

1 **Subpart P of 40 CFR 98, As Modified by Proposed 20.2.300**

2 **NMAC – Reporting of Greenhouse Gas Emissions**

3
4 plain text = unchanged EPA rule language

5 underline = added by 20.2.300 NMAC (NMED-Musick Rebuttal Exhibit 1)

6 ~~strikeout~~ = deleted by 20.2.300 NMAC (NMED-Musick Rebuttal Exhibit 1)

7 *Note: This version of 40 CFR 98 Subpart P includes Technical Corrections*
8 *amendments as signed by the EPA Administrator on October 7, 2010. These EPA*
9 *amendments are incorporated as plain text, not underline/strikeout.*

10
11 **Subpart P – Hydrogen Production**

12
13 **§98.160 Definition of the source category.**

14 (a) A hydrogen production source category consists of facilities that produce
15 hydrogen gas for use onsite or sold as a product to other entities.

16 (b) This source category comprises process units that produce hydrogen by reforming,
17 gasification, oxidation, reaction, or other transformations of feedstocks.

18 (c) This source category includes merchant hydrogen production facilities located
19 within another facility if they are not owned by, or under the direct control of, the other
20 facility's owner and operator.

21
22 **§98.161 Reporting threshold.**

23 You must report GHG emissions under this subpart if your facility contains a hydrogen
24 production process and the facility meets the requirements of either §98.2(a)(1) or (a)(2).

25
26 **§98.162 GHGs to report.**

27 You must report:

28 (a) CO₂ emissions from each hydrogen production process unit.

29 (b) [Reserved]

1 (c) CO₂, CH₄, and N₂O emissions from each stationary combustion unit other than
 2 hydrogen production process units. You must calculate and report these emissions under
 3 subpart C of this part (General Stationary Fuel Combustion Sources) by following the
 4 requirements of subpart C.

5 (d) For CO₂ collected and transferred off site, you must follow the requirements of
 6 subpart PP of this part.

7 **§98.163 Calculating GHG emissions.**

8 You must calculate and report the annual CO₂ emissions from each hydrogen production
 9 process unit using the procedures specified in either paragraph (a) or (b) of this section.

10 (a) *Continuous Emissions Monitoring Systems (CEMS)*. Calculate and report under
 11 this subpart the CO₂ emissions by operating and maintaining CEMS according to the Tier
 12 4 Calculation Methodology specified in §98.33(a)(4) and all associated requirements for
 13 Tier 4 in subpart C of this part (General Stationary Fuel Combustion Sources).

14 (b) *Fuel and feedstock material balance approach*. Calculate and report CO₂
 15 emissions as the sum of the annual emissions associated with each fuel and feedstock
 16 used for hydrogen production by following paragraphs (b)(1) through (b)(3) of this
 17 section.

18 (1) *Gaseous fuel and feedstock*. You must calculate the annual CO₂ emissions
 19 from gaseous fuel and feedstock according to Equation P-1 of this section:

$$CO_2 = \left(\sum_{n=1}^k \frac{44}{12} * Fdstk_n * CC_n * \frac{MW}{MVC} \right) * 0.001 \quad (\text{Eq. P-1})$$

21
 22 Where:

23 CO₂ = Annual CO₂ emissions arising from fuel and feedstock consumption
 24 (metric tons/yr).

25 Fdstk_n = Volume of the gaseous fuel and feedstock used in month n (scf (at standard
 26 conditions of 68 °F and atmospheric pressure) of fuel and feedstock).

27 CC_n = Weighted Average carbon content of the gaseous fuel and feedstock,
 28 from the results of one or more analyses for month n for natural gas or from daily
 29 analysis for gaseous feedstocks other than natural gas (kg carbon per kg of fuel and
 30 feedstock).

- 1 MW = Molecular weight of the gaseous fuel and feedstock (kg/kg-mole).
- 2 MVC = Molar volume conversion factor (849.5 scf per kg-mole at standard
- 3 conditions).
- 4 k = Months in the year.
- 5 44/12 = Ratio of molecular weights, CO₂ to carbon.
- 6 0.001 = Conversion factor from kg to metric tons.

7

8 (2) *Liquid fuel and feedstock.* You must calculate the annual CO₂ emissions from
 9 liquid fuel and feedstock according to Equation P-2 of this section:

$$10 \quad CO_2 = \left(\sum_{n=1}^k \frac{44}{12} * Fdstk_n * CC_n \right) * 0.001 \quad \text{(Eq. P-2)}$$

11 Where:

- 12 CO₂ = Annual CO₂ emissions arising from fuel and feedstock consumption
- 13 (metric tons/yr).
- 14 Fdstk_n = Volume of the liquid fuel and feedstock used in month n (gallons of fuel
- 15 and feedstock).
- 16 CC_n = Weighted Average carbon content of the liquid fuel and feedstock, from
- 17 the results of ~~daily one or more~~ analyses for month n (kg carbon per gallon of fuel and
- 18 feedstock).
- 19 k = Months in the year.
- 20 44/12 = Ratio of molecular weights, CO₂ to carbon.
- 21 0.001 = Conversion factor from kg to metric tons.

22 (3) *Solid fuel and feedstock.* You must calculate the annual CO₂ emissions from
 23 solid fuel and feedstock according to Equation P-3 of this section:

$$24 \quad CO_2 = \sum_{n=1}^k \frac{44}{12} * (Fdstk_n * CC_n) * 0.001 \quad \text{(Eq.P-3)}$$

25 Where:

- 26 CO₂ = Annual CO₂ emissions from fuel and feedstock consumption in metric
- 27 tons per year ~~month~~ (metric tons/yr).
- 28 Fdstk_n = Mass of solid fuel and feedstock used in month n (kg of fuel and
- 29 feedstock).

1 CC_n = ~~Weighted Average~~ Average carbon content of the solid fuel and feedstock, from
 2 the results of ~~daily one or more~~ analyses for month n (kg carbon per kg of fuel and
 3 feedstock).
 4 k = Months in the year.
 5 $44/12$ = Ratio of molecular weights, CO_2 to carbon.
 6 0.001 = Conversion factor from kg to metric tons.

7
 8 (c) If GHG emissions from a hydrogen production process unit are vented through the
 9 same stack as any combustion unit or process equipment that reports CO_2 emissions
 10 using a CEMS that complies with the Tier 4 Calculation Methodology in subpart C of
 11 this part (General Stationary Fuel Combustion Sources), then the calculation
 12 methodology in paragraph (b) of this section shall not be used to calculate process
 13 emissions. The owner or operator shall report under this subpart the combined stack
 14 emissions according to the Tier 4 Calculation Methodology in §98.33(a)(4) and all
 15 associated requirements for Tier 4 in subpart C of this part (General Stationary Fuel
 16 Combustion Sources).

17
 18 **§98.164 Monitoring and QA/QC requirements.**

19 The GHG emissions data for hydrogen production process units must be quality-assured
 20 as specified in paragraphs (a) or (b) of this section, as appropriate for each process unit:

21 (a) If a CEMS is used to measure GHG emissions, then the facility must comply with
 22 the monitoring and QA/QC procedures specified in §98.34(c).

23 (b) If a CEMS is not used to measure GHG emissions, then you must: .

24 (1) Calibrate all oil and gas flow meters (except for gas billing meters), solids
 25 weighing equipment, and oil tank drop measurements (if used to determine liquid fuel
 26 and feedstock use volume) according to the calibration accuracy requirements in
 27 §98.3(i) of this part .

28 (2) Determine the carbon content and the molecular weight ~~monthly annually for~~
 29 ~~of standard gaseous hydrocarbon fuels and feedstocks having consistent composition~~
 30 (e.g., natural gas). For other gaseous fuels and feedstocks (e.g., biogas, refinery gas, or

1 | process gas), ~~daily~~ weekly sampling and analysis is required to determine the carbon
2 | content and molecular weight of the fuel and feedstock.

3 | (3) Determine the carbon content of fuel oil, naphtha, and other liquid fuels and
4 | feedstocks at least ~~monthly~~ daily, ~~except annually for standard liquid hydrocarbon~~
5 | ~~fuels and feedstocks having consistent composition, or upon delivery for liquid fuels~~
6 | ~~delivered by bulk transport (e.g., by truck or rail).~~

7 | (4) Determine the carbon content of coal, coke, and other solid fuels and
8 | feedstocks at least ~~monthly~~ daily ~~except annually for standard solid hydrocarbon fuels~~
9 | ~~and feedstocks having consistent composition, or upon delivery for solid fuels~~
10 | ~~delivered by bulk transport (e.g., by truck or rail).~~

11 | (5) You must use the following applicable methods to determine the carbon
12 | content for all fuels and feedstocks, and molecular weight of gaseous fuels and
13 | feedstocks.

14 | (i) ASTM D1945-03 Standard Test Method for Analysis of Natural Gas by Gas
15 | Chromatography (incorporated by reference, see §98.7).

16 | (ii) ASTM D1946-90 (Reapproved 2006), Standard Practice for Analysis of
17 | Reformed Gas by Gas Chromatography (incorporated by reference, see §98.7).

18 | (iii) ASTM D2013-07 Standard Practice of Preparing Coal Samples for
19 | Analysis (incorporated by reference, see §98.7).

20 | (iv) ASTM D2234/D2234M-07 Standard Practice for Collection of a Gross
21 | Sample of Coal (incorporated by reference, see §98.7).

22 | (v) ASTM D2597-94 (Reapproved 2004) Standard Test Method for Analysis of
23 | Demethanized Hydrocarbon Liquid Mixtures Containing Nitrogen and Carbon
24 | Dioxide by Gas Chromatography (incorporated by reference, see §98.7).

25 | (vi) ASTM D3176-89 (Reapproved 2002), Standard Practice for Ultimate
26 | Analysis of Coal and Coke (incorporated by reference, see §98.7).

27 | (vii) ASTM D3238-95 (Reapproved 2005), Standard Test Method for
28 | Calculation of Carbon Distribution and Structural Group Analysis of Petroleum
29 | Oils by the n-d-M Method (incorporated by reference, see §98.7).

30 | (viii) ASTM D4057-06 Standard Practice for Manual Sampling of Petroleum
31 | and Petroleum Products (incorporated by reference, see §98.7).

1 (ix) ASTM D4177-95 (Reapproved 2005) Standard Practice for Automatic
 2 Sampling of Petroleum and Petroleum Products (incorporated by reference, see
 3 §98.7).

4 (x) ASTM D5291-02 (Reapproved 2007), Standard Test Methods for
 5 Instrumental Determination of Carbon, Hydrogen, and Nitrogen in Petroleum
 6 Products and Lubricants (incorporated by reference, see §98.7).

7 (xi) ASTM D5373-08 Standard Test Methods for Instrumental Determination of
 8 Carbon, Hydrogen, and Nitrogen in Laboratory Samples of Coal (incorporated by
 9 reference, see §98.7).

10 (xii) ASTM D6609-08 Standard Guide for Part-Stream Sampling of Coal
 11 (incorporated by reference, see §98.7).

12 (xiii) ASTM D6883-04 Standard Practice for Manual Sampling of Stationary
 13 Coal from Railroad Cars, Barges, Trucks, or Stockpiles (incorporated by reference,
 14 see §98.7).

15 (xiv) ASTM D7430-08a e1 Standard Practice for Mechanical Sampling of Coal
 16 (incorporated by reference, see §98.7).

17 (xv) ASTM UOP539-97 Refinery Gas Analysis by Gas Chromatography
 18 (incorporated by reference, see §98.7).

19 (xvi) GPA 2261-00 Analysis for Natural Gas and Similar Gaseous Mixtures by
 20 Gas Chromatography (incorporated by reference, see §98.7).

21 (xvii) ISO 3170: Petroleum Liquids -- Manual sampling -- Third Edition
 22 (incorporated by reference, see §98.7).

23 (xviii) ISO 3171: Petroleum Liquids -- Automatic pipeline sampling -- Second
 24 Edition (incorporated by reference, see §98.7).

25 (c) For units using the calculation methodologies described in this section, the records
 26 required under §98.3(g) must include both the company records and a detailed
 27 explanation of how company records are used to estimate the following:

28 (1) Fuel and feedstock consumption, when solid fuel and feedstock is combusted
 29 and a CEMS is not used to measure GHG emissions.

30 (2) Fossil fuel consumption, when, pursuant to §98.33(e), the owner or operator of
 31 a unit that uses CEMS to quantify CO₂ emissions and that combusts both fossil and

1 biogenic fuels separately reports the biogenic portion of the total annual CO₂
2 emissions.

3 (3) Sorbent usage, if the methodology in §98.33(d) is used to calculate CO₂
4 emissions from sorbent.

5 (d) The owner or operator must document the procedures used to ensure the accuracy
6 of the estimates of fuel and feedstock usage and sorbent usage (as applicable) in
7 paragraph (b) of this section, including, but not limited to, calibration of weighing
8 equipment, fuel and feedstock flow meters, and other measurement devices. The
9 estimated accuracy of measurements made with these devices must also be recorded, and
10 the technical basis for these estimates must be provided.

11

12 **§98.165 Procedures for estimating missing data.**

13 A complete record of all measured parameters used in the GHG emissions calculations is
14 required. Therefore, whenever a quality-assured value of a required parameter is
15 unavailable (e.g., if a meter malfunctions during unit operation), a substitute data value
16 for the missing parameter must be used in the calculations as specified in paragraphs (a),
17 (b), and (c) of this section:

18 (a) For each missing value of the monthly fuel and feedstock consumption, the
19 substitute data value must be the best available estimate of the fuel and feedstock
20 consumption, based on all available process data (e.g., hydrogen production, electrical
21 load, and operating hours). You must document and keep records of the procedures used
22 for all such estimates.

23 (b) For each missing value of the carbon content or molecular weight of the fuel and
24 feedstock, the substitute data value must be the arithmetic average of the quality-assured
25 values of carbon contents or molecular weight of the fuel and feedstock immediately
26 preceding and immediately following the missing data incident. If no quality-assured data
27 on carbon contents or molecular weight of the fuel and feedstock are available prior to
28 the missing data incident, the substitute data value must be the first quality-assured value
29 for carbon contents or molecular weight of the fuel and feedstock obtained after the
30 missing data period. You must document and keep records of the procedures used for all
31 such estimates.

1 (c) For missing CEMS data, you must use the missing data procedures in §98.35.

2

3 **§98.166 Data reporting requirements.**

4 In addition to the information required by §98.3(c), each annual report must contain the
5 information specified in paragraphs (a) or (b) of this section, as appropriate, and
6 paragraphs (c) and (d) of this section:

7 (a) If a CEMS is used to measure CO₂ emissions, then you must report the relevant
8 information required under §98.36 for the Tier 4 Calculation Methodology and the
9 following information in this paragraph (a):

10 (1) Unit identification number and annual CO₂ emissions.

11 (2) Annual quantity of hydrogen produced (metric tons) for each process unit and
12 for all units combined.

13 (3) Annual quantity of ammonia produced (metric tons), if applicable, for each
14 process unit and for all units combined.

15 (b) If a CEMS is not used to measure CO₂ emissions, then you must report the
16 following information for each hydrogen production process unit:

17 (1) Unit identification number and annual CO₂ emissions

18 (2) Monthly consumption of each fuel and feedstock used for hydrogen production
19 and its type (scf of gaseous fuels and feedstocks, gallons of liquid fuels and
20 feedstocks, kg of solid fuels and feedstocks).

21 (3) Annual quantity of hydrogen produced (metric tons).

22 (4) Annual quantity of ammonia produced, if applicable (metric tons).

23 (5) Monthly or daily analyses of carbon content for each fuel and feedstock used in
24 hydrogen production (kg carbon/kg of gaseous and solid fuels and feedstocks, (kg
25 carbon per gallon of liquid fuels and feedstocks).

26 (6) Monthly or daily analyses of the molecular weight of gaseous fuels and
27 feedstocks (kg/kg-mole) used, if any.

28 (7) Amount of carbon in unconverted feedstock for which GHG emissions are
29 calculated and reported by your facility using other calculation methods provided in
30 this regulation. This would include, for example, carbon in waste diverted to a fuel

1 system or flare, where the CO₂ and CH₄ emissions are calculated and reported using
 2 other methods provided in 20.2.300 NMAC (metric tons CO₂e/year).

3 (c) Quantity of CO₂ collected and transferred off site in either gas, liquid, or solid
 4 forms, following the requirements of subpart PP of this part.

5 (d) Annual quantity of carbon other than CO₂ collected and transferred off site in
 6 either gas, liquid, or solid forms (kg carbon).

7

8 **§98.167 Records that must be retained.**

9 In addition to the information required by §98.3(g), you must retain the records specified
 10 in paragraphs (a) through (b) of this section for each hydrogen production facility.

11 (a) If a CEMS is used to measure CO₂ emissions, then you must retain under this
 12 subpart the records required for the Tier 4 Calculation Methodology in §98.37.

13 (b) If a CEMS is not used to measure CO₂ emissions, then you must retain records of
 14 all analyses and calculations conducted as listed in §§98.166(b), (c), and (d).

15

16 **§98.168 Definitions.**

17 All terms used in this subpart have the same meaning given in the Clean Air Act and
 18 subpart A of this part.