

## Calculating Progress Toward Meeting the Goals

### **Normalization**

Production normalization is calculated using matching factors from baseline and current year worksheets. If multiple normalizing factors are submitted, normalization is calculated for each factor and the factor producing the most favorable results is selected. Production normalization is applied to each goal that requires a calculation of a net change in the goal quantity (e.g., waste generated or water consumed) from the baseline year to the current year as follows:

$$[G_{cy}/P_{cy} - G_{bas}/P_{bas}] / [G_{bas}/P_{bas}] * 100$$

Where

- $G_{cy}$  = Goal quantity for the current year
- $P_{cy}$  = Production for the current year
- $G_{bas}$  = Goal quantity for the baseline year
- $P_{bas}$  = Production for the baseline year

If production units are dollars, the current year production is adjusted to baseline year dollars as follows:

$$[G_{cy}/(P_{cy}-I) - G_{bas}/P_{bas}] / [G_{bas}/P_{bas}] * 100$$

Where

- $I$  = the cumulative inflation rate (Producers Price Index) for the time period from the baseline to the current year and  $P_{cy}$ .

### **50% Water Reduction**

This goal is calculated as follows:

$$[W_{cy}/(P_{cy}-I) - W_{bas} /P_{bas}] / [W_{bas}/P_{bas}] * 100 = G1$$

$$G1_p = G1/-50$$

Where

- $G1$  = the production normalized percentage change in water consumption, adjusted for inflation. If greater than -50, the goal has not been achieved.
- $G1_p$  = The percentage of Goal 1 achieved.
- $W_{cy}$  = Water consumption for the current year
- $W_{bas}$  = Water consumption for the baseline year
- $I$  = the cumulative inflation rate (Producers Price Index) for the time period from the baseline to the current year and  $P_{cy}$ .  $I$  = zero if units for production normalization are not dollars.

### **25% Energy Reduction**

Energy quantities entered on the worksheet are converted to BTUs with the following equivalencies:

- Fuel Oil (gal) = 140,000 BTU
- KWHr = 3412 BTU
- Therm = 100,000 BTU

The goal is calculated as follows:

$$[E_{cy}/(P_{cy}-I) - E_{bas} /P_{bas}] / [E_{bas}/P_{bas}] * 100 = G2$$

$$G2_p = G2/-25$$

Where

- G2 = The production normalized percentage change in energy use, adjusted for inflation. If greater than -25, the goal has not been achieved.
- G2<sub>p</sub> = The percentage of Goal 2 achieved.
- E<sub>cy</sub> = Sum of all energy usage listed for the current year, converted to BTUs
- E<sub>bas</sub> = Sum of all energy usage listed for the baseline year, converted to BTUs
- I = the cumulative inflation rate (Producers Price Index) for the time period from the baseline to the current year and P<sub>cy</sub>. I = zero if units for production normalization are not dollars.

### **90% Reduction In Organics**

This goal is calculated as follows:

$$[O_{cy}/(P_{cy}-I) - O_{bas} /P_{bas}] / [O_{bas}/P_{bas}] * 100 = G3$$

$$G3_p = G3/-90$$

Where

- G3 = The production normalized percentage change in organics emissions, adjusted for inflation. If greater than -90, the goal has not been achieved.
- G3<sub>p</sub> = The percentage of Goal 3 achieved.
- O<sub>cy</sub> = The sum of all organics emissions entered in part V for the current year.
- O<sub>bas</sub> = The sum of all organics emissions entered in part V for the baseline year.
- I = the cumulative inflation rate (Producers Price Index) for the time period from the baseline to the current year and P<sub>cy</sub>. I = zero if units for production normalization are not dollars.

### **50% Reduction In Land Disposal of Sludge**

The goal is calculated as follows:

$$[(S_{cy} * (100 - WC_{cy})) / (P_{cy} - I) - ((S_{bas} * (100 - WC_{bas})) / P_{bas}) / [S_{bas} / P_{bas}]] * 100 = G4$$

$$G4_p = G4 / -50$$

Where

- G4 = The production normalized percentage change in sludge shipped offsite for land disposal. If greater than -50, the goal has not been achieved.
- G4<sub>p</sub> = The percentage of Goal 4 achieved.
- S<sub>cy</sub> = Amount of sludge shipped offsite during the current year.
- S<sub>bas</sub> = Amount of sludge shipped offsite during the baseline year.
- WC<sub>cy</sub> = The percent water content average for the current year
- WC<sub>bas</sub> = The percent water content average for the baseline year.
- I = the cumulative inflation rate (Producers Price Index) for the time period from the baseline to the current year and P<sub>cy</sub>. I = zero if units for production normalization are not dollars.

### **98% Metals Utilization**

There are two methods for calculating progress toward this goal. The method which produces the highest results is selected.

#### Method 1-Land-disposing less than 2% of metals Used

All data are collected from the current year and no comparison to a baseline is made and no accounting for inflation is necessary. The Goal is calculated as follows:

$$[(MP - MR) / MP] * 100 = G5$$

$$G5_p = G5 / 98$$

Where

- G5 = The percentage of metals utilized. If less than 98, the goal has not been achieved.
- G5<sub>p</sub> = The percentage of Goal 5 achieved.
- MP = Metals purchased. This is the sum of the anodes column and the compounds column in Part IV for each metal entered. For each compound, the metal content of the compound is calculated from atomic weights tables and molecular formula of the compound.
- MR = Metals Released. This is the sum of the sludge metal content for all sludge shipped offsite and the metal content of the wastewater discharged. The sludge volume data is collected in Part III, the metal content in Part IV. Water usage is collected in Part II, the metal concentration in Part IV.

## Method 2: 50% Overall Reduction in Sludge Generation

Method 2 is calculated as follows:

$$[(S_{cy} * (100 - WC_{cy})) / (P_{cy} - I) - ((S_{bas} * (100 - WC_{bas})) / P_{bas})] / [S_{bas} / P_{bas}] * 100 = G5$$

$$G5_p = G5 / -50$$

Where

- $G5$  = The production normalized percentage change in total sludge solids produced. If greater than -50, the goal has not been achieved.
- $G5_p$  = The percentage of Goal 5 achieved.
- $S_{cy}$  = Amount of sludge produced during the current year.
- $S_{bas}$  = Amount of sludge produced during the baseline year.
- $WC_{cy}$  = The percent water content average for the current year
- $WC_{bas}$  = The percent water content average for the baseline year.
- $I$  = the cumulative inflation rate (Producers Price Index) for the time period from the baseline to the current year and  $P_{cy}$ .  $I$  = zero if units for production normalization are not dollars.

## **50% Reduction in Metals Emissions To Air and Water**

The data for Goal 6 is collected in Part IV. The Goal is calculated as follows:

$$[((A_{cy} + W_{cy}) / P_{cy} - I) - ((A_{bas} + W_{bas}) / P_{bas})] / [((A_{bas} + W_{bas}) / P_{bas})] * 100 = G6$$

$$G6_p = G6 / -50$$

Where

- $G6$  = The production normalized percentage change in metals emissions to air and water. If greater than -50, the goal has not been achieved.
- $G6_p$  = The percentage of Goal 6 achieved.
- $A_{cy}$  = Amount of metal released to air in the current year. This quantity is entered directly in column 5 of Part IV.
- $W_{cy}$  = Amount of metal released to water in current year. This quantity is derived from the total water usage (Part II) and the concentrations entered in Part IV.
- $A_{bas}$  = Amount of metal released to air in the baseline year. This quantity is entered directly in column 5 of Part IV.
- $W_{bas}$  = Amount of metal released to water in the baseline year. This quantity is derived from the total water usage (Part II) and the concentrations entered in Part IV.
- $I$  = the cumulative inflation rate (Producers Price Index) for the time period from the baseline to the current year and  $P_{cy}$ .  $I$  = zero if units for production normalization are not dollars.

### **Reduction in Human Exposure**

The data for Goal 7 is collected in Part VI. The Goal is considered achieved if all of the Yes/No boxes in Part VI are checked "Yes".

### **Insufficient Data**

The following table describes the conditions that, if present, will result in an "insufficient data" (ID) mark to be returned for a specific goal.

<b>Goal</b>	<b>Insufficient Data Will Be Returned If:</b>
50% Water Reduction	Baseline or current year water consumption data is missing; baseline or current year production data is missing or not in consistent units
25% Energy Reduction	Baseline or current year energy data is missing or inconsistent; baseline or current year production data is missing or not in consistent units
90% Reduction in Organics	Baseline or current year organics usage data is missing; baseline or current year production data is missing or not in consistent units
50% Reduction in Sludge Disposal	Baseline or current year sludge shipment data is missing; baseline or current year sludge water content data missing or out of range; baseline or current year production data is missing or not in consistent units
98% Metals Utilization	Current year water consumption data is missing; current year metals purchased data (anodes and chemistry) missing, current year sludge shipments or water content data missing; discharge metals concentration data missing.
50% Reduction in Metals Emissions to Air and Water	Baseline or current year water consumption data is missing; baseline or current year production data is missing or not in consistent units; baseline or current year air emission data missing, baseline or current year discharge metals concentration data missing
Reduction In Human Exposure	Any questions are not answered.