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14	This tool will assist in calculating the emissions generated from the combustion of various fuels (GHGs, inorganics, etc.) as required by the RC report process.
15	Step 1 - Enter:
16	the amounts of each fuel burned for the year in the tab titled "Step 1 - Fuels Burned".
17	Be sure to separate the amount of fuels used in the processing units from those used in central boilers or power plants.
18	Pay careful attention to the required input units. These input units may be different from your utility bills or you metering systems.
19	Enter the sulfur content for fuel oils and propane used in the tab titled "Step 1 - Fuels Burned".
20	Step 2 - Go to the tab titled "Step 2 - RC Report Values" This tab will have the GHGs emitted from the combustion of fuels.
21	If any other sources of these GHGs exist, they must be added to these data before entering it in the RC Database.
22	This tool does not capture other types of GHGs (i.e.. SF6, HFCs, and PFCs), only those from combusting fuels.
23	This tool does not yet capture GHGs from burned wastes (i.e. comparable fuels) or in process recovered fuels.
26	Assumptions/Explanations
27	All results on the Step 2 - RC Report Values tab are rounded to three decimal places.
28	The sulfur content must be expressed as a percent for fuel oils and not as a decimal (if the content is 1.5%, enter 1.5, not 0.15). Do not include the % symbol
29	GHGs are based upon 40 CFR Part 98 Tables C-1 & C-2
30	Inorganics, Metals, Carcinogens, NMVOC, and Other Organics are based upon AP-42 Emission Factors with the following caveats
31	-
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38	-

Instructions & Revision

	B
4	**Version**
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31	Contaminants based upon AP-42 only covers natural gas, fuel oils, and propane
32	NOx emissions are based on small boiler low NOx burner. See embedded AP-42 for your specific boiler/burner type
33	CO emissions are based on small boiler low NOx burner. See embedded AP-42 for your specific boiler/burner type
34	Metals emissions for No. 6 fuel oil are based upon combustion with no further emissions contols, if your fuel combustion device includes a flue gas emissions control device, the resulting emissions will be lower
35	Be & Se emissions are based upon the lower detection limit for those metals. Actual calculated emissions are lower.
36	The sum of the Other Organics as calculated by AP-42 are greater than the total VOCs as calculated by AP-42. The EF quality ratings for these other organics is E (poor). The
37	emissions have been normalized to ensure there total does not exceed the NMVOC calculation. These speciated emissions are visible in Tab 2 only if they are > 550 lbs/yr.
38	The NMVOC emission factors for the fuel oils and propane are estimated based upon the NMTOC factors

	C	D	E	H	I	J	K	L	M
4	**Description of Change**	**Date**	**Changed/Reviewed By**						
5	Updated emission factors to coincide with the latest revisions to tables c-1 & c-2 in 40 CFR 98.	6/25/14	Jeff Howard	Nataural Gas AP-42.pdf		Fuel Oil AP-42.pdf		Liquified Petroleum Gas AP-42.pdf	
6	Added Calcs to determine inorganics, metals, carcinogens, NMVOC, & Other Organics	8/7/14	Jeff Howard						
7	Made the following changes on tab "Step 2 - RC Report values": 1. Corrected formula in cell G4 2. Changed line 58 to read "Carbon Dioxide - Central Boilers & Power Plants"	8/12/14	Jeff Howard						
8	Minor Corrections to Instructions	9/12/14	Jeff Howard						
9	Embedded AP-42 Guidance in Instructions Tab	10/30/14	Jeff Howard						
10	Minor Corrections to Instructions	1/23/2015	Jeff Howard						
11	Revised comment in cell B4 of 'AP-42 Oil - Gas - Propane' tab to correctly reflect the value	1/11/2016	Jeff Howard						
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Step 1 - Fuels Burned

	A	B	C	D	E
1	**Fuel type**	**Units Required**	**Amount Burned in Central Boilers or Power Plants (Part III - Tab A)**	**Amount Burned in Process Equipment (Part III - Tab C)**	**Total Fuel Burned**
2	Coal and coke				
3	Lignite	US Tons	0	0	0
4	Mixed (Industrial sector)	US Tons	0	0	0
5	Natural gas				
6	(Weighted U.S. Average)	scf	100586000	150390000	250976000
7	Petroleum products				
8	Distillate Fuel Oil No. 1	gallons	0	0	0
9	Distillate Fuel Oil No. 2	gallons	0	0	0
10	Distillate Fuel Oil No. 4	gallons	0	0	0
11	Residual Fuel Oil No. 5	gallons	0	0	0
12	Residual Fuel Oil No. 6	gallons	0	0	0
13	Used Oil	gallons	0	0	0
14	Kerosene	gallons	0	0	0
15	Liquefied petroleum gases (LPG)[1]	gallons	0	0	0
16	Propane[1]	gallons	0	0	0
17	Propylene[2]	gallons	0	0	0
18	Ethane[1]	gallons	0	0	0
19	Ethanol	gallons	0	0	0
20	Ethylene[2]	gallons	0	0	0
21	Isobutane[1]	gallons	0	0	0
22	Isobutylene[1]	gallons	0	0	0
23	Butane[1]	gallons	0	0	0
24	Butylene[1]	gallons	0	0	0
25	Naphtha (<401 deg F)	gallons	0	0	0
26	Natural Gasoline	gallons	0	0	0
27	Other Oil (>401 deg F)	gallons	0	0	0
28	Pentanes Plus	gallons	0	0	0
29	Petrochemical Feedstocks	gallons	0	0	0
30	Petroleum Coke	gallons	0	0	0
31	Special Naphtha	gallons	0	0	0
32	Unfinished Oils	gallons	0	0	0
33	Heavy Gas Oils	gallons	0	0	0
34	Lubricants	gallons	0	0	0
35	Motor Gasoline	gallons	0	0	0
36	Aviation Gasoline	gallons	0	0	0
37	Kerosene-Type Jet Fuel	gallons	0	0	0
38	Asphalt and Road Oil	gallons	0	0	0
39	Crude Oil	gallons	0	0	0
40	Other fuels-gaseous				
41	Blast Furnace Gas	scf	0	0	0
42	Coke Oven Gas	scf	0	0	0
43	Propane Gas	scf	0	0	0
44	Fuel Gas[4]	scf	0	0	0
45	Biomass fuels-gaseous				
46	Landfill Gas	scf	0	0	0
47	Other Biomass Gases	scf	0	0	0
48	Biomass Fuels-Liquid				
49	Ethanol	gallons	0	0	0
50	Biodiesel (100%)	gallons	0	0	0
51	Rendered Animal Fat	gallons	0	0	0
52	Vegetable Oil	gallons	0	0	0
57	**Sulfur Content**				
58	**Fuel type**	**Sulfur Content**	**Units**		
59	Distillate Fuel Oil No. 1		%		
60	Distillate Fuel Oil No. 2	0.05	%		
61	Distillate Fuel Oil No. 4		%		
62	Residual Fuel Oil No. 5		%		
63	Residual Fuel Oil No. 6		%		
64	Propane[1]		gr/100 ft^3		
65					

Input the amounts of the fuels used in the appropriate location. **Pay careful attention to the required input units.** These input units may be different from your utility bills or you metering systems.

Separate the fuels used in the processing units from the fuels used in the central boilers.

If you did not use a particular fuel, just leave those cells blank.

If you used fuel oils, don't forget to enter the average sulfur content below.

Input the sulfur contents of any of the fuels to the left, if they were burned. The sulfer content in the fuel oils should be list as a percent. For example, if the sulfur content is 1.5%, enter 1.5 in the cell, not 0.015.

Cell: B59
Comment: JEFFERY HOWARD:
Enter the sulfur content as a percent not a decimal [Author:JEFFERY HOWARD],[Creator:xlCreatorCode]

Cell: B60
Comment: JEFFERY HOWARD:
Enter the sulfur content as a percent not a decimal [Author:JEFFERY HOWARD],[Creator:xlCreatorCode]

Cell: B61
Comment: JEFFERY HOWARD:
Enter the sulfur content as a percent not a decimal [Author:JEFFERY HOWARD],[Creator:xlCreatorCode]

Cell: B62
Comment: JEFFERY HOWARD:
Enter the sulfur content as a percent not a decimal [Author:JEFFERY HOWARD],[Creator:xlCreatorCode]

Cell: B63
Comment: JEFFERY HOWARD:
Enter the sulfur content as a percent not a decimal [Author:JEFFERY HOWARD],[Creator:xlCreatorCode]

Step 2 - RC Report Values

	A	B	F	G
1	**RC Report Parameters**			
2	Part II A2 - Greenhouse Gases (from combustion of fuels only)			
3		Parameter	Unit	Value
4	A2	Carbon Dioxide (CO2) - Process only	lbs/yr	18,000,000
5	A2	N2O	lbs/yr	56.8
6	A2	CH4	lbs/yr	568
7				
8				
10	**RC Report Parameters**			
11	Part II A3 - Inorganic Emissions (from combustion of fuels only)			
12		Parameter	Unit	Value
13	A3	Carbon Monoxide (CO)	lbs/yr	21100
14	A3	Ammonia (NH3)	lbs/yr	
15	A3	Nitrogen Oxides (NOx)	lbs/yr	25100
16	A3	Sulfur Oxides (SOx)	lbs/yr	151
17	A3	Chlorine (Cl & inorganic comp.)	lbs/yr	
18	A3	Cyanide (CN & inorganic comp.)	lbs/yr	
19	A3	Fluorine (F & inorganic comp.)	lbs/yr	
20				
22	**RC Report Parameters**			
23	Part II A4 - Metals Emissions (from combustion of fuels only)			
24		Parameter	Unit	Value
25	A4	Arsenic (As)	lbs/yr	0.05
26	A4	Beryllium (Be)	lbs/yr	0
27	A4	Cadmium (Cd)	lbs/yr	0.28
28	A4	Cobalt (Co)	lbs/yr	0.02
29	A4	Chromium (Cr)	lbs/yr	0.35
30	A4	Copper (Cu)	lbs/yr	0.21
31	A4	Mercury (Hg)	lbs/yr	0.07
32	A4	Nickel (Ni)	lbs/yr	0.53
33	A4	Lead (Pb)	lbs/yr	0.13
34	A4	Selenium (Se)	lbs/yr	0.01
35	A4	Zinc (Zn)	lbs/yr	7.28
37	**RC Report Parameters**			
38	Part II A5C. Carcinogenic organic substances (from combustion of fuels only)			
39		Parameter	Unit	Value
40	A5C	Benzene	lbs/yr	0.53
41	A5C	Formaldehyde	lbs/yr	18.8
42				
43	**RC Report Parameters**			
44	Part II A5D - Organic Emissions (from fuel combustion only)			
45		Parameter	Unit	Value
46	A5D	Non-Methane VOC - (NMVOC) total	lbs/yr	803
47	Other Organic Emissions > 550 lbs/yr (from fuel combustion only)			
48	A5D	Butane	lbs/yr	0
49	A5D	Ethane	lbs/yr	0
50	A5D	Hexane	lbs/yr	0
51	A5D	Pentane	lbs/yr	0
52	A5D	Propane	lbs/yr	0
53	A6	PM Total	lbs/yr	1910
55	**RC Report Parameters**			
56	Part III A - Direct CO2 Emissions in Central Boilers & Power Plants			
57		Parameter	Unit	Value
58	Mass or Volume of Fuel (Natual Gas, Light Oil, Heavy Oil, Propane Only)			
59	A	Heavy Oil	Barrels	0
60	A	Light Oil	Barrels	0
61	A	Natural Gas	1000 cu ft	101000
62	A	Others 2, Liquid (propane)	1000 gal	0
63	Energy from fuel (Natual Gas, Light Oil, Heavy Oil, Propane only)			
64	A	Heavy Oil	10^6 Btu (HHV)	0
65	A	Light Oil	10^6 Btu (HHV)	0
66	A	Natural Gas	10^6 Btu (HHV)	103000
67	A	Others 2, Liquid (propane)	10^6 Btu (HHV)	0
68	OCF of fuel 2) (Natual Gas, Light Oil, Heavy Oil, Propane only)			
69	A	Heavy Oil	tons (CO2)/10^6 Btu (HHV)	0.0815

These values are rounded to 3 significant digits. The raw data ca found on the "GHG Calculations"

The NOx value is based upon the AP-42 emission factor (EF) small boiler with a low NOx burner. You may need to chang to match your burner/boiler type (see "AP-42 Oil - Gas - Pro tab.

Benzene & formaldehyde are the only two that would be expected to have any appreciable value from the combustion of fuels.

The 'Other Organics' have been 'normalized' to ensure the sum of these do not exceed the AP-42 calculation for Total VOC less the CH4. Non-zero numbers will only appear in these cells if they are > 550 lbs.

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Step 2 - RC Report Values

	A	B	F	G	H	I	J	K	L	M	N
70	A	Light Oil	tons (CO2)/10^6 Btu (HHV)	0.0819							
71	A	Natural Gas	tons (CO2)/10^6 Btu (HHV)	0.0585							
72	A	Others 2, Liquid (propane)	tons (CO2)/10^6 Btu (HHV)	0.0693							
73	A	Carbon Dioxide (CO2) - Central Boilers & Power Plants	tons (CO2)	6030							
74											
75											
76											
77											
78											
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This value may be slightly different from the auto calculated value in the RC Database because of rounding.

Step 2 - RC Report Values

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GHG Calculations

	A	B	C	D	F	G	H	I
1	Process CO2 Calculations				Central Boiler CO2 Calculations			
2	Fuel Type	Units	Amounts Burned	CO2 (pounds)	Fuel Type	Units	Amounts Burned	CO2 (pounds)
3	Coal and coke				Coal and coke			
4	Lignite	US Tons	0	0	Lignite	US Tons	0	0
5	Mixed (Industrial sector)	US Tons	0	0	Mixed (Industrial sector)	US Tons	0	0
6	Natural gas				Natural gas			
7	(Weighted U.S. Average)	scf	150390000	18044512.6	(Weighted U.S. Average)	scf	100586000	12068790.11
8	Petroleum products				Petroleum products			
9	Distillate Fuel Oil No. 1	gallons	0	0	Distillate Fuel Oil No. 1	gallons	0	0
10	Distillate Fuel Oil No. 2	gallons	0	0	Distillate Fuel Oil No. 2	gallons	0	0
11	Distillate Fuel Oil No. 4	gallons	0	0	Distillate Fuel Oil No. 4	gallons	0	0
12	Residual Fuel Oil No. 5	gallons	0	0	Residual Fuel Oil No. 5	gallons	0	0
13	Residual Fuel Oil No. 6	gallons	0	0	Residual Fuel Oil No. 6	gallons	0	0
14	Used Oil	gallons	0	0	Used Oil	gallons	0	0
15	Kerosene	gallons	0	0	Kerosene	gallons	0	0
16	Liquefied petroleum gases (LPG)[1]	gallons	0	0	Liquefied petroleum gases (LPG)[1]	gallons	0	0
17	Propane[1]	gallons	0	0	Propane[1]	gallons	0	0
18	Propylene[2]	gallons	0	0	Propylene[2]	gallons	0	0
19	Ethane[1]	gallons	0	0	Ethane[1]	gallons	0	0
20	Ethanol	gallons	0	0	Ethanol	gallons	0	0
21	Ethylene[2]	gallons	0	0	Ethylene[2]	gallons	0	0
22	Isobutane[1]	gallons	0	0	Isobutane[1]	gallons	0	0
23	Isobutylene[1]	gallons	0	0	Isobutylene[1]	gallons	0	0
24	Butane[1]	gallons	0	0	Butane[1]	gallons	0	0
25	Butylene[1]	gallons	0	0	Butylene[1]	gallons	0	0
26	Naphtha (<401 deg F)	gallons	0	0	Naphtha (<401 deg F)	gallons	0	0
27	Natural Gasoline	gallons	0	0	Natural Gasoline	gallons	0	0
28	Other Oil (>401 deg F)	gallons	0	0	Other Oil (>401 deg F)	gallons	0	0
29	Pentanes Plus	gallons	0	0	Pentanes Plus	gallons	0	0
30	Petrochemical Feedstocks	gallons	0	0	Petrochemical Feedstocks	gallons	0	0
31	Petroleum Coke	gallons	0	0	Petroleum Coke	gallons	0	0
32	Special Naphtha	gallons	0	0	Special Naphtha	gallons	0	0
33	Unfinished Oils	gallons	0	0	Unfinished Oils	gallons	0	0
34	Heavy Gas Oils	gallons	0	0	Heavy Gas Oils	gallons	0	0
35	Lubricants	gallons	0	0	Lubricants	gallons	0	0
36	Motor Gasoline	gallons	0	0	Motor Gasoline	gallons	0	0
37	Aviation Gasoline	gallons	0	0	Aviation Gasoline	gallons	0	0
38	Kerosene-Type Jet Fuel	gallons	0	0	Kerosene-Type Jet Fuel	gallons	0	0
39	Asphalt and Road Oil	gallons	0	0	Asphalt and Road Oil	gallons	0	0
40	Crude Oil	gallons	0	0	Crude Oil	gallons	0	0
41	Other fuels-gaseous				Other fuels-gaseous			
42	Blast Furnace Gas	scf	0	0	Blast Furnace Gas	scf	0	0
43	Coke Oven Gas	scf	0	0	Coke Oven Gas	scf	0	0
44	Propane Gas	scf	0	0	Propane Gas	scf	0	0
45	Fuel Gas[4]	scf	0	0	Fuel Gas[4]	scf	0	0
46	Biomass fuels-solid				Biomass fuels-solid			
47	Biomass fuels-gaseous				Biomass fuels-gaseous			
48	Landfill Gas	scf	0	0	Landfill Gas	scf	0	0
49	Other Biomass Gases	scf	0	0	Other Biomass Gases	scf	0	0
50	Biomass Fuels-Liquid				Biomass Fuels-Liquid			
51	Ethanol	gallons	0	0	Ethanol	gallons	0	0
52	Biodiesel (100%)	gallons	0	0	Biodiesel (100%)	gallons	0	0
53	Rendered Animal Fat	gallons	0	0	Rendered Animal Fat	gallons	0	0
54	Vegetable Oil	gallons	0	0	Vegetable Oil	gallons	0	0
55	Total Process CO2 From Combustion of Fuels (pounds)			18044512.6	Total Central Boiler CO2 From Combustion of Fuels (tons)			6034.395056
58	N2O Calculations				CH4 Calculations			
59	Fuel Type	Units	Amounts Burned	N2O (pounds)	Fuel Type	Units	Amounts Burned	CH4 (pounds)
60	Coal and coke				Coal and coke			
61	Lignite	US Tons	0	0.00	Lignite	US Tons	0	0.00
62	Mixed (Industrial sector)	US Tons	0	0.00	Mixed (Industrial sector)	US Tons	0	0.00
63	Natural gas				Natural gas			
64	(Weighted U.S. Average)	scf	250976000	56.75	(Weighted U.S. Average)	scf	250976000	567.53
65	Petroleum products				Petroleum products			
66	Distillate Fuel Oil No. 1	gallons	0	0.00	Distillate Fuel Oil No. 1	gallons	0	0.00
67	Distillate Fuel Oil No. 2	gallons	0	0.00	Distillate Fuel Oil No. 2	gallons	0	0.00

GHG Calculations

	A	B	C	D	F	G	H	I
68	Distillate Fuel Oil No. 4	gallons	0	0.00	Distillate Fuel Oil No. 4	gallons	0	0.00
69	Residual Fuel Oil No. 5	gallons	0	0.00	Residual Fuel Oil No. 5	gallons	0	0.00
70	Residual Fuel Oil No. 6	gallons	0	0.00	Residual Fuel Oil No. 6	gallons	0	0.00
71	Used Oil	gallons	0	0.00	Used Oil	gallons	0	0.00
72	Kerosene	gallons	0	0.00	Kerosene	gallons	0	0.00
73	Liquefied petroleum gases (LPG)[1]	gallons	0	0.00	Liquefied petroleum gases (LPG)[1]	gallons	0	0.00
74	Propane[1]	gallons	0	0.00	Propane[1]	gallons	0	0.00
75	Propylene[2]	gallons	0	0.00	Propylene[2]	gallons	0	0.00
76	Ethane[1]	gallons	0	0.00	Ethane[1]	gallons	0	0.00
77	Ethanol	gallons	0	0.00	Ethanol	gallons	0	0.00
78	Ethylene[2]	gallons	0	0.00	Ethylene[2]	gallons	0	0.00
79	Isobutane[1]	gallons	0	0.00	Isobutane[1]	gallons	0	0.00
80	Isobutylene[1]	gallons	0	0.00	Isobutylene[1]	gallons	0	0.00
81	Butane[1]	gallons	0	0.00	Butane[1]	gallons	0	0.00
82	Butylene[1]	gallons	0	0.00	Butylene[1]	gallons	0	0.00
83	Naphtha (<401 deg F)	gallons	0	0.00	Naphtha (<401 deg F)	gallons	0	0.00
84	Natural Gasoline	gallons	0	0.00	Natural Gasoline	gallons	0	0.00
85	Other Oil (>401 deg F)	gallons	0	0.00	Other Oil (>401 deg F)	gallons	0	0.00
86	Pentanes Plus	gallons	0	0.00	Pentanes Plus	gallons	0	0.00
87	Petrochemical Feedstocks	gallons	0	0.00	Petrochemical Feedstocks	gallons	0	0.00
88	Petroleum Coke	gallons	0	0.00	Petroleum Coke	gallons	0	0.00
89	Special Naphtha	gallons	0	0.00	Special Naphtha	gallons	0	0.00
90	Unfinished Oils	gallons	0	0.00	Unfinished Oils	gallons	0	0.00
91	Heavy Gas Oils	gallons	0	0.00	Heavy Gas Oils	gallons	0	0.00
92	Lubricants	gallons	0	0.00	Lubricants	gallons	0	0.00
93	Motor Gasoline	gallons	0	0.00	Motor Gasoline	gallons	0	0.00
94	Aviation Gasoline	gallons	0	0.00	Aviation Gasoline	gallons	0	0.00
95	Kerosene-Type Jet Fuel	gallons	0	0.00	Kerosene-Type Jet Fuel	gallons	0	0.00
96	Asphalt and Road Oil	gallons	0	0.00	Asphalt and Road Oil	gallons	0	0.00
97	Crude Oil	gallons	0	0.00	Crude Oil	gallons	0	0.00
98	Other fuels-gaseous				Other fuels-gaseous			
99	Blast Furnace Gas	scf	0	0.00	Blast Furnace Gas	scf	0	0.00
100	Coke Oven Gas	scf	0	0.00	Coke Oven Gas	scf	0	0.00
101	Propane Gas	scf	0	0.00	Propane Gas	scf	0	0.00
102	Fuel Gas[4]	scf	0	0.00	Fuel Gas[4]	scf	0	0.00
103	Biomass fuels-gaseous				Biomass fuels-gaseous			
104	Landfill Gas	scf	0	0.00	Landfill Gas	scf	0	0.00
105	Other Biomass Gases	scf	0	0.00	Other Biomass Gases	scf	0	0.00
106	Biomass Fuels-Liquid				Biomass Fuels-Liquid			
107	Ethanol	gallons	0	0.00	Ethanol	gallons	0	0.00
108	Biodiesel (100%)	gallons	0	0.00	Biodiesel (100%)	gallons	0	0.00
109	Rendered Animal Fat	gallons	0	0.00	Rendered Animal Fat	gallons	0	0.00
110	Vegetable Oil	gallons	0	0.00	Vegetable Oil	gallons	0	0.00
111	Total N2O From Combustion of Fuels (pounds)			56.75330327	Total CH4 From Combustion of Fuels (pounds)			567.5330327
116	18051171.29							

PM Summary

	A	B
1	PM Source	lbs. PM
3	Combustion	1910
4	Catalyst Production	3132
5	LIB Production	61
6	Total	5103

NOx Summary

	A	B
1	NOx Source	lbs. NOx
3	Combustion	25100
4	Catalyst Production	1480
6	Total	26580

	A	B	C	D	E
1	**Table C-1 Data**			**Table C-2 Data**	
2	**Fuel type**	**Default high heat value**	**Default CO_2 emission factor**	**Default CH_4 emission factor**	**Default N_2O emission factor**
3	Coal and coke	mmBtu/short ton	kg CO_2/mmBtu	kg CH4/mmBtu	kg N2O/mmBtu
4	Lignite	14.21	97.72	1.10E-02	1.60E-03
5	Mixed (Industrial sector)	22.35	94.67	1.10E-02	1.60E-03
6	Natural gas	mmBtu/scf	kg CO_2/mmBtu	kg CH4/mmBtu	kg N2O/mmBtu
7	(Weighted U.S. Average)	1.026E-03	53.06	1.00E-03	1.00E-04
8	Petroleum products	mmBtu/gallon	kg CO_2/mmBtu	kg CH4/mmBtu	kg N2O/mmBtu
9	Distillate Fuel Oil No. 1	0.139	73.25	3.00E-03	6.00E-04
10	Distillate Fuel Oil No. 2	0.138	73.96	3.00E-03	6.00E-04
11	Distillate Fuel Oil No. 4	0.146	75.04	3.00E-03	6.00E-04
12	Residual Fuel Oil No. 5	0.14	72.93	3.00E-03	6.00E-04
13	Residual Fuel Oil No. 6	0.15	75.1	3.00E-03	6.00E-04
14	Used Oil	0.138	74	3.00E-03	6.00E-04
15	Kerosene	0.135	75.2	3.00E-03	6.00E-04
16	Liquefied petroleum gases (LPG)[1]	0.092	61.71	3.00E-03	6.00E-04
17	Propane[1]	0.091	62.87	3.00E-03	6.00E-04
18	Propylene[2]	0.091	67.77	3.00E-03	6.00E-04
19	Ethane[1]	0.068	59.6	3.00E-03	6.00E-04
20	Ethanol	0.084	68.44	3.00E-03	6.00E-04
21	Ethylene[2]	0.058	65.96	3.00E-03	6.00E-04
22	Isobutane[1]	0.099	64.94	3.00E-03	6.00E-04
23	Isobutylene[1]	0.103	68.86	3.00E-03	6.00E-04
24	Butane[1]	0.103	64.77	3.00E-03	6.00E-04
25	Butylene[1]	0.105	68.72	3.00E-03	6.00E-04
26	Naphtha (<401 deg F)	0.125	68.02	3.00E-03	6.00E-04
27	Natural Gasoline	0.11	66.88	3.00E-03	6.00E-04
28	Other Oil (>401 deg F)	0.139	76.22	3.00E-03	6.00E-04
29	Pentanes Plus	0.11	70.02	3.00E-03	6.00E-04
30	Petrochemical Feedstocks	0.125	71.02	3.00E-03	6.00E-04
31	Petroleum Coke	0.143	102.41	3.00E-03	6.00E-04
32	Special Naphtha	0.125	72.34	3.00E-03	6.00E-04
33	Unfinished Oils	0.139	74.54	3.00E-03	6.00E-04
34	Heavy Gas Oils	0.148	74.92	3.00E-03	6.00E-04
35	Lubricants	0.144	74.27	3.00E-03	6.00E-04
36	Motor Gasoline	0.125	70.22	3.00E-03	6.00E-04
37	Aviation Gasoline	0.12	69.25	3.00E-03	6.00E-04
38	Kerosene-Type Jet Fuel	0.135	72.22	3.00E-03	6.00E-04
39	Asphalt and Road Oil	0.158	75.36	3.00E-03	6.00E-04
40	Crude Oil	0.138	74.54	3.00E-03	6.00E-04
41	Other fuels-gaseous	mmBtu/scf	kg CO_2/mmBtu	kg CH4/mmBtu	kg N2O/mmBtu
42	Blast Furnace Gas	9.200E-05	274.32	2.20E-05	1.00E-04
43	Coke Oven Gas	5.990E-04	46.85	4.80E-04	1.00E-04
44	Propane Gas	2.516E-03	61.46	3.00E-03	6.00E-04
45	Fuel Gas[4]	1.388E-03	59	3.00E-03	6.00E-04
46	Biomass fuels-gaseous	mmBtu/scf	kg CO_2/mmBtu	kg CH4/mmBtu	kg N2O/mmBtu
47	Landfill Gas	4.850E-04	52.07	3.20E-03	6.30E-04
48	Other Biomass Gases	6.550E-04	52.07	3.20E-03	6.30E-04
49	Biomass Fuels-Liquid	mmBtu/gallon	kg CO_2/mmBtu	kg CH4/mmBtu	kg N2O/mmBtu
50	Ethanol	0.084	68.44	1.10E-03	1.10E-04
51	Biodiesel (100%)	0.128	73.84	1.10E-03	1.10E-04
52	Rendered Animal Fat	0.125	71.06	1.10E-03	1.10E-04
53	Vegetable Oil	0.12	81.55	1.10E-03	1.10E-04

	A	B	C	D	E	F	G
1	**AP-42 Emission Factors (Natural Gas, Fuel Oil, & Propane only)**						
2	**Fuel type**	**Default NOx emission factor**	**Default CO emission factor**	**Default Pb emission factor**	**Default PM emission factor**	**Default SOx emission factor**	**Default VOC emission factor**
3	Natural gas	(lb/10^6 scf)	(lb/10^6 scf)	(lb/10^6 scf)	(lb/10^6 scf)	(lb/10^6 scf)	(lb/10^6 scf)
4	(Weighted U.S. Average)	100	84	5.00E-04	7.6	0.6	5.5
5	Petroleum products	(lb/10^3 gallons)	(lb/10^3 gallons)	(lb/10^3 gallons)	(lb/10^3 gallons)	(lb/10^3 gallons)	(lb/10^3 gallons)
6	Distillate Fuel Oil No. 1	20	5		3.3	0	0.252
7	Distillate Fuel Oil No. 2	20	5		3.3	7.2	0.252
8	Distillate Fuel Oil No. 4	20	5		8.5	0	0.252
9	Residual Fuel Oil No. 5	55	5		11.5	0	1.28
10	Residual Fuel Oil No. 6	55	5	1.51E-03	3.22	0	1.28
11	Propane[1]	13	7.5		0.7	0	1
12							
13	**Fuel type**	**Default As emission factor**	**Default Ba emission factor**	**Default Be emission factor**	**Default Cd emission factor**	**Default Cr emission factor**	**Default Co emission factor**
14	Natural gas	(lb/10^6 scf)	(lb/10^6 scf)	(lb/10^6 scf)	(lb/10^6 scf)	(lb/10^6 scf)	(lb/10^6 scf)
15	(Weighted U.S. Average)	2.00E-04	4.40E-03	1.20E-05	1.10E-03	1.40E-03	8.40E-05
16	Petroleum products	(lb/10^3 gallons)	(lb/10^3 gallons)	(lb/10^3 gallons)	(lb/10^3 gallons)	(lb/10^3 gallons)	(lb/10^3 gallons)
17	Distillate Fuel Oil No. 1						
18	Distillate Fuel Oil No. 2						
19	Distillate Fuel Oil No. 4						
20	Residual Fuel Oil No. 5						
21	Residual Fuel Oil No. 6	1.32E-03	2.57E-03	2.78E-05	3.98E-04	8.45E-04	6.02E-03
22	Propane[1]						
23							
24	**Fuel type**	**Default Mn emission factor**	**Default Hg emission factor**	**Default Mo emission factor**	**Default Ni emission factor**	**Default Se emission factor**	**Default Va emission factor**
25	Natural gas	(lb/10^6 scf)	(lb/10^6 scf)	(lb/10^6 scf)	(lb/10^6 scf)	(lb/10^6 scf)	(lb/10^6 scf)
26	(Weighted U.S. Average)	3.80E-04	2.60E-04	1.10E-03	2.10E-03	2.40E-05	2.30E-03
27	Petroleum products	(lb/10^3 gallons)	(lb/10^3 gallons)	(lb/10^3 gallons)	(lb/10^3 gallons)	(lb/10^3 gallons)	(lb/10^3 gallons)
28	Distillate Fuel Oil No. 1						
29	Distillate Fuel Oil No. 2						
30	Distillate Fuel Oil No. 4						
31	Residual Fuel Oil No. 5						
32	Residual Fuel Oil No. 6	3.00E-03	1.13E-04	7.87E-04	8.45E-02	6.83E-04	3.18E-02
33	Propane[1]						
34							
35	**Fuel type**	**Default Butane emission factor**	**Default Ethane emission factor**	**Default Hexane emission factor**	**Default Pentane emission factor**	**Default Propane emission factor**	**Default Formaldehyde emission factor**
36	Natural gas	(lb/10^6 scf)	(lb/10^6 scf)	(lb/10^6 scf)	(lb/10^6 scf)	(lb/10^6 scf)	(lb/10^6 scf)
37	(Weighted U.S. Average)	2.10E+00	3.10E+00	1.80E+00	2.60E+00	1.60E+00	7.50E-02
38	Petroleum products	(lb/10^3 gallons)	(lb/10^3 gallons)	(lb/10^3 gallons)	(lb/10^3 gallons)	(lb/10^3 gallons)	(lb/10^3 gallons)
39	Distillate Fuel Oil No. 1						3.30E-02
40	Distillate Fuel Oil No. 2						3.30E-02
41	Distillate Fuel Oil No. 4						3.30E-02
42	Residual Fuel Oil No. 5						3.30E-02
43	Residual Fuel Oil No. 6						3.30E-02
44	Propane[1]						

	H
1	
2	**Default CH_4 emission factor**
3	($lb/10^6$ scf)
4	2.3
5	($lb/10^3$ gallons)
6	0.052
7	0.052
8	0.052
9	1
10	1
11	0.2
12	
13	**Default Cu emission factor**
14	($lb/10^6$ scf)
15	8.50E-04
16	($lb/10^3$ gallons)
17	
18	
19	
20	
21	1.76E-03
22	
23	
24	**Default Zn emission factor**
25	($lb/10^6$ scf)
26	2.90E-02
27	($lb/10^3$ gallons)
28	
29	
30	
31	
32	2.91E-02
33	
34	
35	**Default Benzene emission factor**
36	($lb/10^6$ scf)
37	2.10E-03
38	($lb/10^3$ gallons)
39	
40	
41	2.14E-04
42	2.14E-04
43	2.14E-04
44	

Cell: B4
Comment: JEFFERY HOWARD:
Based on small boiler uncontrolled NOx. See embedded AP-42 for your specific boiler/burner type [Author:JEFFERY HOWARD],[Creator:xlCreatorCode]

Cell: C4
Comment: JEFFERY HOWARD:
Based on small boiler low NOx burner. See embedded AP-42 for your specific boiler/burner type [Author:JEFFERY HOWARD],[Creator:xlCreatorCode]

Cell: D10
Comment: JEFFERY HOWARD:
Based upon uncontrolled combustion. [Author:JEFFERY HOWARD],[Creator:xlCreatorCode]

Cell: A11
Comment: JEFFERY HOWARD:
Based on industrial boiler. See embedded AP-42 for your specific boiler type [Author:JEFFERY HOWARD],[Creator:xlCreatorCode]

Cell: D15
Comment: JEFFERY HOWARD:
The actual value is <1.2E-05 [Author:JEFFERY HOWARD],[Creator:xlCreatorCode]

Cell: B21
Comment: JEFFERY HOWARD:
Based upon uncontrolled combustion. [Author:JEFFERY HOWARD],[Creator:xlCreatorCode]

Cell: C21
Comment: JEFFERY HOWARD:
Based upon uncontrolled combustion. [Author:JEFFERY HOWARD],[Creator:xlCreatorCode]

Cell: D21
Comment: JEFFERY HOWARD:
Based upon uncontrolled combustion. [Author:JEFFERY HOWARD],[Creator:xlCreatorCode]

Cell: E21
Comment: JEFFERY HOWARD:
Based upon uncontrolled combustion. [Author:JEFFERY HOWARD],[Creator:xlCreatorCode]

Cell: F21
Comment: JEFFERY HOWARD:
Based upon uncontrolled combustion. [Author:JEFFERY HOWARD],[Creator:xlCreatorCode]

Cell: G21
Comment: JEFFERY HOWARD:
Based upon uncontrolled combustion. [Author:JEFFERY HOWARD],[Creator:xlCreatorCode]

Cell: H21
Comment: JEFFERY HOWARD:
Based upon uncontrolled combustion. [Author:JEFFERY HOWARD],[Creator:xlCreatorCode]

Cell: F26
Comment: JEFFERY HOWARD:
The actual value is <2.4E-05
[Author:JEFFERY HOWARD],[Creator:xlCreatorCode]

Cell: B32
Comment: JEFFERY HOWARD:
Based upon uncontrolled combustion. [Author:JEFFERY HOWARD],[Creator:xlCreatorCode]

Cell: C32
Comment: JEFFERY HOWARD:
Based upon uncontrolled combustion. [Author:JEFFERY HOWARD],[Creator:xlCreatorCode]

Cell: D32
Comment: JEFFERY HOWARD:

Based upon uncontrolled combustion. [Author:JEFFERY HOWARD],[Creator:xlCreatorCode]

Cell: E32
Comment: JEFFERY HOWARD:
Based upon uncontrolled combustion. [Author:JEFFERY HOWARD],[Creator:xlCreatorCode]

Cell: F32
Comment: JEFFERY HOWARD:
Based upon uncontrolled combustion. [Author:JEFFERY HOWARD],[Creator:xlCreatorCode]

Cell: G32
Comment: JEFFERY HOWARD:
Based upon uncontrolled combustion. [Author:JEFFERY HOWARD],[Creator:xlCreatorCode]

Cell: H32
Comment: JEFFERY HOWARD:
Based upon uncontrolled combustion. [Author:JEFFERY HOWARD],[Creator:xlCreatorCode]

AP-42 Calcs Calcs

	A	B	C	D	E	F	G	H	I	J	K	L
1	Inorganic & Metals											
2	Fuel Type	Units	Amounts Burned	**NOx (pounds)**	**CO (pounds)**	**Pb (pounds)**	**PM (pounds)**	**SOx (pounds)**	**NMVOC (pounds)**	**CH4 (pounds)**		
3	Natural gas											
4	(Weighted U.S. Average)	scf	250976000	25097.6	21081.984	0.125488	1907.4176	150.5856	803.1232	577.2448		
5	Petroleum products											
6	Distillate Fuel Oil No. 1	gallons	0	0	0	0	0	0	0	0		
7	Distillate Fuel Oil No. 2	gallons	0	0	0	0	0	0	0	0		
8	Distillate Fuel Oil No. 4	gallons	0	0	0	0	0	0	0	0		
9	Residual Fuel Oil No. 5	gallons	0	0	0	0	0	0	0	0		
10	Residual Fuel Oil No. 6	gallons	0	0	0	0	0	0	0	0		
11	Propane[1]	gallons	0	0	0	0	0	0	0	0		
12	Totals	Pounds		25097.6	21081.984	0.125488	1907.4176	150.5856	803.1232	577.2448		
14	Inorganic & Metals											
15	Fuel Type	Units	Amounts Burned	**As (pounds)**	**Ba (pounds)**	**Be (pounds)**	**Cd (pounds)**	**Cr (pounds)**	**Co (pounds)**	**Cu (pounds)**		
16	Natural gas											
17	(Weighted U.S. Average)	scf	250976000	0.0501952	1.1042944	0.003011712	0.2760736	0.3513664	0.021081984	0.2133296		
18	Petroleum products											
19	Distillate Fuel Oil No. 1	gallons	0									
20	Distillate Fuel Oil No. 2	gallons	0									
21	Distillate Fuel Oil No. 4	gallons	0									
22	Residual Fuel Oil No. 5	gallons	0									
23	Residual Fuel Oil No. 6	gallons	0	0	0	0	0	0	0	0		
24	Propane[1]	gallons	0									
25	Totals	Pounds		0.0501952	1.1042944	0.003011712	0.2760736	0.3513664	0.021081984	0.2133296		
27	Inorganic & Metals											
28	Fuel Type	Units	Amounts Burned	**Mn (pounds)**	**Hg (pounds)**	**Mo (pounds)**	**Ni (pounds)**	**Se (pounds)**	**Va (pounds)**	**Zn (pounds)**		
29	Natural gas											
30	(Weighted U.S. Average)	scf	250976000	0.09537088	0.06525376	0.2760736	0.5270496	0.006023424	0.5772448	7.278304		
31	Petroleum products											
32	Distillate Fuel Oil No. 1	gallons	0									
33	Distillate Fuel Oil No. 2	gallons	0									
34	Distillate Fuel Oil No. 4	gallons	0									
35	Residual Fuel Oil No. 5	gallons	0									
36	Residual Fuel Oil No. 6	gallons	0	0	0	0	0	0	0	0		
37	Propane[1]	gallons	0									
38	Totals	Pounds		0.09537088	0.06525376	0.2760736	0.5270496	0.006023424	0.5772448	7.278304		
40	Speciated Carcinogenics & Other .Organics											
41	Fuel Type	Units	Amounts Burned	**Butane (pounds)**	**Ethane (pounds)**	**Hexane (pounds)**	**Pentane (pounds)**	**Propane (pounds)**	**Formaldehyde (pounds)**	**Benzene (pounds)**		
42	Natural gas											
43	(Weighted U.S. Average)	scf	250976000	150.5856	222.2930286	129.0733714	186.4393143	114.7318857	18.8232	0.5270496	803.1232	
44	Petroleum products											
45	Distillate Fuel Oil No. 1	gallons	0						0			
46	Distillate Fuel Oil No. 2	gallons	0						0			
47	Distillate Fuel Oil No. 4	gallons	0						0	0		
48	Residual Fuel Oil No. 5	gallons	0						0	0		
49	Residual Fuel Oil No. 6	gallons	0						0	0		
50	Propane[1]	gallons	0									
51	Totals	Pounds		150.5856	222.2930286	129.0733714	186.4393143	114.7318857	18.8232	0.5270496		
55	Fuel Type	Units	Amounts Burned	**Butane (pounds)**	**Ethane (pounds)**	**Hexane (pounds)**	**Pentane (pounds)**	**Propane (pounds)**	**Formaldehyde (pounds)**	**Benzene (pounds)**	**Total Speciated NMVOC AP-42**	**NMVOC Ratio**
56	Natural gas											
57	(Weighted U.S. Average)	scf	250976000	527.0496	778.0256	451.7568	652.5376	401.5616	18.8232	0.5270496	2810.9312	0.285714286
58	Petroleum products											
59	Distillate Fuel Oil No. 1	gallons	0						0			
60	Distillate Fuel Oil No. 2	gallons	0						0			
61	Distillate Fuel Oil No. 4	gallons	0						0	0		
62	Residual Fuel Oil No. 5	gallons	0						0	0		
63	Residual Fuel Oil No. 6	gallons	0						0	0		
64	Propane[1]	gallons	0									
65	Totals	Pounds		527.0496	778.0256	451.7568	652.5376	401.5616	18.8232	0.5270496		