (1)	Added clarifying language to first sentence	Clarifies what submittal information is required to be retained in recordkeeping.
090	No changes.	

Commenter Index

The table below lists the names of organizations or individuals who submitted comments on the rule proposal and where you can find Ecology’s response to the comment(s). Ecology’s response immediately follows each individual comment.

Commenter	Page
Holmes, Frank E., Western States Petroleum Association	7-24
Brimmer, Janette, Earthjustice	24-34
Serrurier, Ben, Climate Solutions	23-34
Pollack, Sasha, Washington Environmental Council	23-34
Ruby, Mike, Envirometrics, Inc	34-37
Lyons, Doug	38

Response to Comments

Ecology accepted comments between December 18, 2013 and January 31, 2014. This section provides verbatim or by summary the comments that we received during this period and our responses. (RCW 34.05.325(6)(a)(iii))

This Concise Explanatory Statement responds to the identified comments in a comment-and-response format. Ecology's response follows each comment or summary of comments.

Glossary of terms used in the Response to Comments:

Agencies or the Agencies - Ecology, Northwest Clean Air Agency (NWCAA), and Puget Sound Clean Air Agency (PSCAA)

BACT – Best Available Control Technology

CAA – Clean Air Act

EPA – Environmental Protection Agency

GHG(s) – greenhouse gas or gases

NAAQS -National Ambient Air Quality Standard

RACT - Reasonably Available Control Technology

SIC – Standard Industrial Classification

Solomon EII[®] - Solomon Energy Intensity Index[®]

TSD - Washington Oil Refinery RACT Technical Support Document

The following are summaries of comments received from Frank E. Holmes, Director, Northwest Region, Western States Petroleum Association (WSPA):

WSPA Comment #1: The commenter states that since Ecology is no longer under court order to finish this rule making, the authority to proceed must come from state law.

Response: Ecology made the decision to proceed with this rule making in part because the court case remained in the appeal process throughout the rule making. On February 12, 2014, the District Court's order was vacated and the case dismissed. Ecology agrees that even with the outcome of the appeal process, we have authority under state law to develop RACT regulations for sources and pollutants we consider significant.

WSPA Comment #2: The commenter states that Ecology failed to comply with procedural requirements for a RACT rule making according to RCW 70.94.154. Ecology needs to complete an updated RACT List and Schedule before rule making continues.

Response: Being listed on the ‘RACT List and Schedule’ is not a prerequisite for subjecting a source or source category to a RACT review. There are alternative approaches listed in RCW 70.94.154 and in WAC 173-400-040 that trigger such a review.

In addition, it is likely that petroleum refineries or specific components of the refineries would be at or near the top of an updated RACT list and schedule.

WSPA Comment #3: The commenter claims Ecology failed to adequately analyze costs and benefits of this rule, and that the rule is invalid because the potential costs of the proposed requirements exceed potential benefits. Commenter claims a hypothetical “Washington refinery” would need to pay \$47.25 million to achieve 3% GHG emission reductions, while Ecology’s analysis indicated it would cost a maximum of \$13.35 million for all five refineries to achieve 10% GHG emission reductions. Commenter also takes issue with Ecology’s use of EPA’s estimates for the social cost of carbon to determine the benefits from reduced GHG emissions.

Response: The Washington Administrative Procedure Act (APA; RCW 34.05.328) requires Ecology to evaluate significant legislative rules to “determine that the probable benefits of the rule are greater than its probable cost, taking into account both the qualitative and quantitative benefits and costs and the specific directives of the law being implemented.” Ecology developed a preliminary Cost-Benefit Analysis and Least Burdensome Alternative Analysis (CBA) for the rule. The document was available for public review and comment as part of our public process. These analyses, which were based on the best available information at the time of publication, indicate that the benefits of the RACT rule are greater than the costs.

Ecology believes the wholesale changes to the CBA requested above are not necessary for the following reasons:

1. Based on the very limited description provided in the comment, the hypothetical “Washington refinery” is likely an efficient refinery that is already meeting the energy efficiency requirement of the RACT rule. However, the example did not include the Solomon EII[®] status for the facility. If lower cost improvements with greater marginal return have already been completed and limited improvements remain at such a facility, Ecology qualitatively agrees that costs of emission reductions and efficiency improvements could be quite high. However, through ongoing reviews and proactively pursuing efficiency improvements described in the comment, this example refinery is likely close to the plant’s maximum energy efficiency. The refinery described in this comment, while simplified, is then likely meeting or nearly meeting the energy efficiency requirement. The emissions-reduction requirement would then be not applicable or would be unlikely to be chosen because it would be easier to meet RACT by improving energy efficiency through projects that result in considerably less than 10% reduction in GHG emissions.
2. Two of Washington’s five petroleum refineries have reported publicly that they have achieved an energy efficiency that puts them the top quartile of participating peer refineries on the basis of the Solomon EII[®]. This information has been provided in either information published on Energy Star[®] website or publications¹. Ecology believes the two refineries have clearly found that

¹ "ENERGY STAR Plant Profile." *ENERGY STAR Labeled Building Profile*. N.p., n.d. Ferndale Refinery 2013. Web. 25 Mar. 2014.

http://www.energystar.gov/index.cfm?fuseaction=labeled_buildings.showPlantProfile&OWNER_ID=&STR=&building_type_i

having this level of production and energy efficiency provides significant financial and environmental benefits. Ecology has updated the CBA to analyze the emissions and costs representing the remaining three facilities, corrected an insignificant calculation error, and included a sensitivity analysis of repayment duration.

3. Ecology reviewed the costs of emission reductions from the Technical Support Document (TSD) for this rule. Ecology did not indicate that all emission reductions would be achieved solely with boiler improvements. Instead, the costs and emissions improvements resulting from implementing possible boiler improvements were used to ratio the potential boiler emission reductions to the potential total emission reductions and costs across the refinery. We have tried to clarify this in the updated CBA. The sensitivity analysis in the CBA uses:
 - Alternative technology-based ratios of technology emissions
 - Total facility emissions
 - A straightforward calculation of representative per-ton costs and benefits regardless of their emitter.
4. Ecology believes its analysis of benefits resulting from GHG emission reductions is appropriate. While it is not possible to specify the local benefits to climate change resulting from control of local emissions, Ecology believes it is appropriate to acknowledge that local emissions contribute to the global pool of GHGs that cause global impacts. These impacts affect local ecology, people, industry, agriculture, and infrastructure. Establishing a direct 100% relationship is inherently impossible. This is precisely why Ecology and other government agencies have chosen to represent the costs of GHG emissions and the benefits of reducing them on a global scale. We believe this is consistent with our analytic practices and the requirements of Administrative Procedure Act for costs and benefits (RCW 34.05.328).

After evaluating the likely cost and benefits of the rule, Ecology believes that the likely qualitative and quantitative benefits of the rule exceed the likely costs. Benefits of reduced emissions and improved efficiency are likely more than the compliance costs to be accrued by petroleum refineries over 20 years.

WSPA Comment #4: The commenter recommends various edits to the text of the rule if Ecology proceeds with rule making.

Response: See WSPA comments #8 through #19 for various suggested edits and Ecology's responses.

WSPA Comment #5: The commenter states that the requirement to reduce GHG emissions by 10 percent in WAC 173-485-040 is not economically feasible. The commenter requests Ecology revise the emission reduction requirement downward to 2.5 percent

Response: The commenter offers a hypothetical "Washington refinery" in support of the claim that the proposed 10% reduction is not feasible. We have found the hypothetical refinery to be likely at or near the proposed efficiency standard. We agree that relatively efficient refineries – those such as the hypothetical

[d=PETREF&PAGE=1&VIEW=&year=&MINI=&s_code=ALL&search_owner_id=&search_prop_manager_id=&FILTER_B_ID=&zip=&STARTNUM=1&search_spp_id=&city=&profiles=0&plantprofile_id=p_10041](#)

BP Cherry Point Refinery – Blaine, Washington: 2009 Health, Safety and Environmental Statement, March 2010.

McKenzie, Mike. "Cherry Point Steers Good Fortune and Vitality in Whatcom County." *Business Pulse Magazine*. Whatcom Business Alliance. Winter 2014.

“Washington refinery” that meet the RACT standard through the energy efficiency standard – might have a difficult time meeting the 10% GHG emission reduction requirement. However, the analysis in the TSD indicates that projects that reduce GHG emissions by 10% are available to refineries unable to meet the energy efficiency standard. The evaluations of projects that are in our citation list focus on smaller projects which will add up to produce the proposed 10% reduction. We find the commenter’s argument for the proposed 2.5% reduction to be unconvincing.

WSPA Comment #6: The commenter asks that Ecology include an additional option in WAC 173-485-040 allowing refineries to demonstrate compliance by implementing all projects with a 4-year or less payback period.

Response: While the commenter is correct that many projects meeting RACT for refineries will have a 4-year or shorter payback period, Ecology believes that limiting projects to only those with a 4-year or less payback period is inappropriate for the following reasons:

- Generally speaking, emission control devices require a capital investment plus annual operating costs. By contrast, energy efficiency projects typically reduce operational costs sufficiently that the facility not only recovers all the annual operating costs of the equipment or work practices but also recoups the initial capital investment.
- Almost all energy efficiency projects provide additional economic benefits, including those associated with reductions in water use and waste generation.
- Restricting projects to only those with a 4-year payback period could result in the exclusion of projects that meet the definition of RACT.

Ecology is not implementing the suggested option.

WSPA Comment #7: The commenter states that WAC 173-485-060(3) and WAC 173-485-060 (4) conflict with each other. The commenter asks that refineries be allowed to take credit for all GHG emission reductions that occur at the refinery, without regard to emissions that may occur at off-site power plants as load on those plants increase. Alternately, the commenter asks to be able to take credit for emission reductions at off-site power plants resulting from efficiency improvements to electrical equipment at the refinery.

Response: We do not believe that WAC 173-485-060(3) and (4) are in conflict with each other. Both provisions work to quantify the actual emission reductions that occur as a result of electrification projects at a refinery.

No changes have been made to the final rule language.

WSPA Comment #8: The commenter submitted suggested edits to proposed rule text for WAC 173-485-020(1) suggesting a revised definition for “petroleum refineries” that defines the term by SIC code, rather than simply naming the five existing refineries in Washington. The commenter notes that several Washington refineries are located on complex sites that host operations other than refineries such as cogeneration plants owned by third parties. Commenter also notes that if one of the listed refineries permanently shuts down, it is no longer subject to this rule. The suggested edit clarifies that the rule regulates only active refinery operations on these sites. See WSPA Comment # 11 below.

Commenter also suggests revising WAC 173-485-020(2) to reference rather than adopt EPA's GHG reporting rules. Commenter claims that the EPA GHG reporting rules conflict in some ways with Chapter 173-441 WAC, and that Ecology can achieve the purposes of this rule simply by referencing 40 CFR Part 98.

Suggested edits from the commenter to proposed rule text for this comment are:

WAC 173-485-020 Applicability. (1) This chapter applies to all petroleum refineries in Washington state ~~identified~~ as defined in WAC 173-485-030.

(2) All ~~federal regulations referenced~~ references in this regulation to federal regulations are ~~adopted~~ to the versions in effect as they exist on July 1, 2013.

Response: Ecology is not including the proposed reference to a new definition of refineries in WAC 173-485-020(1). We believe our approach clearly identifies the refineries that are subject to the rule and avoids the potential that a future new refinery might be considered subject to the rule's requirements. Ecology agrees that when one of the listed refineries goes out of business and is not restarted by another company, it is no longer subject to this rule.

Ecology agrees the proposed changes to WAC 173-485-020(2) provide better clarity to the rule. The suggested changes clarifying edits identified above have been made.

WSPA Comment #9: The commenter submitted suggested edits to proposed rule text for WAC 173-485-030, definition of "Baseline greenhouse gas emissions." Commenter believes Ecology should give the refineries a wider choice in selecting the baseline year because many factors separate from turnarounds affect GHG emissions. Refineries should have some limited flexibility to select 2010 or 2011 as the baseline year. This flexible selection would take into account relevant factors, such as characteristics of crude slate, as long as the refinery did not experience more than 30 days of outage in the crude unit that year. Under this approach it is no longer necessary to define the term "typical refinery operations."

Suggested edits from the commenter to proposed rule text for this comment are:

WAC 173-485-030 Definitions. Definitions in chapter 173-400 WAC apply to this chapter. Definitions specific to this chapter include:

"Baseline greenhouse gas emissions" means greenhouse gas emissions, reported to the United States Environmental Protection Agency (EPA) to comply with 40 C.F.R. Part 98. The baseline greenhouse gas emissions are for either calendar year 2010 or 2011, as determined by the refinery, so long as the refinery did not experience more than 30 continuous days of outage in the crude unit that year. ~~If petroleum refinery operations during 2010 were not representative of typical refinery operations, then the petroleum refinery must use its 2011 emissions.~~ Emissions must be provided in units of metric tons of CO_{2e}.

Emissions attributable to the production of electricity from on-site cogeneration equipment are not included in the baseline emissions. Emissions attributable to the production of steam by the cogeneration equipment are included in the baseline emissions.

Response: With the exception of the word “continuous,” the suggested edits clarify what we intended in the definition. With some further edits for brevity, and without the word “continuous,” these suggestions are included in final rule language.

WSPA Comment #10: The commenter submitted suggested edits to proposed rule text for WAC 173-485-030, definition of “Greenhouse gases (GHGs)” to clarify that “greenhouse gases” means *only* the gases identified in the definition.

Suggested edits from the commenter to proposed rule text for this comment are:

"Greenhouse gases (GHGs)" ~~include~~ mean carbon dioxide, methane, nitrous oxide, hydrofluorocarbons, perfluorocarbons, and sulfur hex-

afluoride.

Response: To be consistent with RCW 70.235, Ecology is not changing the definition of greenhouse gases for this rule.

WSPA Comment #11: The commenter submitted suggested edits to proposed rule text for WAC 173-485-030, definition of “Petroleum refinery” to define the term by SIC code, rather than simply naming the five existing refineries in Washington. The commenter notes that several Washington refineries are located on complex sites that host operations other than refineries such as cogeneration plants owned by third parties. Commenter also notes that if one of the listed refineries permanently shuts down, it is no longer subject to this rule. The suggested edit clarifies that the rule regulates only active refinery operations on these sites.

Suggested edits from the commenter to proposed rule text for this comment are:

"Petroleum refinery" or "petroleum refineries" means
Washington

refineries operating within the Standard Industrial Classification

Code 2911 (petroleum refining), which as of the effective date of
this

rule include the following facilities, regardless of future
changes

in ownership or name:

(a) BP Cherry Point Refinery in Blaine, WA;

(b) Phillips 66 Company Refinery in Ferndale,

WA; (c) Shell Oil Company Refinery in

Anacortes, WA;

(d) Tesoro Refining & Marketing Company, LLC Anacortes

Refinery in Anacortes, WA; and

(e) U.S. Oil & Refining Co. Tacoma Refinery in Tacoma, WA.

Response: The commenter suggests including a generic description of petroleum refinery using SIC code 2911 (NAICS code 324110). Ecology chooses to simply name the affected refineries and locations to reduce potential future ambiguity. In our opinion, our approach clearly defines the refineries that are subject to the

rule. This avoids the potential that a future new refinery might be considered subject to the rule's requirements.

Ecology is not including the proposed revisions to the definitions of "Petroleum refinery" or "petroleum refineries" in the final rule.

WSPA Comment #12: The commenter suggests deleting the definition of "Typical refinery operation."

Response: Ecology is deleting this definition as suggested since the pertinent criteria will be included in the definition of "Baseline greenhouse gas emissions."

WSPA Comment #13: The commenter submitted suggested edits to proposed rule text for WAC 173-485-040. Commenter asks that a new subsection (2) be added to provide an alternative option for compliance. The commenter is concerned that codifying Solomon Associates as the sole provider of service as a regulatory requirement potentially leads to anti-competitive pricing and practices for which the recipient of the services lacks market freedom and choice.

The commenter also asks that the emission reduction requirement in WAC 173-485-040(3)(a) be reduced from 10% to 2.5% because meeting the 10% reduction requirement would be too difficult.

The commenter also asks that WAC 173-485-040(3)(ii) be deleted as unnecessary.

Suggested edits from the commenter to proposed rule text for this comment are:

WAC 173-485-040 Greenhouse gas reasonably available control

tech- nology emission standard. (1) Energy efficiency standard.

The own- er/operator of each petroleum refinery subject to this

rule shall meet the requirement to use reasonably available

control technology (RACT)

for greenhouse gas emissions by demonstrating that the petroleum re-

finery has a calculated EII® equal to or more efficient than the

EII® value representing the fiftieth percentile EII® of similar

sized Unit- ed States refineries, based on 2006 data and the EPA

EnergyStar® cal-

culatation methodology. The petroleum refinery must demonstrate compli-

ance with WAC 173-485-050 in the annual report required in WAC 173-

485-090 using any EII® report issued between 2006 and ~~the first annual~~

~~report~~ 2024. If a petroleum refinery is unable to or chooses not to

demonstrate compliance with the energy efficiency standard ~~in the first annual report required in WAC 173-485-090~~, the petroleum refin-

ery shall document that it has met the requirements of subsections (2)

or (3) of this section no later than October 1, 2025.

(2) As an alternative to the Solomon Associates EII® methodology,

the owner/operator of each petroleum refinery subject to this rule may

meet the requirement to use RACT for GHG emissions using other ac-

ceptable protocols, methodologies or evaluation as deemed acceptable

by the agency.

(3) Emission reduction requirement. A petroleum refinery that does not meet the requirements of either subsection (1) or (2) of this

section, must:

(a) No later than October 1, 2025, ~~have implemented~~ greenhouse

gas reduction projects that÷

~~-(i)-r~~Result in cumulative annual emissions reduction(s)
equiva-

lent to ~~ten~~ 2.5 percent of the facility's baseline greenhouse gas
emissions (as CO_{2e}). Compliance with this option shall be
demonstrated

using the procedures outlined in WAC 173-485-060; or

~~-(ii)-Result in the petroleum refinery meeting the energy
effi-~~

~~ciency standard in subsection (1) of this section.~~

~~(b) Demonstrate compliance with the emission reduction
require-~~

~~ment in WAC 173-485-060.~~Complete an energy assessment of the
refinery

as provided in this subsection and implement those projects that
meet

the criteria described in this subsection:

(i) the energy assessment shall be completed by a third
party

energy assessment company no later than one year from the
effective

date of this rule.

(ii) the energy assessment shall include a list of energy
re-

duction projects that include the information specified in WAC
173-

485-060 (1)(a) - (c).

(iii) all projects identified in the energy assessment
study

that have a 4-year or less payout shall be completed by October 1,
2025; unless prior to completion of all the identified projects,
the
petroleum refinery is able to satisfy the requirements of this
chapter
by meeting either the energy efficiency standard in 173-485-040(1)
or
the emission reduction requirement in 173-485-040(3)(a).

Response: Ecology is not making any changes to WAC 173-485-040. We are not adding suggested subsection (2), allowing the use of an unknown alternative energy efficiency metric because, as stated in the TSD, no other performance metric was found to be available.

See response to WSPA Comment #5 above for the reason the suggested change to the emission reduction requirement in paragraph (3)(a) is not being included.

See response to WSPA Comment #6 above for the reason the suggested new alternative in paragraph (3)(b) is not being included.

WSPA Comment #14: The commenter submitted suggested edits to proposed rule text for WAC 173-485-050(1)(c) to change “data was certified” to “data were certified” to reflect the fact that the term “data” is plural.

Response: Ecology made the suggested edit to this section to reflect the fact that the term “data” is plural.

WSPA Comment #15: The commenter submitted suggested edits to proposed rule text for WAC 173-485-060. Commenter notes that demonstrating the exact amount of CO₂e emission reductions achieved from a single project would be very difficult for a complex refinery. Commenter recommends adding language to WAC 173-485-060(1)(b) making it clear that analysis be based on the emission reductions the project is designed to achieve. Commenter suggests deleting WAC 173-485-060(3) because they believe it conflicts with WAC 173-485-060(4). Commenter suggests changing WAC 173-485-060(4) to use the statewide average of 331 lbs CO₂/MWh rather than emissions specific to a given refinery’s source of electricity.

Suggested edits from the commenter to proposed rule text for this comment are:

WAC 173-485-060 Demonstrating compliance with the emission
reduc- tion requirement. (1) Requesting credit. Owners/operators

of a petroleum refinery demonstrating compliance through the emission reduction

requirement in WAC 173-485-040(~~2~~3) shall submit, as part of each annual

report required in WAC 173-485-090(1), requests for a credit against the greenhouse gas emission reduction requirement. A credit request must be based on specific projects that have been completed at the petroleum refinery since the previous annual report. Each request must include the following information:

(a) An engineering description and analysis of the project, including the emission reduction and energy efficiency objectives for the project.

(b) A quantitative analysis of the project documenting the annual metric tons of CO_{2e} emission reductions the project is designed to achieved as a result of completing the project.

(c) Information supporting the quantitative analysis including engineering assumptions, measurements, or monitoring data.

(d) Requests for credits shall be submitted as part of the first

annual report submitted after the petroleum refinery project has been completed.

(2) Processing a credit request.

(a) Each request for credit shall be reviewed and certified by a professional engineer licensed in the state of Washington. The certification must contain the name and license number of the professional engineer who performed the review and certified the submittal.

(b) Within thirty days after the receipt of a request for credit, the permitting authority may require the submission of additional information needed to review the request.

(c) Within thirty days after all required information has been received, the permitting authority shall propose to approve or deny

the request for credit. Final approval or denial of a request shall be established through the issuance of a ~~regulatory~~credit order. The regulatory order must be issued in accordance with the procedures of the permitting authority for issuing such orders. Each regulatory order issued to approve a request shall include both the quantity of greenhouse gas reduction credit awarded and any conditions necessary to support the validity of the credit award.

~~(3) Improvements in the efficiency of existing electrical equip-~~

~~ment or electrical equipment upgrades are not eligible for credits.~~

(~~4~~3) Greenhouse gas reductions for the replacement of direct fired or steam-driven equipment with electrical equipment will be credited based on the calculated difference between the greenhouse gas emissions reduced at the refinery and the greenhouse gas emissions

~~calculated from generation of~~ for the electricity required. The green-

house gas emissions for electricity used will be 331 lbs CO2/MWh, the

statewide average of
greenhouse

g emiss
a ions
s

~~specific to the~~
~~petrole-~~

~~um refinery's~~ from statewide sources of electricity.

(5) Greenhouse gas emission reductions at the petroleum refinery

that occurred prior to January 1, 2010, are not eligible for credits.

Response: The reference to WAC 173-485-040(2) in section (1) is not being changed to WAC 173-485-040(3) because Ecology is not adding the proposed new section to WAC 173-485-040 that would necessitate the changed reference.

The suggested edits to paragraph (1)(b) are not being made. If the refinery staff can estimate the emission reduction that a project is designed to achieve, the refinery has identified the information necessary to determine if the reduction has actually been achieved.

The suggested edit to (2)(c) is not being made. Ecology declines the request to rename the orders credit orders rather than regulatory orders.

See response to WSPA Comment #7 above for an explanation for why the suggested edits to (3) and (4) are not being made.

WSPA Comment #16: The commenter submitted suggested edits to proposed rule text for WAC 173-485-070. WSPA suggests language clarifying that the monitoring described in WAC 173-485-070(1) is not required of a refinery that demonstrates compliance with the energy efficiency standard. The commenter believes there is no basis to require additional monitoring because the monitoring specified in 40 CFR Part 98 is sufficient to demonstrate compliance with RACT. They suggest deleting WAC 173-485-070(2).

Suggested edits from the commenter to proposed rule text for this comment are:

WAC 173-485-070 Monitoring. (1) ~~Each~~ To demonstrate compliance

with the emission reduction requirement, each petroleum refinery must

use monitoring measures that satisfy requirements for

petroleum refinery owners/operators reporting greenhouse

gas emissions to EPA under

40 C.F.R. Part 98. ~~Unless additional monitoring is required by the~~

~~credit order issued under WAC 173-485-060 (2)(c), t~~The 40 C.F.R. Part

98 monitoring is considered sufficient for quantifying annual emis- sions for this regulation.

~~(2) The permitting authority may require additional monitoring,~~

~~recordkeeping, and reporting to document compliance with a credit es-~~

~~tablished through this regulation. The additional monitoring, record-~~

~~keeping, and reporting must be identified in the credit order issued~~

~~under WAC 173-485-060 (2)(c).~~

Response: Ecology agrees that the additional clarity in (1) is useful. It is included in the final rule language.

Ecology also agrees it is unlikely that additional specific monitoring may be needed. However, Ecology is retaining the WAC 173-485-070(2) option to require additional information for those special cases that may require specific information in addition to that required by the federal GHG reporting program.

WSPA Comment #17: The commenter submitted suggested edits to proposed rule text for WAC 173-485-080. The commenter notes that every two years Washington refineries submit huge volumes of data to Solomon Associates. The “records used for preparing submittals to Solomon” include operating data from all of the process equipment at the refinery. The commenter believes the rule should require a refinery to retain only those records that are used to show compliance with the energy efficiency standard. They state that is the only part of this rule for which records used to prepare submittals to Solomon are relevant. The commenter also notes that, if a refinery does not demonstrate compliance for several years, retaining all records until five years after the final report is a very burdensome requirement.

Suggested edits from the commenter to proposed rule text for this comment are:

WAC 173-485-080 Recordkeeping. (1) All records used for preparing

submittals to Solomon Associates to support a showing of compliance

with the energy efficiency standard or for preparing reports to the

permitting authority shall be retained at least five years beyond the

date of the ~~last~~ associated annual report required by WAC 173-485-

090(2).

(2) Records related to emission calculations and reports shall be provided to the permitting authority upon request. The petroleum re- finery owner/operator retains the rights to keep specified records and information confidential as provided in RCW 70.94.205.

Response: The first change suggested by the commenter is an appropriate way to address holding of compliance data when the energy efficiency standard is being met. This edit is included in the final rule language.

We do not agree with the five year retention requirement proposed for those projects required to meet the emission reduction standard. Ecology believes this data needs to be available for plant and agency use for a longer period of time. This data has potential uses outside of this rule as documentation of emission reductions of non-greenhouse gas air pollutants that could be useable in Prevention of Significant Deterioration and Nonattainment New Source Review permitting.

WSPA Comment #18: The commenter submitted suggested edits to proposed rule text for WAC 173-485-090 to require biennial rather than annual reporting. The commenter believes that, where the main goal of reporting is to document progress toward meeting the emission reduction requirement, a biennial report is adequate to show progress. This would reduce the cost of reporting. Nothing would prevent a refinery that satisfies the performance standards of this chapter from filing a report less than two years after a previous report.

Response: We disagree that a biennial report is adequate to determine progress in meeting the requirements of this chapter. We are retaining the annual reporting to better assure that progress is being made to meet the energy efficiency or emission reduction requirement.

WSPA Comment #19: The commenter suggests adding a new section, WAC 173-485-100, to address confidential business information. The commenter notes that the reports required to be submitted regarding the proposed emission reduction projects under WAC 173-485-060(1) and the annual reports required by WAC 173-485-090(1) contain sensitive, proprietary information about a refinery's operations.

Suggested rule text for the new section from this comment is:

173-485-100 Confidential Business Information. All
proprietary in-

formation submitted by a refinery to demonstrate compliance
with this

chapter shall be treated as confidential information within
the mean-

ing of RCW 70.94.205.

Response: We are not including this suggestion in the rule. As directed in RCW 70.94.205, the source must identify the information it wishes the permitting authority to withhold from disclosure, and must explain how the information meets the parameters of the law justifying nondisclosure. This is a case by case demonstration and decision. See RCW 70.94.205 for details on the process. Ecology has specific procedures for a source to request that proprietary information be held confidential. The refineries can use these procedures to request confidentiality as appropriate.

We received similar comments from the following people representing environmental interests:

- Janette K. Brimmer, EarthJustice on behalf of Washington Environmental Council (WEC) and Sierra Club (the "Conservation Organizations")
- Ben Serrurier, Program Associate, Climate Solutions
- Sasha Pollack, Climate and Clean Energy Campaign Director for Washington Environmental Council

For ease of reference, we refer to these comments collectively as "Environmental Groups Comments." Summaries of those comments are given below, along with Ecology's responses.

Environmental Groups Comment #1: Some commenters support going forward with the RACT determination, but would like Ecology to reconsider approach and outcome.

Response: Thank you for your support in adopting this rule in a timely manner. Ecology acknowledges the Conservation Organizations concerns about the proposed rule.

Environmental Groups Comment #2: Some commenters question the use of energy efficiency benchmarking.

Response: The process for determining RACT for petroleum refineries was extremely challenging. As reflected in the TSD, we also anticipated that a more traditional unit by unit RACT determination would result from the process. As we progressed through the analysis phase, it became apparent that focusing on the individual emission units would not result in significant reductions or changes to the parts of a refinery that could most affect the emissions of GHGs. We also found that there are currently no regulations in the U.S. limiting GHG emissions at petroleum refineries. Ecology found that there are many voluntary GHG reduction programs for refineries which rely on energy efficiency benchmarking. After looking at the options, Ecology determined that a RACT standard based on energy efficiency benchmarking would provide the flexibility required to obtain the greatest possible reductions in GHG emissions using reasonably available technology.

Environmental Groups Comment #3: The commenters question the use of the Solomon EII[®] for energy efficiency benchmarking.

Response: The predominant energy efficiency benchmarking index used by the petroleum sector is the proprietary product called Solomon Associates Energy Intensity Index[®] (EII[®]). Solomon has been benchmarking energy efficiency in refineries since 1981. The EII[®] compares the energy performance of a single facility over time, and also compares a refinery's energy efficiency against the range of energy efficiencies of the industry. Ecology determined that the Solomon EII[®] provides the most thorough and most credible energy efficiency benchmarking available for refineries, both worldwide and in the U.S. In addition, refineries representing approximately 90% of the refining capacity in the U.S. participate in the Solomon EII[®] program. Finally, the U.S. EPA uses the Solomon EII[®] as one of several criteria to qualify facilities for recognition in EPA's Energy Star[®] program. For these reasons, Ecology found the Solomon EII[®] to be the best benchmarking tool for establishing RACT for GHG emissions from Washington's refineries.

Environmental Groups Comment #4: The Commenters oppose the use of the Solomon EII[®] because the Solomon process is not transparent. These commenters point out that neither the public nor Ecology will have access to the information the refineries provide to Solomon nor will they have access to Solomon's analysis determining a refinery's energy efficiency.

Response: Ecology recognizes the lack of transparency in the EII[®] analysis. For this reason, the rule requires a professional engineer licensed in the state of Washington to review and certify all operational data submitted to Solomon. WAC 173-485-050(1)(c).

Ecology also recognizes that Solomon Associates is a reputable firm that has been in the business of evaluating energy efficiency at refineries for more than 30 years. The agencies have determined that Solomon Associates has every incentive to provide accurate analyses to refineries and to regulators, and no incentive to compromise its process. Refineries worldwide, including refineries constituting 90% of the U.S. refining capacity, pay significant fees for Solomon's products. These refineries rely on Solomon's assessments to evaluate the efficiency and competitive position of their operations. The Solomon performance metrics provide a basis for refinery decisions on how to prioritize improvement projects to meet operational projections within the competitive market. Thus, not only is there a lack of incentive for Solomon to collude with its customers or trade groups, there is also a tremendous risk that in doing so, Solomon would lose the trust of the worldwide market.

Other regulatory agencies in Europe and the U.S. agree. The US EPA uses the Solomon EII[®] as one of several criteria to qualify facilities for recognition in EPA's Energy Star[®] program. The California Air Resources Board (CARB) used the Solomon EII[®] in phase one of its GHG cap and trade program to determine initial carbon allocations. CARB will also be using another Solomon product for the next phase of GHG credit allocations for refineries. The European Union likewise relies on a Solomon product to determine credit allocations under its GHG cap and trade program.

Finally, Ecology was unable to find a more transparent benchmarking process. Few benchmarking metrics were found for the petroleum refinery industry. Because refineries are highly integrated and complex facilities, development of an alternative benchmarking strategy would be a complex task requiring specific expertise in refining and refining efficiency assessment as well as access to all U.S. petroleum refinery data. The Washington agencies do not have the required expertise or access to the required data. The development of an alternate benchmark is therefore not possible for the agencies.

Environmental Groups Comment #5: The Commenter notes that Solomon data is voluntary, so doesn't include all U.S. refineries.

Response: Ecology has determined that refineries representing approximately 90% of U.S. refining capacity participate in the Solomon EII[®] process.

Environmental Groups Comment #6: Some commenters claim the Solomon EII[®] is weakened by the inclusion of refineries from Mexico and Canada.

Response: The RACT rule requires refineries to score in the top 50th percentile compared to similarly sized U.S. refineries. WAC 173-485-040(1). Likewise, EPA's Energy Star[®] program includes only refineries located in the U.S.² These requirements thus exclude refineries from Mexico and Canada.

Environmental Groups Comment #7: The commenters note that Solomon's fact checking may not be adequate and refineries are not always accurate in the information they provide to Solomon.

² In establishing the Energy Star[®] benchmark, for petroleum refineries, EPA had Solomon follow EPA's general approach of only including U.S. facilities in Energy Star[®] analysis.

Response: The RACT rule does not rely on Solomon's fact checking. Rather, the rule requires a professional engineer licensed in the state of Washington to review and certify all operational data submitted to Solomon. WAC 173-485-050(1)(c).

Environmental Groups Comment #8: The commenters believe the EII[®] is based on energy efficiency and is not directly related to the carbon dioxide or GHG emissions from a refinery.

Response: The EII[®] is based on overall energy efficiency at a refinery. As such, it recognizes minimizing energy usage per unit of production is an important aspect of refinery operation. The reduction in energy usage directly relates to reductions in emissions of all air pollutants. This is because energy efficiency goes up with the implementation of projects resulting in a reduction in the need to burn fuel for the purposes of generating heat. Examples of possible energy efficiency projects include projects that reduce thermal losses, projects that increase heat transfer capacity, improvements in steam processing to reduce losses, and projects that improve combustion efficiency. See also slide 30, first bullet of Kumana Lecture 10 (attached to Earth Justice's comments), which links energy efficiency to GHG reductions.

Environmental Groups Comment #9: Commenters state that Solomon provides additional analysis products that would be better approaches for GHG emission benchmarking – the CWT and CWB metrics.

Response: The EII[®] is the only universally available benchmark for the refinery industry. As noted on the ECOFYS report to the State of California on refinery benchmarking³ (provided with the EarthJustice comments) there are three alternative benchmark products that can be provided by Solomon. Of the three products, Solomon only recommends that two of them are suitable for regulatory purposes, the CWT and CWB. The CWB and CWT products were developed specifically for usage by the European Union and California GHG cap and trade programs. As noted in the ECOFYS report, the CWT and CWB differ in how electricity usage and generation are treated, rendering the results of these two analyses incomparable.

Sections 5 and 4 of the ECOFYS document explain how the CWT and CWB benchmarks are used to establish allocations of GHG emission credits. Due to EU laws, the CWT weighting factors are publically available, while the CWB weighting factors developed for use in California are not publically available.

While it would be possible to use the publically available CWT weighting factors to calculate the CWT for each Washington refinery, we would have no other US refineries to compare those results to. Alternatively, if we were to require Washington refineries to determine their CWB values, we again would at best expand our ranking to include the California refineries, which would still not provide a statistically significant dataset⁴. The Technical Support Document (TSD) for this rule notes that the five Washington refineries have implemented more energy saving options than the California refineries.

³ Development of GHG efficiency benchmarks for the distribution of free emissions allowances in the California Can-and-Trade Program, Refineries – Preliminary Work Product, ECOFYS, August 20, 2012

⁴ The comments by Mike Ruby on the statistics of the EII[®] values are illustrative on this point. The number of refineries is too few to produce a significant statistical trend.

We have confirmed our understanding with EPA and Solomon that the 2006 EPA Energy Star[®] analysis limits the scope of the refineries to include only the U.S. refineries that participated in the Solomon process in 2006. The 2006 U.S.-only dataset was developed and analyzed specifically to use only U.S. sources in order to be consistent with EPA's practice in establishing other Energy Star[®] industrial benchmarks. The EPA process uses the most recent year of data available from U.S. industrial plants for analysis and determination of the benchmarks. Under the Energy Star[®] process, once a benchmark is established for an industrial sector, it does not change until EPA determines that it no longer represents the best performing 25% facilities in a specific industrial sector.

Environmental Groups Comment #10: The commenters claim that RACT is not “average” control equipment, so Ecology has no basis for choosing the 50th percentile as the benchmark for meeting RACT.

Response: Ecology has determined that being more energy efficient than the average similarly sized petroleum refineries in the U.S. is RACT. These commenters believe RACT should result in better than “average” control of emissions.

EPA has published control techniques guidelines (CTGs) to help states determine what RACT should look like when RACT is required by federal law for sources in non-attainment areas. In these CTGs, EPA acknowledges that RACT level emission control requirements are already in place at many affected facilities.⁵ These CTGs also acknowledge that the implementation of RACT will incur little, if any, increased costs.⁶ Thus, EPA guidance indicates that RACT can be “average” controls, reflecting emission reductions already occurring at facilities across the country and/or emission reductions that can be achieved at minimal cost.

The Solomon EII[®] Energy Star[®] analysis ranks refineries in the U.S. by quartile. The analysis says a particular refinery is in the top 25th percentile, top 50th percentile, top 75th percentile, or bottom 25th percentile. The analysis does not indicate, for example, whether a refinery is in the top 40th percentile, or whether a refinery is between the top 50th percentile and the top 40th percentile. The lack of a more refined analysis stems from the fact that there are only 145 refineries in the U.S.⁷

⁵ See, e.g., CTG for Automobile and Light-Duty Truck Assembly Coatings, p. 23 (“The recommended VOC emission rates described above reflect the control measures that are currently being implemented by these facilities. Consequently, there is no additional cost to implement the CTG recommendations for coatings. For the same reason, we do not anticipate additional VOC emission reduction from coatings.”); CTG for Paper, Film, and Foil Coatings, p. 20 (finding that 176 out of a total of 251 affected facilities were already using the recommended control devices); CTG for Fiberglass Boat Manufacturing Materials, p. 34 (most, if not all, affected facilities are already using the materials and methods recommended by this CTG).

⁶ See, e.g., CTG for Metal Furniture Coatings p. 26 (Cost to implement VOC limits is about \$200 per ton of VOC emission reduction, work practices will result in net cost savings); CTG for Large Appliance Coatings p. 21 (cost effectiveness is \$500 per ton of VOC reduced); CTG for Miscellaneous Industrial Adhesives p. 20 (cost effectiveness is \$265 per ton; work practices in the CTG will result in a net cost savings); CTG for Industrial Cleaning Solvents p. 10-11 (implementation of controls will result in either a slight cost increase or a cost savings). It is informative to compare the cost to implement RACT with the cost of implementing best available control technology (BACT). EPA guidance indicates that in 2006 the cost of implementing RACT requirements for controlling emissions of NOx was between \$160 and \$1300 per ton of NOx removed. Memo from William T. Harnett, Director, EPA Air Quality Policy Division, SUBJECT: RACT Qs & As – Reasonably Available Control Technology (RACT) Questions and Answers, May 18, 2006. By contrast, in 2001, EPA estimated the cost of implementing BACT for controlling NOx to be an order of magnitude higher, at \$10,000/ton of NOx removed. Matt Haber: Best Available

Once the analysis further breaks these refineries into separate categories by size, there are not enough refineries in any given size category to provide more specific rankings that are meaningful. Therefore, the choice of energy efficiency percentiles for RACT is limited to the 25th percentile, the 50th percentile, the 75th percentile (top 25th percentile) or the 100th percentile.

Ecology determined that the types of projects needed to reach the top 25th percentile for energy efficiency (installation of new cogeneration, replacement of crude oil heaters and sulfur plants) are process redesigns that are beyond the expectation of RACT. However, the types of projects that enable a refinery to reach the top 50th percentile are well within the purview of RACT. See TSD, pp. 46-65. Ecology determined that the fact that one-half of the refineries in a given size class reach the 50th percentile in energy efficiency is consistent with the EPA guidance cited above indicating that many sources already meet RACT requirements. Therefore, Ecology determined that RACT is met by any refinery in the top 50th percentile for energy efficiency at similarly sized refineries.

Environmental Groups Comment #11: The commenters question the use of process capacity (barrels per day) for determining the peer group to which a refinery is compared in determining its EII[®] score.

Response: We recognize that the use of crude unit capacity is generally not a definitive factor in determining the overall complexity of a refinery. The use of crude unit capacity to identify peer groups in this rule is a consequence of the decision to utilize the EPA Energy Star[®] U.S. refinery quartile ranking as the basis for RACT. As explained in our response to Environmental Groups Comment #9, Solomon developed the dataset based on the EII[®] values of the participating U.S. refineries in 2006. EPA has considered plant size/throughput as a factor in establishing benchmarks for other industries. Based on Solomon's advice, EPA accepted the use of crude unit capacity as the means to identify peer groups for the Energy Star[®] process.

Environmental Groups Comment #12: The commenters question the use of the 2006 year for determining the Solomon EII[®] ranking.

Response: The year 2006 Solomon EII[®] ranking was chosen for determining compliance with RACT because that is the only year for which Solomon has produced an EII[®] ranking based solely on refineries from the U.S.

Use of a more recent year would not result in a U.S. specific analysis for our program. That is, the use of a newer year for benchmarking would add refineries outside the U.S. into the analysis. The EII[®] ranking would then be against those refineries in one of Solomon's standard comparisons, such as one covering all North American refineries.

Environmental Groups Comment #13: The commenters claim RACT should result in more than 10% GHG emission reductions.

Control Technologies for the Baldwin Generating Station, Baldwin Illinois, Prepared for the United States in connection with: United States v. Illinois Power Company and Dynegy Midwest Generation, Inc., April 2002 p. 17.

⁷ As noted in the TSD, not all of these refineries participate in the Solomon process.

Response: Commenters note that training material provided by Kumana indicates energy efficiency projects at refineries should easily result in GHG emission reductions of 14% to 40%. However, the information presented by Kumana is based on opportunities to increase energy efficiency at refineries around the world and is therefore not directly applicable to refineries in Washington State.

As discussed in the TSD (see pp. 49-53), refineries in Washington have already implemented many of the energy efficiency projects available to them. Therefore, the universe of GHG emission reduction and energy efficiency improvement projects available to Washington's refineries is more limited than contemplated by Kumana. In addition we expect that by reducing GHGs by 10% or less, even the poorest performing refinery in Washington will be capable of improving its EII[®] score enough to be in the top 50th percentile.

Environmental Groups Comment #14: The commenters claim the RACT process requires Ecology to first determine all "reasonably available" controls, and then determine which of those are economically feasible.

Response: The process advocated by these commenters is more akin to the "top-down" analysis used to determine best available control technology (BACT) than to a RACT determination. EPA recognizes the difference. In responding to a question about whether a RACT analysis is similar to a BACT analysis, EPA stated, "BACT requires that new or modified sources adopt the best available controls and, as such, the analysis is a "top-down" analysis that first looks at the most stringent level of control available for a source. ... RACT requires that sources adopt controls that are reasonably available and thus they may not be the most stringent controls that have been adopted for other similar sources."⁸ Consistent with this response, EPA's control techniques guidelines for RACT do not follow the "top-down" approach. Instead, they identify control measures that they recommend as RACT, and then analyze the likely costs of implementing these measures. Similarly, Ecology's analysis for this RACT rule determined control measures appropriate for RACT, and then looked at the likely costs of implementing these measures. EPA found costs of implementing their proposed RACT standards to range from zero (implementing the controls provides a cost savings) to \$2800 per ton of pollutant removed. Like EPA, Ecology found that implementing some of the measures required to meet the RACT standard would provide a cost savings to the refineries. Ecology did not evaluate the costs of specific projects to meet the emission reduction standard because the costs of implementing the projects will vary considerably from refinery to refinery. Therefore, Ecology left it up to the refineries to determine which projects they could and would implement.

Environmental Groups Comment #15: The commenters are concerned that the record contains no evidence of the factors Ecology considers relevant in determining economic or technical feasibility, or how Ecology made its determinations.

Response: The TSD prepared for this rule includes extensive analysis of the various types of emission units in a refinery, possible emission controls for those units, and whether or not the

⁸ Memo from William T. Harnett, Director, EPA Air Quality Policy Division, SUBJECT: RACT Qs & As – Reasonably Available Control Technology (RACT) Questions and Answers, May 18, 2006 at p. 1, Question 1.

controls are suitable to be RACT. See TSD pp. 41-73. As a result of this analysis, it became apparent that focusing on the individual emission units would not result in significant reductions in GHG emissions or affect the parts of a refinery that could most affect the emissions of GHGs. After looking at the options, Ecology determined that a RACT standard based on energy efficiency benchmarking would provide the flexibility required to obtain the greatest possible reductions in GHG emissions using reasonably available technology.

As discussed in response to comment #13, the process for determining RACT is not the “top-down” process generally used for determining BACT. Therefore, the economic feasibility analysis required for RACT is different from the analysis required for a BACT determination. The TSD for this rule includes an economic analysis that explains how the Agencies determined that the implementation of energy efficiency projects that reduce GHG emissions would result in cost savings for the refineries. See TSD pp. 85-90.

Environmental Groups Comment #16: The commenters believe the RACT analysis does not follow EPA guidance on determining RACT.

Response: These commenters quote EPA guidance that states, “To conclude that the existing level of control is RACT for a source or source category, the State’s analysis should demonstrate that more effective controls are not economically or technically feasible.”

The federal Clean Air Act (CAA) requires RACT for sources in nonattainment areas to control the pollutants for which the area is in nonattainment. The EPA statement quoted by the commenter was answering a question concerning RACT controls that could be required should they be necessary to ensure compliance with the 8-hour ozone NAAQS. EPA’s statement was qualified by the observation that a state evaluating RACT should examine “existing EPA guidance as well as other available information” from EPA.

Washington state law goes beyond the federal CAA by requiring all existing sources to meet RACT – not just sources in nonattainment areas. There is no National Ambient Air Quality Standard (NAAQS) for GHGs. Therefore, there is no NAAQS to meet and no possibility of nonattainment. The portions of EPA’s guidance addressing RACT controls that could be required should they be necessary to ensure compliance with a NAAQS are therefore not relevant to the state law RACT requirements that apply in this case.

Finally, as noted in Ecology’s responses to Environmental Groups Comments #9 and #13, the analysis used to develop this rule is consistent with EPA’s guidance for determining RACT.

Environmental Groups Comment #17: The commenters are concerned that the RACT determination does not meet Washington’s statutory legal requirements for RACT.

Response: Washington’s CAA defines “reasonably available control technology (RACT)” as “the lowest emission limit that a particular source or source category is capable of meeting by the application of control technology that is reasonably available considering technological and economic feasibility. RACT is determined on a case-by-case basis for an individual source or source category taking into account the impact of the source upon air quality, the availability of additional controls, the emission reduction to be achieved by additional controls, the impact of

additional controls on air quality, and the capital and operating costs of the additional controls. RACT requirements for any source or source category shall be adopted only after notice and opportunity for comment are afforded.” RCW 70.94.030(20).

Under this definition, emission controls identified as RACT must be:

- Reasonably available
- Technologically feasible
- Economically feasible

In determining whether emission controls at a particular source or source category meet the definition of RACT, the agency must look at:

- Impact of the source on air quality
- Availability of additional controls
- Emission reduction achieved by additional controls
- Impact of additional controls on air quality
- Capital and operating costs of the additional controls.

The agency must also consider RACT determinations and guidance made by EPA and other state and local authorities for similar sources, as well as “other relevant factors.” RCW 70.94.154(5).

If a source category includes three or more sources, RACT must be established by rule unless conditions justifying individual RACT orders exist. RCW 70.94.154(2) and (3). In this case, the Agencies determined that conditions justifying individual RACT orders do not exist.

Most regulatory experience implementing RACT, both in Washington State and throughout the U.S., has occurred in the context of controlling emissions of criteria pollutants in nonattainment areas. For criteria pollutants, EPA has established nationally applicable ambient air quality standards (NAAQS) and requires monitoring of the concentrations of those pollutants in the ambient air. EPA also requires existing major sources of air pollutants located in areas where NAAQS are not being met to install RACT. When imposing RACT in such nonattainment areas, regulatory agencies have relied on EPA’s NAAQS to provide end points that must be met and the monitoring data required by EPA to determine the effects of RACT. At this point, no ambient air standards, national or otherwise, have been set for greenhouse gases. Therefore, the benefit of experience gained in determining RACT controls necessary to reach attainment is of limited value in determining RACT for emissions of GHG. For example, information on which to base one of the critical steps prescribed in the RACT determination process (the impact of additional controls on air quality) is unavailable.

The analysis of economic feasibility is also different for GHG RACT than in a normal RACT determination. RACT analyses have generally centered on determining appropriate emission-unit-specific controls to impose on individual emission units at a facility. Such an approach is not productive for determining RACT for emissions of greenhouse gases from refineries. Instead, the agencies focused on GHG emissions reductions resulting from improving the efficiency of the use of energy in the refineries.

In addition, a traditional RACT analysis compares the cost of implementing a particular control technology to the number of tons of pollutants the control technology will remove in one year. The assumption is that the control technology will have an initial capital cost and ongoing costs

associated with maintaining and operating the control technology that will continue over the life of the technology. This approach does not work for greenhouse gases from refineries, because the energy efficiency improvement projects at refineries have a payback period in which not only the operating costs of the project are recovered, but also the initial capital expense.

The Agencies determined that control technology meeting the requirements for GHG RACT for refineries would be a reasonably efficient refinery operation in Washington State in the 2010-2012 timeframe. The RACT rule defines a reasonably efficient refinery as a refinery that demonstrates an energy efficiency performance comparable to or above the 50% percentile of similar-sized US refineries based on the Solomon EII⁹ or a refinery that reduces GHG emissions through the implementation of reasonably available technology (including work practice standards) that cumulatively amount to 10% of the facility overall emissions, whichever milestone is met first. The agencies believe that all Washington refineries will reach the 50th percentile by reducing GHG emissions by 10% or less.

The agencies determined that the means to meet the energy efficiency standard are reasonably available because at least 50% of similarly sized refineries in the U.S. have employed them. The fact that at least 50% of similarly sized refineries are meeting the standard also indicates that the means to meet this standard are both technologically and economically feasible.

The proposed GHG emissions reductions can also be achieved by implementing control strategies that have been demonstrated in practice. The proposed RACT provides each refinery the flexibility to choose any control strategy, including but not limited to those listed in the TSD, that can be implemented at the refinery within the 10-year period. The proposed 10-year compliance period allows facilities to manage the capital costs of compliance by allowing planning time over approximately two turn-around cycles. The implementation of projects during planned turnarounds also avoids emissions associated with additional equipment shutdowns.

In determining RACT for greenhouse gases from the refineries, the Agencies took into account the fact that the five refineries in Washington collectively emit approximately 6.5 million metric tons of greenhouse gases per year. Although these emissions are small compared to global GHG emissions, they amount to approximately 28.6% of all greenhouse gases emitted in Washington from stationary sources, second only to power plants, which account for approximately 33.4% of the greenhouse gases emitted in Washington from stationary sources.

It is difficult to know exactly how much the implementation of the Agencies' proposed RACT requirements will reduce GHG emissions from Washington's refineries because some of the refineries may already be meeting the proposed RACT. However, if none of the refineries is currently meeting RACT, implementing RACT could result in a 10% reduction in GHG emissions – a reduction of approximately 630,758 metric tons per year. In the global scheme of things, this

⁹ The Agencies considered the use of the Solomon CWBTM metric developed for California. However, this approach was rejected because the Solomon CWBTM metric was not developed for the purpose of devising emission limits, rather it provides a calculation method for carbon emissions allowances, and therefore, would require substantial specialized review and modification by Solomon Associates - essentially developing a new product. The Agencies found that development of a new metric was beyond the available resources and scope of this GHG RACT rulemaking. Further, the existing Solomon EII[®] product (which is available) was determined to be appropriate. The California CWB factors are largely an adaptation of the EII[®] standard energy, and the data used as basis was collected by Solomon in 2006 from worldwide participating refineries.

reduction is not huge, but it provides measurable progress toward the state's goal of reducing GHG emissions in Washington to 1990 levels by 2020.

Although no changes were made to this rule in response to the comments, Ecology thanks the commenters for expressing their concerns. We welcome and share your passion for minimizing the impact of climate change. Ecology believes this rule making is forward movement in control of GHG emissions in the State of Washington. We support this rule as a reasonable solution to a complex problem.

We received a number of comments from Mike Ruby, Envirometrics, Inc. Below are summaries of those comments, along with Ecology's responses:

Ruby Comment #1: The EII[®] is opaque to the public and Ecology.

Response: See response to Environmental Groups Comment #4.

Ruby Comment #2: Energy Star[®] petroleum refinery benchmarking should not be used. It would be better for Ecology to specify the size ranges for similar sized refineries directly in the rule and establish a baseline more recent than 2006, such as 2010 or 2012.

Response: See responses to Environmental Groups Comments #10 and #11 on the peer groups and baseline year.

The agencies have determined that the Energy Star[®] benchmarking process provides the most representative data set to use because it is based on the energy efficiencies of all U.S. refineries participating in the Solomon EII[®] in 2006. These refineries represent 90% of the refining capacity in the U.S.

A more recent baseline than 2006 cannot be used because the only analysis Solomon has done including only refineries in the U.S. was the analysis done for EPA's Energy Star[®] program in 2006. Solomon has indicated that there is no need to redo the Energy Star[®] analysis because in their review of their EII[®] rankings, the quartile divisions have remained stable. EPA has not seen a need to update the benchmarking either. If EPA determines that their Energy Star[®] refinery benchmark is no longer representative of the best 25th percentile of all refineries in the U.S., they will pursue such an update.

Ruby Comment #3: Reducing emissions by 10% does not relate directly to the purpose of RACT, which is to achieve all technically and economically feasible projects.

Response: RACT does not require a source to complete all technically and economically feasible projects. Such a requirement is closer to a BACT requirement, which, as EPA has noted, is a different analysis from RACT. See response to Environmental Groups Comments #14 and #16.

Ruby Comment #4: It is not clear that there is any relationship between the EII[®] and GHG emissions at a facility.

Response: As discussed in the Technical Support Document (TSD) (pp. 43-45), GHG emissions at a refinery are closely related to the refinery's energy efficiency. That is, the more energy efficient the refinery, the lower its GHG emissions. The Solomon EII[®] indicates a refinery's relative energy efficiency. A low EII[®] score indicates that a refinery is less energy efficient, and therefore emits higher amounts of greenhouse gases, than its peers.

Ruby Comment #5: The use of the EII[®] distribution to find the average for regulatory purpose is without any statistical merit. There is very little in the small example distributions provided that provides confidence that an average set of refinery EII[®] scores is a meaningful metric. Setting RACT as the average (50th percentile) EII[®] will not achieve all RACT-eligible projects.

Response: The small samples the commenter mentions consist of one sample of 21 refineries in California and another sample of 16 refineries on a graph from the Kumana Associates training materials. The 2006 Solomon EII[®] analysis used in this rule is based on a sample consisting of 90% of the refinery capacity in the U.S. - a sample large enough to support a quartile analysis. See our response to Environmental Groups Comment #10 for additional discussion of the use of the average (50th percentile) EII[®] score.

Ruby Comment #6: EII[®] has no relationship to the availability of RACT-eligible projects at a particular refinery.

Response: The Solomon EII[®] indicates a refinery's relative energy efficiency. A low EII[®] score indicates that a refinery is less energy efficient than its peers, and will therefore emit relatively higher amounts of greenhouse gases than its peers. Section 7 of the TSD identifies a number of possible RACT-eligible projects that a refinery can implement to improve energy efficiency. More of these (or other) projects are available to a refinery with a low EII[®] score than a more efficient refinery.

Ruby Comment #7: We don't know the refineries in the national EII[®] sample so we don't know what Washington's refineries are being compared to. What is economically feasible will be different in different parts of the country and for different sources of crude.

Response: Under the RACT rule, Washington's refineries are compared to refineries in the U.S. representing 90% of the U.S. refinery capacity. The TSD prepared for this rule examined a number of types of projects that could be economically feasible as RACT at the refineries in Washington. The RACT rule gives the refineries the opportunity to choose projects they find feasible. Basing the EII[®] score on U.S. refineries limits the comparison to refineries subject to a more similar regulatory climate than if the metric included refineries located in other countries.

Ruby Comment #8: "Reasonable" needs to be defined in terms of the needs of the state of Washington, not in terms of the firm's return on its investment. The EII[®] is based on what refineries have found to be reasonable in the past, and will set a lower bar than what is required by law.

Response: “Reasonable” as used in the definition of RACT, applies to the availability of technology. In developing the RACT rule, the Agencies determined that technology to reach the 50th percentile of the EII[®] is reasonably available, since half the refineries in the country are using it. See responses to Environmental Groups Comments #14-#17.

The Agencies also determined that in order to reach the top 25th percentile of the EII[®], refineries were employing measures, such as the installation of new cogeneration and the replacement of crude oil furnaces and sulfur plants, that are beyond the scope of RACT. The Agencies also noted that refineries have every incentive to implement all possible energy efficiency measures, because energy efficiency means lower operating costs for the refinery. The Agencies therefore believe the EII[®] does not set an artificially low bar, and consequently have set the RACT bar as the achievement of an EII[®] score at or above the 50th percentile. See the response to the Environmental Groups Comment #10 for further discussion of why the 50th percentile is a reasonable level for RACT.

Ruby Comment #9: Oil refineries have indicated that reasonable is represented by a four-year rate of return on investment. The corporate-desirable rate of return on investment is very different from the socially-desirable rate of return on investment.

Response: Ecology agrees, and has not accepted WSPA’s suggestion that projects be limited to those with a four-year rate of return on investment.

Ruby Comment #10: There is no justification for using 2006 as the baseline for the EII[®] while at the same time using 2010 or 2011 as the baseline for GHG reductions.

Response: The Solomon EII[®] analysis of refineries in the U.S. was completed in 2006, and has not been repeated. Solomon has indicated that there is no need to redo the Energy Star[®] analysis because in the review of their EII[®] rankings, the quartile divisions have remained stable. In order to restrict the population of refineries included in the evaluation to refineries located in the U.S., the analysis performed for EPA in 2006 must be the analysis used to develop the benchmark for the EII[®] rating. See the response to the Environmental Groups Comment #12 for additional discussion on using 2006.

On the other hand, the first year for which Ecology has reliable complete GHG emissions information is 2010. Therefore, the RACT rule is unable to use 2006 as the baseline for GHG emission reductions.

Ruby Comment #11: The rule is vague on the timing of the acceptability of projects already executed. The rule should be more precise in saying that projects are acceptable if they are completed in 2010 or later.

Response: Thank you for your comment. Ecology has changed the relevant rule language to clarify that GHG emission reductions occurring as a result of projects completed prior to January 1, 2010 are not eligible for credits. WAC 173-485-060(5).

Ruby Comment #12: The rule should reflect the fact that technology may improve in 2016 or later years, and technology may become available that makes it much less expensive to implement an energy efficiency project.

Response: The commenter is correct that RACT can change over time as technology changes. It is also correct that the law requires existing sources to always use RACT. However, the regulatory scheme requires that a given RACT determination be made at a particular point in time, and reflect what is reasonable at that time. If, in the future, the regulator determines that RACT has changed, the regulator must make a new RACT determination.

Ruby Comment #13: It would be reasonable to require the refineries to complete the projects determined in the TSD to be RACT-eligible. Ecology could continue to develop potential projects at refineries and add RACT-eligible projects for refineries to evaluate. Alternatively, each refinery could begin the process by developing an incremental 10-year plan for implementing all RACT-eligible projects, as was done in the successful Pollution Prevention effort under RCW 70.95C.200.

Response: Requiring the refineries to complete the projects determined in the TSD to be RACT-eligible would require the Agencies to complete the required analysis for each affected emission unit at each refinery to determine which of the RACT-eligible projects actually are RACT for each refinery. RACT is, by definition, an emission limit. The Agencies have determined that it is a better use of everyone's resources to set the emission limit, and allow the refineries to determine which projects they will complete to meet that standard.

However, when evaluating RACT for a less complex source category, we would be more likely to evaluate and determine unit specific RACT controls and emission limitations. We don't believe the definition of RACT incorporates the open-ended, continuous improvement concept included in Mr. Ruby's comment.

Ruby Comment #14: Given the 10-year period given to the refineries to complete RACT, what happens if a refinery leaves all the projects to the end, and the projects submitted in 2025 are all rejected for credit by Ecology? What is the penalty for noncompliance?

Response: The rule requires the refineries to report each year on their plans for meeting RACT. This will ensure that each refinery is on track to meet the standard by the deadline, and the scenario presented does not occur. The penalty for noncompliance is in RCW 70.94 - that is, a fine of up to \$10,000 per day for each day of noncompliance, plus the potential of additional civil or criminal enforcement, as allowed under the Act.

Comment from Doug Lyons: I would hope that CO2 emission is not included. Note that water vapor is 97% of the content of greenhouse gases. That leaves 3% for all other gases of which CO2 is 10% or 0.3%. That is an insignificant amount. Further there is no scientific proven link between CO2 and global warming or any other climate effect. In fact CO2 is beneficial to plant growth and is even used in green houses to promote plant growth.

Response: Thank you for submitting your comment.

The amount of water vapor in the atmosphere is a function of temperature -- the warmer the temperature, the more water vapor is stored in the atmosphere. As the climate warms from the burning of fossil fuels, the concentrations of water vapor increase. This moisture absorbs more heat and further raises the temperature. Water vapor is an important part of the natural atmosphere and the natural greenhouse effect. It accounts for 60 to 70 percent of the greenhouse effect.

However, water vapor is quickly removed as rain and only stays in the atmosphere for about 10 days. Carbon dioxide remains for 50 to 100 years. In addition, human activities do not directly increase the concentration of water vapor in the atmosphere. However, the impacts of carbon emissions are amplified by water vapor. The scientific community, participating in the Intergovernmental Panel on Climate Change (IPCC), has reached a strong consensus regarding the science of global climate change: The Earth's temperature is rising, and that rise is caused by emissions of carbon dioxide and other greenhouse gases (GHG) from human activities.

This RACT rule addresses greenhouse gases as they are defined in state law. At this time, the definition of greenhouse gases does not include water vapor. Your comment is outside the scope of this rule. No changes were made to this rule in response to this comment.

Appendix A: Transcript from public hearing

See Ecology Publication no. 14-02-006A.

Appendix B: Copies of all written comments

See Ecology Publication no. 14-02-006B.