

Calculating a tradable unit allowance beginning in 2013

Formula A applies to an existing mercury budget unit

$$\text{Tradable units per year} = A \times B \times C \times D \times E$$

When:

- A = Net megawatt-hour rating of mercury budget unit (MWh)
- B = 8760 hours per year (maximum operating hours in one year)
- C = 1 Gigawatt/1000 Megawatt (units conversion constant)
- D = 16 ounces/1 pound (units conversion constant)
- E = Emission rate of 0.0080 in pounds of mercury per gigawatt-hour net electrical output (lb/GWh)

Formula B applies to a new mercury budget unit

$$\text{Tradable units per year} = A \times B \times C \times D \times F$$

When:

- A = Net megawatt-hour rating of mercury budget unit from fuel based on coal or from a burner designed to run on coal or coal-derived fuel (MWh)
- B = 8760 hours per year (maximum operating hours in one year)
- C = 1 Gigawatt/1000 Megawatt (units conversion constant)
- D = 16 ounces/1 pound (units conversion constant)
- F = The lesser emission rate of Best Available Control Technology established in the air quality permit and expressed in pounds of mercury per gigawatt-hour net electrical output or 0.0066 pounds of mercury per gigawatt-hour (lb/GWh)

1st Plant –operating in 2007

Assume this is the oldest existing power plant with 2 units each rated at 702 MW. Use Formula A to calculate the tradable units for each unit.

$$\begin{array}{ccccccccccccccc}
 \mathbf{A} & & \mathbf{x} & & \mathbf{B} & & \mathbf{x} & & \mathbf{C} & & \mathbf{x} & & \mathbf{D} & & \mathbf{x} & & \mathbf{E} & & = & & \mathbf{Tradable} \\
 \downarrow & & & & & \mathbf{units} \\
 702 & \text{MW} & \times & 8760 & \frac{\text{hour}}{\text{year}} & \times & \frac{1}{1000} & \frac{\text{GW}}{\text{MW}} & \times & \frac{16}{1} & \frac{\text{ounces}}{\text{Pound}} & \times & 0.008 & \frac{\text{pound}}{\text{GW-h}} & = & 787 & \frac{\text{ounces}}{\text{year}} & & & &
 \end{array}$$

In this example, each unit would get 787 tradable units per year for a total of 1574 tradable units for the plant.

- If the available tradable units are 2496, subtracting 1574 from this number leaves 922 tradable units available for use by subsequent plants.
- If the available tradable units are 2240, subtracting 1574 from this number leaves 666 tradable units available for use by subsequent plants.

The tradable units would be transferred to the tradable unit account for the existing plant by December 1, 2012.

2nd Plant – based on a permit issued after January 1, 2007

Assume this is a 680 MW rated power plant with 1 unit that got its permit in 2008. Use Formula B to calculate the tradable units.

- Example using $F = 0.0066$

$$\begin{array}{cccccccccccccc}
 \text{A} & & \text{x} & \text{B} & & \text{x} & \text{C} & & \text{x} & \text{D} & & \text{x} & \text{F} & & = & & \text{Tradable} \\
 \downarrow & & & & \text{units} \\
 680 & \text{MW} & \text{x} & 8760 & \frac{\text{hour}}{\text{year}} & \text{x} & \frac{1}{1000} & \frac{\text{GW}}{\text{MW}} & \text{x} & \frac{16}{1} & \frac{\text{ounces}}{\text{Pound}} & \text{x} & 0.0066 & \frac{\text{pound}}{\text{GW-h}} & = & 629 & \frac{\text{ounces}}{\text{year}}
 \end{array}$$

In this example, the one unit would be eligible for 629 tradable units per year.

- If there are 922 available tradable units, subtracting 629 from this number leaves 293 tradable units available for use by subsequent plants.
- If there are 666 available tradable units, subtracting 629 from this number leaves 37 tradable units available for use by subsequent plants.

- Example using $F = 0.005$ based on a hypothetical BACT determination

$$\begin{array}{cccccccccccccc}
 \text{A} & & \text{x} & \text{B} & & \text{x} & \text{C} & & \text{x} & \text{D} & & \text{x} & \text{F} & & = & & \text{Tradable} \\
 \downarrow & & & & \text{units} \\
 680 & \text{MW} & \text{x} & 8760 & \frac{\text{hour}}{\text{year}} & \text{x} & \frac{1}{1000} & \frac{\text{GW}}{\text{MW}} & \text{x} & \frac{16}{1} & \frac{\text{ounces}}{\text{Pound}} & \text{x} & 0.0055 & \frac{\text{pound}}{\text{GW-h}} & = & 524 & \frac{\text{ounces}}{\text{year}}
 \end{array}$$

In this example, the one unit would be eligible for 524 tradable units per year.

- If there are 922 available tradable units, subtracting 524 from this number leaves 398 tradable units available for use by subsequent plants.
- If there are 666 available tradable units, subtracting 524 from this number leaves 142 tradable units available for use by subsequent plants.

The tradable units would be reserved for the plant starting on the date its air permit was issued. The tradable units would be transferred to the plant’s tradable unit account after it was operating.

3rd Plant – based on a permit issued after January 1, 2007

Assume this is a 670 MW rated power plant with 2 units that got its permit in 2009. Use Formula B to calculate the tradable units.

- Example using $F = 0.0066$

$$\begin{array}{cccccccccccccc}
 \text{A} & & \text{x} & \text{B} & & \text{x} & \text{C} & & \text{x} & \text{D} & & \text{x} & \text{F} & & = & & \text{Tradable} \\
 \downarrow & & & & \text{units} \\
 335 & \text{MW} & \text{x} & 8760 & \frac{\text{hour}}{\text{year}} & \text{x} & \frac{1}{1000} & \frac{\text{GW}}{\text{MW}} & \text{x} & \frac{16}{1} & \frac{\text{ounces}}{\text{Pound}} & \text{x} & 0.0066 & \frac{\text{pound}}{\text{GW-h}} & = & 310 & \frac{\text{ounces}}{\text{year}}
 \end{array}$$

In this example, each unit would be eligible for 310 tradable units per year for a total of 620 tradable units for the plant.

If the lb/GW-h rate used in the calculation for the 2nd plant is = 0.0066, then:

- If there are 293 available tradable units, then the plant would receive this amount even though it is eligible for 620. The plant must decide if this amount is sufficient to operate, and whether the number is to be divided between the 2 units or allocated to one. The plant could negotiate with either or both of the operating plants for additional tradable units.
- If there are 37 available tradable units, then the plant would receive this amount even though it is eligible for 620. The same scenario applies as in the previous bullet.

- Example using $F = 0.0055$ based on a hypothetical BACT determination

$$\begin{array}{cccccccccccccc}
 \text{A} & & \text{x} & \text{B} & & \text{x} & \text{C} & & \text{x} & \text{D} & & \text{x} & \text{F} & & = & & \text{Tradable} \\
 \downarrow & & & & \text{units} \\
 335 & \text{MW} & \text{x} & 8760 & \frac{\text{hour}}{\text{year}} & \text{x} & \frac{1}{1000} & \frac{\text{GW}}{\text{MW}} & \text{x} & \frac{16}{1} & \frac{\text{ounces}}{\text{Pound}} & \text{x} & 0.0055 & \frac{\text{pound}}{\text{GW-h}} & = & 235 & \frac{\text{ounces}}{\text{year}}
 \end{array}$$

In this example, each unit would be eligible for 235 tradable units per year for a total of 470 tradable units for the plant.

If the lb/GW-h rate used in the calculation for the 2nd plant is = 0.0055, then:

- If there are 398 available tradable units, then the plant would receive this amount even though it is eligible for 470. The plant must decide if this amount is sufficient to operate, and whether the number is to be divided between the 2 units or allocated to one. The plant could negotiate with either or both of the operating plants for additional tradable units.
- If there are 142 available tradable units, then the plant would receive this amount even though it is eligible for 470. The same scenario applies as in the previous bullet.

Appendix 3 – Calculating a tradable unit allowance

Available units	Tradable Units		Emission rate
	High	Low	
	2496	2240	
Plant 1	1574	1574	E = 0.008
Plant 2	629	629	F = 0.0066
Plant 3	293	37	F = 0.0066

Available units	Tradable Units		Emission rate
	2496	2240	
Plant 1	1574	1574	E = 0.008
Plant 2	524	524	F = 0.0055
Plant 3	398	142	F = 0.005