

California Environmental Protection Agency  
**Air Resources Board**

California Regulation for the  
Mandatory Reporting of Greenhouse Gas Emissions

**2013 Product Data Reporting:  
Complexity Weighted Barrels (CWB)  
for Petroleum Refineries**

March 20, 2014  
Presentation Slides Available Here:  
<http://www.arb.ca.gov/cc/reporting/ghg-rep/guidance/guidance-training.htm>

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**Outline**

- Background
- Metering requirements for CWB throughputs
- Calculating and reporting total CWB

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**Background:  
Complexity Weighted Barrel**

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**Background**

- **Mandatory Reporting Regulation (MRR):**  
<http://www.arb.ca.gov/cc/reporting/ghg-rep/regulation/mrr-regulation.htm>
- § 95113(l)(3) requires refineries to report CWB starting with 2013 data reported in 2014
- Beginning in 2014, Cap-and-Trade Regulation will use reported CWB along with CWB-based benchmarks to calculate allowance allocation to refineries
- CWB unit throughputs are **covered product data**  
– Total CWB is subject to material misstatement

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## Complexity Weighted Barrel

- Metric of GHG efficiency for petroleum refineries developed by Solomon Associates:
  - CWB factors represent GHG intensity for processes at average efficiency level for standard fuels
  - CWB factors expressed relative to atmospheric crude distillation

## CWB Component Equations

- Process CWB

$$CWB_{proce} = (CWB_{ctor} \times Throughput)$$

- Offsites CWB

$$CWB_{o\_ite} = (0.327 \times Total\ Refinery\ Input) + (0.0085 \times CWB_{proce})$$

- Noncrude Sensible Heat CWB

$$CWB_{noncrude} = (0.44 \times Noncrude\ Input)$$

## Total CWB Equations

- Total CWB for MRR verification:

$$CWB_{total} = CWB_{proce} + CWB_{o\_ite}$$

- Total CWB for Cap-and-Trade allocation:

$$CWB_{total} = CWB_{proce} + CWB_{o\_ite} + CWB_{noncrude}$$

## Metering Requirements for CWB Throughputs

## Metering Requirements

- CWB unit throughputs are covered product data and evaluated for conformance
  - ±5% accuracy
- 2013 data: Operators may use Best Available Methods to report throughputs
  - Engineering methods, mass balance, strap-on meters
- 2014 data and beyond: Throughputs subject to metering requirements in §95103(k)(1)-(10)
  - Calibration frequency and methods

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## Complying with Metering Requirements

- Under certain circumstances, reporters may request ARB approval of:
  - Calibration postponements per §95103(k)(8)-(9)
    - Must assure accuracy during postponement period
    - Submit request by April 10, 2014 for reporting in 2015
  - Alternative measurement methods per §95103(m)
    - Must be approved prior to the year implemented
    - Applicable for future years, barring regulatory changes
- Reporters may exclude inaccurate covered product data per §95103(l)
  - Must describe and estimate magnitude of excluded data
  - Allowances will not be allocated for excluded data

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## CWB Reporting Spreadsheet

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## Reporting Spreadsheet Overview

- Download:
  - <http://www.ccdsupport.com/confluence/display/calhelp/Reporting+Form+Instructions>
- Enter data:
  1. Info and Instructions
  2. CWB Worksheet: Input and Calculation
  3. CWB Data Table (No user input)
- Submit:
  - <https://ssl.arb.ca.gov/Cal-eGGRT/login.do>

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## Downloading the Spreadsheet

- Download:**

<http://www.ccdsupport.com/confluence/display/calhelp/Reporting+Form+Instructions>

– scroll down to middle of page

W - Petroleum and Natural Gas Systems (Subarticle 5)	Petroleum and Natural Gas Systems - Emissions Calculation Workbook.xls (contact ARB at ghgreport@arb.ca.gov for info)	n/a	n/a
2011 Product Data	2011 Product Data.xls	n/a	n/a
Y - Petroleum Refineries	Subpart Y Additional Production Data and Solomson Emissions Calculation Tool.xls	carb_subpart_y_addProd_data.xls	XML
Y - Petroleum Refineries	Complexity Weighted Barrel (CWB) Reporting Form.xls	n/a	XLS
MM - Suppliers of Transportation Fuels Calculation and Reporting Tool	Suppliers of Transportation Fuels Calculation and Reporting Tool.xls	carb_subpart_mm.xls	XML

- Save file to computer before entering data**

– Filename: Refinery\_name\_2013\_CWB.xls

## Info and Instructions Tab

- Enter Facility Name, Facility ARB ID and Reporter Name in blue cells
- Follow the instructions

**Subpart Y - Complexity Weighted Barrel Reporting Form**  
 FOLLOW THE INSTRUCTIONS BELOW TO COMPLETE THE CWB SPREADSHEET.  
 THEN UPLOAD THE COMPLETED SPREADSHEET INTO Cal e-GGRT.  
 Version: Cal e-GGRT R.01  
 Today's Date: 3/13/2014

**Facility Information**  
 Instructions: Complete the following facility information.

Facility Name:   
 Facility ARB ID:   
 Reporter Name:

**Instructions for the Use of This Reporting Workbook**

- 1) Enter Facility Name, Facility ARB ID and Reporter Name above.
- 2) On the CWB Worksheet tab: In the CWB Unit column, select a CWB unit from the drop-down menu (beginning in cell A5). This will automatically populate columns B-E and G with appropriate values from MRR section 95113 Table 1.
- 3) Enter Throughput in column H for the selected CWB unit, and the CWB for that row will be automatically calculated in column I.
- 4) For items with a Coke-on-Catalyst CWB Factor listed in column E, please enter a value

## CWB Worksheet Tab

- Enter throughputs and Total CWB is automatically calculated
- Most CWB Units need only two input steps:
  1. Choose the CWB Unit from drop-down menu in column A
  2. Enter throughput for that CWB Unit in column H

CWB unit	EIA Number	Throughput Basis	CWB Factor	Coke-on-Catalyst CWB Factor	Coke-on-Catalyst % by Volume	Unit of Measure	Throughput	CWB (CWB/year)

## CWB Worksheet Tab: Example

- Step #1: Choose a CWB unit from drop-down menu in column A

– Throughput basis, CWB factor, and unit of measure completed automatically

CWB unit	EIA Number	Throughput Basis	CWB Factor	Coke-on-Catalyst CWB Factor	Coke-on-Catalyst % by Volume	Unit of Measure	Throughput	CWB (CWB/year)
Atmospheric Crude Distillation	001	Feed	0.0001	0.0001	0.0001	Thousands of barrels/year		0.00

### CWB Worksheet Tab: Example

- Step #2: Enter throughput
  - CWB for that CWB unit is calculated in column I

CWB unit	EIA Number	Throughput Basis	CWB Factor	Coke-on-Catalyst CWB Factor	Coke-on-Catalyst % by Volume	Unit of Measure	Throughput	CWB (CWB/year)
Atmospheric Crude Distillation	401	Feed	1	0		thousands of barrels/year	34,567.00	34,567.00

- Throughputs must be:
  - Fresh feed/product only, excluding recycled material (don't double-count material that passes through the unit more than once)
  - Entered at most to two digits after decimal point
  - Entered in the units stated in column G

### CWB Worksheet Tab: Example

- If facility has more than one unit of the same type:
  - Sum the throughputs for these units of the same type
  - Report this sum in a single row of the worksheet
  - Do not select any CWB Unit from the drop-down menu more than once
- For example, a refinery with two atmospheric distillation columns would report the sum of their throughputs in one row of the worksheet

### CWB Worksheet Tab: Example

- Repeat for each CWB unit at the facility

CWB unit	EIA Number	Throughput Basis	CWB Factor	Coke-on-Catalyst CWB Factor	Coke-on-Catalyst % by Volume	Unit of Measure	Throughput	CWB (CWB/year)
Atmospheric Crude Distillation	401	Feed	1	0		thousands of barrels/year	34,567.00	34,567.00
Vacuum Distillation	402	Feed	0.91	0		thousands of barrels/year	23,456.00	21,344.96
Delayed Coker	405	Feed	2.55	0		thousands of barrels/year	12,345.00	31,479.75
Naphtha/Distillate Hydrocracker	430 / 440	Feed	3.15	0		thousands of barrels/year	6,789.00	21,386.35
Kerosene Hydrotreater	421	Feed	0.75	0		thousands of barrels/year	4,567.00	3,425.25
Reformer - including ARCOMAX	430 / 431	Feed	3.5	0		thousands of barrels/year	3,456.00	12,096.00
Alkylation/Polymerizer - CS+								
Alkylate	415	CS+ Alkylate	5	0		thousands of barrels/year	2,345.00	11,725.00
Sulfur Recovery - Product Sulfur	435	Product Sulfur	160	0		thousands of long tons/year	45.00	6,300.00
Special Fractionation	5	Feed	0.35	0		thousands of barrels/year	12,345.00	3,819.00
Flare Gas Recovery	0	Feed	0.13	0		millions of standard cubic feet/year	789.00	102.57

- AVOID DOUBLE COUNTING: No single refinery activity may be reported under more than one CWB Unit

### CWB Worksheet Tab: Example

- FCC units need a third step of entering coke-on-catalyst volume percent
  - Enter as a percent (5.67%), not a decimal fraction (0.0567)
  - Enter two digits after the decimal point

CWB unit	EIA Number	Throughput Basis	CWB Factor	Coke-on-Catalyst CWB Factor	Coke-on-Catalyst % by Volume	Unit of Measure	Throughput	CWB (CWB/year)
Atmospheric Crude Distillation	401	Feed	1	0		thousands of barrels/year	34,567.00	34,567.00
Vacuum Distillation	402	Feed	0.91	0		thousands of barrels/year	23,456.00	21,344.96
Delayed Coker	405	Feed	2.55	0		thousands of barrels/year	12,345.00	31,479.75
Naphtha/Distillate Hydrocracker	430 / 440	Feed	3.15	0		thousands of barrels/year	6,789.00	21,386.35
Kerosene Hydrotreater	421	Feed	0.75	0		thousands of barrels/year	4,567.00	3,425.25
Reformer - including ARCOMAX	430 / 431	Feed	3.5	0		thousands of barrels/year	3,456.00	12,096.00
Alkylation/Polymerizer - CS+								
Alkylate	415	CS+ Alkylate	5	0		thousands of barrels/year	2,345.00	11,725.00
Sulfur Recovery - Product Sulfur	435	Product Sulfur	160	0		thousands of long tons/year	45.00	6,300.00
Special Fractionation	5	Feed	0.35	0		thousands of barrels/year	12,345.00	3,819.00
Flare Gas Recovery	0	Feed	0.13	0		millions of standard cubic feet/year	789.00	102.57
Feed Catalyst Cracking (FCC)	407	Feed	1.15	0	5.67%	thousands of barrels/year	12,345.00	87,062.14

### CWB Worksheet Tab: Example

- Process CWB is calculated in cell I40

37									
38									
39									
40									
41									239,364.00
42									41,618.00
43									6,789.00
44									16,971.31
45									256,335.51
46									259,322.00
47									

- Enter Total Refinery Input in cell I41 and Non-Crude Input in cell I42 (defined in §95102(c))
  - Total: crude, condensate, additives, antiknock compounds, cetane improvers, crude diluents, etc.
  - Noncrude: excludes hydrogen, non-processed blendstock and returns from a lube refinery

### CWB Worksheet Tab: Example

- FINAL ANSWERS: Total CWB in yellow cells
  - Total CWB for MRR verification is cell I45
  - Total CWB for Cap-and-Trade allocation is cell I46

37									
38									
39									
40									239,364.00
41									41,618.00
42									6,789.00
43									16,971.31
44									256,335.51
45									259,322.00
46									
47									

- Total CWB for MRR is subject to material misstatement

### CWB Worksheet Tab: Notes

- H<sub>2</sub> production and coke calcining are NOT included in the Total CWB calculation because they are allocated under separate benchmarks
- For outputs (e.g., sulfuric acid, asphalt), report only the amount produced at the facility

### CWB Calculation: Potential Errors

- Processes should be classified by their current function, not historic name
  - Definitions of CWB units are in §95102(c)
- Units: 1000 barrels/year, not barrels/day
- Units for fuel gas recovery: horsepower rating
- Standard conditions for gases: dry, 1 atm, 60 °F
- Noncrude Input only includes material put through a process unit, not just brought onsite

## CWB Data Tab

- No user input needed on this tab
- This is a database of CWB factors, units of measure, and throughput bases for CWB units drawn from Table 1 in §95113(l)(3)
- This information is used by the CWB Worksheet tab to calculate CWB

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## Submitting the Spreadsheet

- Ensure data are accurate and complete
- Save spreadsheet
  - Filename: Refinery\_name\_CWB\_(2013).xls
- Must include completed CWB spreadsheet as part of the 2013 data submittal
  - Due April 10, 2014
- Submit here:
  - <https://ssl.arb.ca.gov/Cal-eGGRT/login.do>

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## Submitting the Spreadsheet

- Login, then OPEN Section 95113 (Subpart Y):

REPORT DATA

2013 Reporting Source or Supplier Category	Validation Messages?	Subpart Reporting
Sections 95100-95108 (Subpart A)—General Information	None	OPEN
Section 95114 (Subpart P)—Hydrogen Production	View Messages	OPEN
Section 95113 (Subpart Y)—Petroleum Refineries	None	OPEN

ADD or REMOVE Subparts

- Click BROWSE, find file, click UPLOAD:

COMPLEXITY WEIGHTED BARREL DATA

Report Complexity Weighted Barrel (CWB) information using the spreadsheet found at the link below. After completing the spreadsheet upload the file using the Browse and Upload buttons below.

Complexity Weighted Barrel Spreadsheet

Browse No file selected.

Uploaded File Name	Attached By	Date	Delete
No files found.			

[Facility Overview](#)

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## Schedule

- April 10: Regulatory deadline for reporting emissions and product data
- September 2: Verification statements due

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**Questions?**

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**Web Resources**

- Email questions: [ghgreport@arb.ca.gov](mailto:ghgreport@arb.ca.gov)
- Reporting Guidance: CWB  
<http://www.arb.ca.gov/cc/reporting/ghg-rep/guidance/cwb.pdf>
- Reporting Guidance: Applicability, Metering  
<http://www.arb.ca.gov/cc/reporting/ghg-rep/guidance/guidance.htm>
- Cal e-GGRT Tool Training: Registration, Subparts  
<http://www.arb.ca.gov/cc/reporting/ghg-rep/tool/ghg-tool.htm>
- Cal e-GGRT Main Help Page  
<http://www.ccdsupport.com/confluence/display/calhelp/Home>

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**END**

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