Calculation of 2012 Crude Average CI Value

The Board approved revisions to the Low Carbon Fuel Standard in 2011, which became effective on November 26, 2012, and were implemented by ARB on January 1, 2013. One of the revisions requires the Executive Officer to post the Annual Crude Average carbon intensity calculation for public comment no later than 15 days after receiving the Annual Compliance Reports, which are due on April 30th of each year. The first such required posting will be in May 2014 for the 2013 the Annual Crude Average carbon intensity calculation.

Nevertheless, staff is posting the 2012 Annual Crude Average carbon intensity in the same manner for public comment. The paragraph below outlines that process.

Posting: Section 95486(b)(2)(A)3 of the Low Carbon Fuel Standard (LCFS) Regulation states that each year the Executive Officer will post the Annual Crude Average carbon intensity calculation at the ARB-LCFS website for public comment. Written comments shall be accepted for 15 calendar days following the date on which the analysis was posted. Only comments related to potential factual or methodological errors in the posted Annual Crude Average carbon intensity value may be considered. The Executive Officer shall evaluate the comments received and, if the Executive Officer deems it necessary, may request in writing additional information or clarification from the commenters. Commenters shall have 10 days to respond to these requests. The Executive Officer shall post the final Annual Crude Average carbon intensity value at the ARB-LCFS website within 15 days of completion of the comment period, if no comments are received. If comments are received, the Executive Officer shall post the final Annual Crude Average carbon intensity value within 15 days of receiving any additional information or clarification requested from the commenters by the Executive Officer.

Calculation of 2012 Crude Average CI: Table 1 shows a breakdown of the sources of crude oil supplied to California refineries during 2012 and the carbon intensity values assigned to these crude sources. All crude oil produced in and offshore of California is assumed to be refined in California. The volume contributions for California crudes are based on oil production data obtained from the California Department of Conservation.[1] The volume contributions of imported crudes are based on oil supply data obtained from California refineries in response to a survey issued in November 2012. Thirty seven crude names that do not appear in Table 8 (i.e. the Crude Lookup Table) were supplied to California refineries during 2012. These crudes contributed only 8.5 percent of the total volume of crude supplied to California refineries and are assigned the 2010 Baseline Crude Average CI value of 11.39 g/MJ.[2] The 2012 Crude Average carbon

[1] California Department of Conservation, Online Production and Injection Query, http://opi.consrv.ca.gov/opi/opi.dll, (accessed May 2013).

[2] In conjunction with the update to OPGEE v1.1, staff intends to submit, for Board approval in 2014, carbon intensity values for all crudes supplied to California refineries during 2011, 2012 and 2013 that are not in the current Crude Lookup Table (i.e. Table 8). Preliminary draft CI values for many of these crudes were released at the March 5, 2013 workshop (http://www.arb.ca.gov/fuels/lcfs/regamend13/Draft_Crude_CI_Values_%28OPGEEv1.1_DraftA%29_Mar

intensity, 11.36 gCO_2/MJ, is calculated by weighting the carbon intensity value for each crude by the volume supplied to California refineries during 2012.

ch_4_2013.pdf). ARB intends to use the amended Table 8 to calculate Annual Crude Average CI values for 2014 and later years.

Table 1: 2012 Crude Average Carbon Intensity Calculation

Country/State	Crude Name	CI (g/MJ)	2012 Volume (bbl)
	2012 Annual Crude Average CI	11.36	
Algeria	Saharan	11.39	1,411,725
Angola	Dalia	7.86	2,803,487
	Gimboa	11.39	177,590
	Girassol	10.43	1,232,150
	Greater Plutonio	8.82	1,956,342
	Kissanje	11.39	682,575
	Nemba	11.39	24,310
	Pazflor	11.39	7,757,093
Argentina	Escalante	7.51	625,020
	Medanito	11.39	310,000
Australia	Pyrenees	5.96	746,771
	Vincent	11.39	764,185
Brazil	Frade	6.62	874,950
	Jubarte	11.39	357,100
	Lula	11.39	552,692
	Marlim	6.75	5,622,108
	Ostra	5.71	947,741
	Roncador	11.39	969,122
	Roncador Heavy	11.39	1,839,954
Canada	Albian Muskeg River Heavy	11.39	375,060
	Albian Heavy Synthetic	21.02	4,407,187
	Cold Lake	18.74	4,540,591
	Koch Alberta	7.61	53,570
	Lloydminster	11.39	2,773
	Mixed Sweet	7.75	53,570
	Peace River Sour	11.39	360,000
	Shell Synthetic Light	11.39	475,489
	Suncor Synthetic (all grades)	24.49	2,925,958
	Surmont	11.39	953,907
	Wabasca	11.39	385,817
Colombia	Cano Limon	11.39	1,175,973
	Castilla	6.45	13,038,302
	Magdalena	11.39	6,841,012
	Rubiales	11.39	120,000
	South Blend	11.39	4,169,622
	Vasconia	6.63	14,974,315

Congo	Azurite	11.39	984,378
	Djeno	11.39	324,585
Ecuador	Napo	7.45	21,580,457
	Oriente	9.34	34,975,946
Equatorial Guinea	Ceiba	11.39	788,000
Iraq	Basra Light	12.08	57,829,491
Kuwait	Kuwait	11.39	3,720,000
Libya	Amna	11.39	513,090
Neutral Zone	Ratawi	5.77	530,000
Nigeria	Antan	11.39	576,160
Oman	Oman	12.30	2,008,966
Peru	Loreto	5.82	2,420,063
	Mayna	7.14	230,000
Russia	ESPO	12.09	9,670,018
	M100	11.39	416,874
Saudi Arabia	Arab Extra Light	6.86	17,475,651
	Arab Light	6.75	49,600,000
	Arab Medium	11.39	10,390,000
Trinidad	Calypso	6.95	620,210
Venezuela	Boscan	12.53	90,000
	Hamaca DCO	11.39	340,000
	Mesa 30	11.39	357,753
	Petrozuata (all grades)	23.58	1,969,774
	Zuata (all grades)	23.50	1,056,003
US Alaska	ANS	12.81	75,026,823
US Colorada	Niobrara	11.39	344,819
US New Mexico	Four Corners	11.39	150,345
US North Dakota	Bakken	11.39	674,519
	North Dakota Sweet	11.39	57,446
US Texas	West Texas Intermediate	11.39	40,710
US Utah	Covenant	11.39	819,520
US California*	Aliso Canyon	1.97	106,177
	Ant Hill	26.37	37,336
	Antelope Hills	2.69	127,271
	Antelope Hills, North	13.16	344,495
	Arroyo Grande	27.81	360,676
	Asphalto	7.92	334,862
	Bandini	7.75	14,863
	Bardsdale	5.24	64,242
	Barham Ranch	2.74	73,669
	Beer Nose	2.18	105,077

	Belgian Anticline	3.62	49,056
	Bellevue	8.27	28,794
	Bellevue, West	8.63	13,638
	Belmont, Offshore	3.19	817,650
	Belridge, North	5.00	2,648,572
	Belridge, South	14.49	23,577,958
	Beverly Hills	3.33	757,920
	Big Mountain	3.15	31,965
	Blackwells Corner	11.05	10,309
	Brea-Olinda	2.97	1,133,831
	Buena Vista	13.61	1,104,970
	Burrel	16.44	10,108
	Cabrillo	2.84	23,888
	Canal	4.04	26,453
	Canfield Ranch	3.58	111,535
	Caneros Creek	2.96	23,490
	Cascade	2.20	160,549
	Casmalia	11.61	195,253
	Castaic Hills	2.79	12,347
	Cat Canyon	5.09	839,883
	Cheviot Hills	3.06	15,523
	Chico-Martinez	3.83	27,806
	Cienaga Canyon	3.89	38,922
	Coalinga	25.36	5,544,989
	Coles Levee, N	3.47	142,360
	Coles Levee, S	4.27	79,246
	Comanche	10.75	23,573
	Coyote, East	5.59	219,777
	Cuyama, South	11.86	215,575
	Cymric	19.91	13,684,277
	Deer Creek	18.29	47,488
	Del Valle	4.30	53,820
	Devils Den	3.63	20,857
	Edison	9.03	823,085
	El Segundo	2.98	15,533
	Elk Hills	5.36	12,978,129
	Elwood, S., Offshore	4.18	1,171,615
	Fruitvale	10.24	417,701
	Greeley	8.14	113,233
	Hasley Canyon	2.07	38,092
	Helm	3.35	76,314

	Holser	3.01	23,487
	Honor Rancho	2.69	52,682
	Huntington Beach	7.80	1,982,425
	Inglewood	8.74	2,779,781
	Jacalitos	2.22	139,061
	Jasmin	17.54	134,603
	Kern Front	25.06	3,322,714
	Kern River	9.55	26,186,959
	Kettleman Middle Dome	3.53	57,570
	Kettleman North Dome	4.70	27,351
	Landslide	10.49	37,023
	Las Cienegas	4.46	374,205
	Livermore	2.17	14,601
	Lompoc	31.05	308,222
	Long Beach	5.12	1,379,227
	Long Beach Airport	3.73	16,443
	Los Angeles Downtown	4.11	37,442
	Los Angeles, East	8.28	20,850
	Lost Hills	11.40	10,744,022
	Lost Hills, Northwest	4.35	29,319
	Lynch Canyon	7.73	144,944
	McCool Ranch	1.71	13,793
	McDonald Anticline	4.92	69,538
	McKittrick	15.47	2,073,737
	Midway-Sunset	21.18	29,280,377
	Montalvo, West	2.63	743,871
	Montebello	10.29	591,594
	Monument Junction	3.81	114,057
	Mount Poso	20.57	737,799
	Mountain View	4.42	119,205
	Newhall-Potrero	2.83	127,544
	Newport, West	4.33	92,769
	Oak Canyon	3.81	25,807
	Oak Park	2.13	15,561
	Oakridge	2.57	139,770
	Oat Mountain	1.90	101,195
	Ojai	3.27	288,758
	Olive	1.93	32,186
	Orcutt	12.52	1,255,451
	Oxnard	16.89	120,901
	Paloma	3.42	30,033

	Placerita	31.66	954,361
	Playa Del Rey	6.04	50,258
	Pleito	4.01	257,895
	Poso Creek	28.41	2,735,209
	Pyramid Hills	2.92	57,368
	Railroad Gap	6.56	151,085
	Raisin City	7.64	134,267
	Ramona	3.37	49,060
	Richfield	3.63	330,802
	Rincon	2.93	361,102
	Rio Bravo	4.85	288,948
	Rio Viejo	2.50	82,445
	Riverdale	2.99	59,992
	Rose	2.10	239,302
	Rosecrans	5.18	160,801
	Rosecrans, South	3.11	10,126
	Rosedale	6.60	14,387
	Rosedale Ranch	8.84	169,915
	Round Mountain	28.73	3,848,124
	Russell Ranch	6.56	66,999
	Salt Lake	2.82	42,607
	Salt Lake, South	3.68	39,329
	San Ardo	28.82	7,262,337
	San Miguelito	4.44	495,804
	San Vicente	2.31	287,856
	Sansinena	2.54	214,214
	Santa Clara Avenue	3.31	61,079
	Santa Fe Springs	11.34	723,809
	Santa Maria Valley	6.48	222,103
	Santa Susana	3.14	17,423
	Sargent	4.77	40,006
	Saticoy	3.26	43,968
	Sawtelle	2.83	175,539
	Seal Beach	4.07	453,799
	Semitropic	3.39	43,624
	Sespe	2.91	392,208
	Shafter, North	2.54	1,094,052
	Shiells Canyon	3.24	83,187
	South Mountain	3.10	521,752
	Stockdale	1.71	110,058
	Tapia	6.42	41,682

	Tapo Canyon, South	2.87	11,136
	Tejon	7.96	772,028
	Tejon Hills	5.74	17,886
	Tejon, North	4.72	47,087
	Temescal	3.10	27,898
	Ten Section	6.22	103,853
	Timber Canyon	3.30	38,697
	Torrance	4.45	393,196
	Torrey Canyon	2.88	121,197
	Union Avenue	1.79	13,583
	Ventura	4.35	5,084,669
	Wayside Canyon	2.93	103,234
	West Mountain	2.89	10,831
	Wheeler Ridge	3.34	100,254
	White Wolf	1.64	11,624
	Whittier	2.51	106,366
	Wilmington	6.36	13,260,055
	Yowlumne	11.22	295,795
	Zaca	10.45	199,167
US Federal OCS	Beta	1.74	1,598,275
	Carpinteria	2.62	363,421
	Dos Cuadras	3.83	1,053,098
	Hondo	4.27	4,402,251
	Hueneme	4.33	105,334
	Pescado	3.45	2,145,845
	Point Arguello	8.68	1,510,212
	Point Pedernales	6.00	1,813,036
	Sacate	2.33	2,789,222
	Santa Clara	2.41	674,216
	Sockeye	5.82	1,140,030

*All California fields that produced at least 10,000 bbls during 2012