

Appendix F:
Burden and Cost for General Stationary Combustion Sources
(Subpart C)

Table of Contents

Appendix F-1. Detailed Unit Burden and Costs for GHGRP Reporters Subject to Subpart C Only—Year 1 through Year 3.....	3
Appendix F-2. Footnotes Applicable to Appendix F-1.....	5
Appendix F-3. Detailed Unit Burden and Costs for GHGRP Reporters Subject to Subpart C Plus Another Subpart(s)—Year 1 through Year 3.....	6
Appendix F-4. Footnotes Applicable to Appendix F-3.....	7

Appendix F-1. Detailed Unit Burden and Costs for GHGRP Reporters Subject to Subpart C Only—Year 1 through Year 3

Year 1 - Year 3	(A) Hours per Occurrence	(B) Occurrences/ Respondent/ Year	(C) Hours/ Respondent/ Year (A x B)	(D) Respondents/ Year	(E) Technical Hours/ Year (C x D)	Legal Hours/Year	Clerical Hours/ Year	Manager Hours/ Year	(H) Cost/ Year
1. APPLICATIONS (Not Applicable)									
2. SURVEY AND STUDIES (Not Applicable)									
3. ACQUISITION, INSTALLATION, AND UTILIZATION OF TECHNOLOGY AND SYSTEMS									
4. REPORT REQUIREMENTS									
A1. Read Rule, Instructions, Guidance Documents for Subpart C ^{1,2,3}	5.00	1	5.00	2,155	10,775.0				\$713,844
A2. Read Rule, Instructions, Guidance Documents for Subpart A ^{2,3,4}	2.00	1	2.00	2,155	4,310.0				\$285,538
B. Required Activities									
<i>Activity covering Tier 1 Methodology</i>									
Conduct annual review of company records to determine mass or volume of fuel combusted ^{2,5,6}	5.00	1.0	5.00	1,458	7,290.0				\$482,963
<i>Activity covering Tier 3 Methodology</i>									
Conduct annual review of company records to determine mass or volume of fuel combusted ^{5,7}	5.00	1.0	5.00	87	435.0				\$28,819
<i>Activity covering Tier 1 Methodology</i>									
Conduct annual review of billing records to determine natural gas consumption in therms or mmBtu ^{2,5,6}	5.00	1.0	5.00	1,458	7,290.0				\$482,963
<i>Activity covering Tier 2 Methodology</i>									
Conduct annual review of billing records to determine natural gas consumption in therms or mmBtu ^{5,8}	5.00	1.0	5.00	974	4,870.0				\$322,638
<i>Tier 1 Methodology for combustion emissions reported under subpart C</i>									
Perform engineering calculation to determine CO ₂ emissions using Eq C-1, C-1a, or C-1b, using default high heat values and/or default emission factors ^{6,9,10}	0.17	0.5	0.08	1,458	121.5				\$8,049
Perform engineering calculation to determine CH ₄ and N ₂ O emissions using Eq C-8, Eq C-8a, or Eq C-8b ^{6,11,12}	0.33	0.5	0.17	1,458	243.0				\$16,099
<i>Tier 2 Methodology for combustion emissions reported under subpart C</i>									
Conduct sampling to determine high heat value for each type of fuel or fuel mixture ^{8,13}		4.1		974					
Daily measurements ^{14,15}	182.50	0.2	43.68	58	2,514.1				\$166,558
Hourly measurements ^{16,17}	4,380.00	0.0	163.80	9	1,473.1				\$97,593
Monthly measurements ^{18,19}	6.00	3.2	19.49	781	15,221.2				\$1,008,402
Quarterly measurements ^{20,21}	2.00	0.2	0.45	54	24.2				\$1,604
Semiannual measurements ^{22,23}	1.00	0.2	0.24	58	13.8				\$913
Weekly measurements ^{24,25}	26.00	0.1	1.60	15	23.8				\$1,577
Perform engineering calculation to determine CO ₂ emissions using Eq C-2a, along with Eq C-2b or Eq C-2c. ^{9,13}	0.17	4.1	0.68	974	657.5				\$43,556
Perform engineering calculation to determine CH ₄ and N ₂ O emissions using Eq C-9a or Eq 9b ^{11,13}	0.33	4.1	1.35	974	1,314.9				\$87,112
<i>Tier 3 Methodology for combustion emissions reported under subpart C</i>									
Conduct sampling to determine carbon content for each type of fuel or fuel mixture ^{7,26}		7.1		87					

Appendix F-2. Footnotes Applicable to Appendix F-1

¹ Assumed 5 hours per reporter per year to read rule.
² Assumed activity occurs once per year per reporter.
³ There are 2,155 facilities that reported only subpart C in RY2014.
⁴ Assumed 2 hours per reporter per year to read rule.
⁵ Assumed 5 hours per year to review company records.
⁶ There are 1,458 facilities that reported only subpart C under Tier 1 in RY2014.
⁷ There are 87 facilities that reported only subpart C under Tier 3 in RY2014.
⁸ There are 974 facilities that reported only subpart C under Tier 2 in RY2014.
⁹ Assumed 10 minutes per pollutant per fuel [1 pollutant].
¹⁰ Using RY2014 data, there are 0.4 fuels per facility using Eq C-1a; 0.01 fuels per facility using Eq C-1b; 0.49 fuels per facility using Eq. C-1.
¹¹ Assumed 10 minutes per pollutant per fuel [2 pollutants].
¹² Using RY2014 data, there are 0 fuels per facility using Eq C-1a; 0.01 fuels per facility using Eq C-1b; 0.49 fuels per facility using Eq. C-1.
¹³ Using RY2014 data, there are 4.1 fuels per respondent using Tier 2 methodology.
¹⁴ Assumed 0.5 hour per fuel and 365 measurements per year.
¹⁵ Using RY2014 data, 5.9% of Tier 2 fuels are measured daily.
¹⁶ Assumed 0.5 hour per fuel and 8,760 measurements per year.
¹⁷ Using RY2014 data, 0.9% of Tier 2 fuels are measured hourly.
¹⁸ Assumed 0.5 hour per fuel and 12 measurements per year.
¹⁹ Using RY2014 data, 80.2% of Tier 2 fuels are measured monthly.
²⁰ Assumed 0.5 hour per fuel and 4 measurements per year.
²¹ Using RY2014 data, 5.5% of Tier 2 fuels are measured quarterly.
²² Assumed 0.5 hour per fuel and 2 measurements per year.
²³ Using RY2014 data, 5.9% of Tier 2 fuels are measured semiannually.
²⁴ Assumed 0.5 hour per fuel and 52 measurements per year.
²⁵ Using RY2014 data, 1.5% of Tier 2 fuels are measured weekly.
²⁶ Using RY2014 data, there are 7.1 fuels per respondent using Tier 3 methodology.
²⁷ Using RY2014 data, 3.8% of Tier 3 fuels are measured daily.
²⁸ Using RY2014 data, 2.9% of Tier 3 fuels are measured hourly.
²⁹ Using RY2014 data, 77.4% of Tier 3 fuels are measured monthly.
³⁰ Using RY2014 data, 3.8% of Tier 3 fuels are measured quarterly.
³¹ Using RY2014 data, 6.7% of Tier 3 fuels are measured semiannually.
³² Using RY2014 data, 5.3% of Tier 3 fuels are measured weekly.
³³ Assumed 0.5 hours per fuel to determine the annual volume of fuel or annual average molecular weight of gaseous fuel.
³⁴ Using RY2014 data, there are 5.3 liquid or gaseous fuels per respondent using Tier 3 methodology.
³⁵ Using RY2014 data, there are 53 facilities reporting only subpart C used liquid or gaseous fuel in RY2014.
³⁶ Using RY2014 data, there are 2.6 gaseous fuels per respondent using Tier 3 methodology.
³⁷ Using RY2014 data, there are 31 facilities reporting only subpart C used gaseous fuel in RY2014.
³⁸ Assumed 20 hours per quarter to gather and QA the CEMS data.
³⁹ Using RY2014 data, there are 73 facilities reporting only subpart C used Tier 4 in RY2014.
⁴⁰ Assumed 10 hours per reporter per year to submit report through e-GGRT and QA the data.
⁴¹ Assumed 5 hours per reporter per year to maintain records.
⁴² Number of occurrences per respondent based on average number of fuels reported by segment for Tier 2 units in RY2014.
⁴³ Assumed testing cost of \$400 per fuel.
⁴⁴ Number of occurrences per respondent based on average number of fuels reported by segment for Tier 3 units in RY2014.
⁴⁵ Assumed capital cost of \$2,400 per fuel per flow meter, which is an annualized cost of \$585.34.

Appendix F-3. Detailed Unit Burden and Costs for GHGRP Reporters Subject to Subpart C Plus Another Subpart(s)—Year 1 through Year 3

Year 1 - Year 3	(A) Hours per Occurrence	(B) Occurrences/ Respondent/ Year	(C) Hours/ Respondent/ Year (A x B)	(D) Respondents/ Year	(E) Technical Hours/ Year (C x D)	Legal Hours/Year	Clerical Hours/ Year	Manager Hours/ Year	(H) Cost/ Year
1. APPLICATIONS (Not Applicable)									
2. SURVEY AND STUDIES (Not Applicable)									
3. ACQUISITION, INSTALLATION, AND UTILIZATION OF TECHNOLOGY AND SYSTEMS									
4. REPORT REQUIREMENTS									
A. Read Rule, Instructions, Guidance Documents ^{1,2,3}	5.00	1.0	5.00	1,395	6,975.0				\$462,094
B. Required Activities									
<i>Activity covering Tier 1 Methodology</i>									
Conduct annual review of company records to determine mass or volume of fuel combusted ^{1,2,4}	5.00	1.0	5.00	891	4,455.0				\$295,144
<i>Activity covering Tier 3 Methodology</i>									
Conduct annual review of company records to determine mass or volume of fuel combusted ^{1,2,5}	5.00	1.0	5.00	79	395.0				\$26,169
<i>Activity covering Tier 1 Methodology</i>									
Conduct annual review of billing records to determine natural gas consumption in therms or mmBtu ^{1,2,4}	5.00	1.0	5.00	891	4,455.0				\$295,144
<i>Activity covering Tier 2 Methodology</i>									
Conduct annual review of billing records to determine natural gas consumption in therms or mmBtu ^{1,2,6}	5.00	1.0	5.00	674	3,370.0				\$223,263
<i>Tier 1 Methodology for combustion emissions reported under subpart C</i>									
Perform engineering calculation to determine CO ₂ emissions using Eq C-1, C-1a, or C-1b, using default high heat values and/or default emission factors ^{4,7,8}	0.17	4.7	0.79	891	702.4				\$46,534
Perform engineering calculation to determine CH ₄ and N ₂ O emissions using Eq C-8, Eq C-8a, or Eq C-8b ^{4,8,9}	0.33	4.7	1.58	891	1,404.8				\$93,069
<i>Tier 2 Methodology for combustion emissions reported under subpart C</i>									
Conduct sampling to determine high heat value for each type of fuel or fuel mixture ^{6,10}		3.4		674					
Daily measurements ^{11,12}	182.50	0.2	44.70	49	2,170.7				\$143,809
Hourly measurements ^{13,14}	4,380.00	0.1	421.82	19	8,053.0				\$533,510
Monthly measurements ^{15,16}	6.00	2.7	16.30	539	8,783.5				\$581,907
Quarterly measurements ^{17,18}	2.00	0.0	0.08	7	0.6				\$37
Semiannual measurements ^{19,20}	1.00	0.3	0.25	50	12.5				\$829
Weekly measurements ^{21,22}	26.00	0.1	1.36	10	14.1				\$935
Perform engineering calculation to determine CO ₂ emissions using Eq C-2a, along with Eq C-2b or Eq C-2c. ^{6,7,10}	0.17	3.4	0.57	674	381.9				\$25,303
Perform engineering calculation to determine CH ₄ and N ₂ O emissions using Eq C-9a or Eq 9b ^{6,9,10}	0.33	3.4	1.13	674	763.9				\$50,606
<i>Tier 3 Methodology for combustion emissions reported under subpart C</i>									
Conduct sampling to determine carbon content for each type of fuel or fuel mixture ^{5,23}		6.8		79					

Year 1 - Year 3	(A) Hours per Occurrence	(B) Occurrences/ Respondent/ Year	(C) Hours/ Respondent/ Year (A x B)	(D) Respondents/ Year	(E) Technical Hours/ Year (C x D)	Legal Hours/Year	Clerical Hours/ Year	Manager Hours/ Year	(H) Cost/ Year
Daily measurements ^{11,24}	182.50	0.4	80.67	5	414.2				\$27,442
Hourly measurements ^{13,25}	4,380.00	0.0	0.00	0	-				\$0
Monthly measurements ^{15,26}	6.00	5.6	33.46	65	2,167.3				\$143,582
Quarterly measurements ^{17,27}	2.00	0.3	0.61	4	2.2				\$144
Semiannual measurements ^{19,28}	1.00	0.0	0.03	0	0.0				\$1
Weekly measurements ^{21,29}	26.00	0.4	11.49	5	59.0				\$3,910
Determine annual volume of liquid or gaseous fuel using fuel flow meters ^{30,31,32}	0.50	4.5	2.25	24	54.0				\$3,578
Determine annual average molecular weight of gaseous fuel ^{30,33,34}	0.50	2.6	1.30	16	20.8				\$1,378
Perform engineering calculation to determine CO ₂ emissions using Eq C-3, Eq C-4, or Eq C-5. ^{5,7,35}	0.17	6.8	1.13	79	89.5				\$5,932
Perform engineering calculation to determine CH ₄ and N ₂ O emissions using Eq C-8 ^{5,9,35}	0.33	6.8	2.27	79	179.1				\$11,863
<i>Tier 4 Methodology for combustion emissions reported under subpart C</i>									
Gather CEMS data for e-GGRT reporting ^{36,37}	20.00	4.0	80.00	34	2,720.0				\$180,200
C. Create Information (Included in 4B)									
D. Gather Existing Information (Included in 4E)									
E. Write Report									
Annual Compliance Reporting through e-GGRT and QA ^{3,38}	10.00	1.0	10.00	1,395	13,950.0				\$924,188
5. RECORDKEEPING REQUIREMENTS									
A. Read Instructions (Included in 4A)									
B. Plan Activities (Included in 4B)									
C. Implement Activities (Included in 4B)									
D. Recordkeeping ^{3,39}	5.00	1.0	5.00	1,395	6,975.0				\$462,094
E. Time to Transmit or Disclose Information (included in 4E)									
F. Time to Train Personnel (included in 4A)									
G. Time for Audits (Not Applicable)									
TOTAL ANNUAL LABOR BURDEN AND COST					68,568.5				\$4,542,662
ANNUAL TESTING COSTS (O&M)									
<i>Sampling costs for Tier 2 units</i>									
Annual gas and liquid samples and analyses ^{40,41}		3.4		674					\$916,640
ANNUALIZED CAPITAL COSTS									
<i>Flow meter costs for Tier 3 units ^{42,43}</i>									
		4.5		24					\$63,216
TOTAL ANNUAL COSTS (Labor, O&M, and annualized capital)									\$5,522,519

Appendix F-4. Footnotes Applicable to Appendix F-3

¹ Assumed 5 hours per reporter per year to read rule.
² Assumed activity occurs once per year per reporter.
³ There are 1,395 facilities that reported subpart C plus another subpart(s) in RY2014.
⁴ There are 891 facilities that reported subpart C plus another subpart(s) used Tier 1 in RY2014.
⁵ There are 79 facilities that reported subpart C plus another subpart(s) used Tier 1 and/or Tier 3 in RY2014. No duplicates are included.
⁶ There are 674 facilities that reported subpart C plus another subpart(s) used Tier 2 in RY2014.
⁷ Assumed 10 minutes per pollutant per fuel [1 pollutant].
⁸ Using RY2014 data, there are 1.47 fuels per facility using Eq C-1a; 1.26 fuels per facility using Eq C-1b; 2.0 fuels per facility using Eq. C-1.
⁹ Assumed 10 minutes per pollutant per fuel [2 pollutants].
¹⁰ Using RY2014 data, there are 2.4 fuels per facility using C-2a; 1 fuel using C-2c.
¹¹ Assumed 0.5 hours per fuel and 365 measurements per year.
¹² Using RY2014 data, 7.2% of Tier 2 fuels are measured daily.
¹³ Assumed 0.5 hours per fuel and 8,760 measurements per year.
¹⁴ Using RY2014 data, 2.8% of Tier 2 fuels are measured hourly.
¹⁵ Assumed 0.5 hours per fuel and 12 measurements per year.
¹⁶ Using RY2014 data, 79.9% of Tier 2 fuels are measured monthly.
¹⁷ Assumed 0.5 hours per fuel and 4 measurements per year.
¹⁸ Using RY2014 data, 1.1% of Tier 2 fuels are measured quarterly.
¹⁹ Assumed 0.5 hours per fuel and 2 measurements per year.
²⁰ Using RY2014 data, 7.4% of Tier 2 fuels are measured semiannually.
²¹ Assumed 0.5 hours per fuel and 52 measurements per year.
²² Using RY2014 data, 1.5% of Tier 2 fuels are measured weekly.
²³ Using RY2014 data, there are 2.3 fuels using C-3; 1.9 fuels using C-4, and 2.6 fuels using C-5.
²⁴ Using RY2014 data, 6.5% of Tier 3 fuels are measured daily.
²⁵ Using RY2014 data, 0% of Tier 3 fuels are measured hourly.
²⁶ Using RY2014 data, 82.0% of Tier 3 fuels are measured monthly.
²⁷ Using RY2014 data, 4.5% of Tier 3 fuels are measured quarterly.
²⁸ Using RY2014 data, 0.5% of Tier 3 fuels are measured semiannually.
²⁹ Using RY2014 data, 6.5% of Tier 3 fuels are measured weekly.
³⁰ Assumed 0.5 hours per fuel to determine the annual volume of fuel or annual average molecular weight of gaseous fuel.
³¹ Using RY2014 data, there are 1.9 fuels using C-4 (liquid fuels), and 2.6 fuels using C-5 (gaseous fuels).
³² There are 24 facilities reporting subpart C plus another subpart(s) that reported liquid or gaseous fuel use in RY2014.
³³ Using RY2014 data, there are 2.6 fuels using C-5 (equation is only for gaseous fuels).
³⁴ There are 16 facilities reporting subpart C plus another subpart(s) that reported gaseous fuel use in RY2014.
³⁵ Using RY2014 data, there are 2.3 fuels using C-3; 1.9 fuels using C-4, and 2.6 fuels using C-5.
³⁶ Assumed 20 hours per quarter to gather and QA the CEMS data.
³⁷ There are 34 facilities reporting subpart C plus another subpart(s) that used Tier 4 methodology in RY2014.
³⁸ Assumed 10 hours per reporter per year to submit report through e-GGRT and QA the data.
³⁹ Assumed 5 hours per reporter per year to maintain records.
⁴⁰ Number of occurrences per respondent based on average number of fuels reported by segment for Tier 2 units in RY2014.
⁴¹ Assumed testing cost of \$400 per fuel.
⁴² Number of occurrences per respondent based on average number of fuels reported by segment for Tier 3 units in RY2014.
⁴³ Assumed capital cost of \$2,400 per fuel per flow meter, which is an annualized cost of \$585.34.