



ENVIRONMENTAL AUDIT, INC.®

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36th ANNIVERSARY
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July 14, 2015

Project No. 2387

Ms. Heather Tomley
Port of Long Beach
4801 Airport Plaza Drive
Long Beach, CA 90815

Subject: Supporting Documentation for Alston & Bird LLC July 10, 2016 Letter - Appeal of CEQA Determinations by Board of Harbor Commissioners re Mitsubishi Cement Corporation's Terminal Modernization Project, July 14, 2015 Meeting, Agenda Item 5-0633

Dear Ms. Tomley:

On behalf of Mitsubishi Cement Corporation (MCC), Environmental Audit, Inc. is providing the emission calculations (see attached) prepared to support Attachment A – Table 1 of the Alston & Bird letter submitted to the Mayor and City Council on July 10, 2015.

In addition, the attached figure shows the reduction in sulfur content in marine fuels. This reduction allows for the emissions control system to be feasible as discussed on page 9 of the Alston & Bird letter.

If you require clarification or additional supporting information, please contact me at 714-632-8521 ext. 237.

Sincerely,

Marcia Baverman, P.E.
Project Manager

MRB:ss

cc: Mike Jasberg, Mitsubishi Cement Corp.
Bud Biggs, Mitsubishi Cement Corp.
Eric Jen, Mitsubishi Cement Corp.
Jocelyn Thompson, Alston & Bird, LLP
Maya Grasse, Alston & Bird, LLP

Attachment A
Mitsubishi Cement Corporation
Emissions from Ships at Anchor in 2006/2007

Total Emissions	Annual (lb/yr)
VOC	505.91
CO	1339.30
NOx	24567.12
SOx	50788.75
PM10	2537.95
PM2.5	2030.36

CO₂EQ	Annual (tonnes/yr)
Ship Emissions	222.66

Based on reported time of arrival to time at berth less maneuvering time.

Attachment A
Mitsubishi Cement Corporation
2006/2007 Ship Parameters

OGV Main Engine Usage per One-Way Transit

Activity	Propulsion Max kW ⁽¹⁾	Speed (Kts) ⁽¹⁾	Load Factor ⁽²⁾	Distance (nm/trip) ⁽³⁾	Duration (hr/trip)	Energy Consumed (kW-hr/trip)
Hoteling ⁽⁴⁾	8,575	n/a	-	n/a	127.3	-

Notes: (1) Port of Long Beach Air Emissions Inventory - 2012 - Table B.3 (Starcrest 2013)

(2) Load factor = (speed/max speed)³. Load factor of 0.02 represents minimum load factor for propulsion engines.

(3) Distances from Table 1.1 Starcrest (2013). Assumes 90% northern route and 10% western route.

Average One-Way Transit Distances	n miles
Fairway 1-way nm	42.6
20nm 1-way Distance within Fairway	20.0
PZ to Breakwater 1-way nm	9.8

(4) Based on 55 anchors and 127.3 hours per anchor.

OGV Auxiliary Generator Usage per One-Way Transit

Activity	Auxiliary kW per Vessel ⁽¹⁾	Hours/Transit	kW-Hrs/Transit
Hoteling - Total	208	127.3	26,478
Hoteling - Aux	208	127.3	26,478
Hoteling - Crane	208	-	-

Notes: (1) Port of Long Beach Air Emissions Inventory - 2012 - Table 2.12 (Starcrest 2013)

OGV Auxiliary Boiler Usage per One-Way Transit

Activity	Boiler kW per Vessel ⁽¹⁾	Hours/Transit	kW-Hrs/Transit
Hoteling	132	127.3	16,803.600

Notes: (1) Port of Long Beach Air Emissions Inventory - 2011 - Table 2.16 (Starcrest 2012)

Attachment A
Mitsubishi Cement Corporation
2006/2007 Ship Emission Factors

Emission Factors for OGV

Engine Type	Assumed Fuel Type	Assumed Fuel Use Application	VOC	CO	NOx	SOx	PM10	PM2.5	CO2	CH4	N2O	Source
Main Propulsion Engine (g/kW-hr)												
OGV Main Engines	Residual Oil (2.7% S)	2006	0.60	1.40	18.10	10.53	1.50	1.20	620	0.0120	0.02914	(1,2)
Auxiliary Engine (g/kW-hr)												
OGV Auxiliary Engines	Residual Oil (2.7% S)	2006	0.40	1.10	14.70	12.26	1.50	1.20	683	0.0080	0.02914	(2,3)
Auxiliary Boiler (g/kW-hr)												
OGV Auxiliary Boilers	Residual Oil (2.7% S)	2006	0.10	0.20	12.30	54.00	1.30	1.04	970	0.002	0.0752	(2,4)

Notes: (1) Port of Long Beach Air Emissions Inventory - 2011 - Table 2.5, 2.6. (Starcrest 2012)

(2) Fuel emission factors were adjusted in accordance with lower sulfur fuels. Port of Long Beach Air Emissions Inventory - 2011 - Table 2.17. (Starcrest 2012)

(3) Port of Long Beach Air Emissions Inventory - 2011 - Table 2.10, 2.11. (Starcrest 2012)

(4) Port of Long Beach Air Emissions Inventory - 2011 - Table 2.14, 2.15.. (Starcrest 2012)

Attachment A
Mitsubishi Cement Corporation
2006/2007 Ship Emissions

Total Emissions per Delivery (lb/visit)

Project Scenario/Activity	VOC	CO	NOx	SOx	PM10	PM2.5	CO2e (MT)
Ships - Hoteling	9.2	24.4	446.7	923.4	46.1	36.9	4.0
Total	9.20	24.35	446.67	923.43	46.14	36.92	4.05

Peak Day Emissions (lb/day)

Project Scenario/Activity	VOC	CO	NOx	SOx	PM10	PM2.5	CO2e (MT)
Ships - Hoteling	1.7	4.6	84.2	174.1	8.7	7.0	0.8
Total	1.73	4.59	84.21	174.10	8.70	6.96	0.76

Total Emissions (55 Anchors) (lb/year)

Project Scenario/Activity	VOC	CO	NOx	SOx	PM10	PM2.5	CO2e (MT)
Ships - Hoteling	505.9	1,339.3	24,567.1	50,788.7	2,538.0	2,030.4	222.7
Total	505.91	1,339.30	24,567.12	50,788.75	2,537.95	2,030.36	222.66

Attachment A
Time at Anchor

VESSEL NAME	Time of Arrival	Time of Berth	Days of Demurrage (Despatch)	Time Between Arrival & Berth	Time at Anchor	No. of Ships	Hours at Anchor	Percentage of Total	Year
OCEAN VIRGO	2006/01/07 20:15	2006/01/08 12:18	-0.2625	16.0	15.3				
BIANCO ZEALAND	2006/01/13 07:20	2006/01/17 06:40	1.0972	95.3	94.6				
KITE	2006/01/18 21:00	2006/01/23 00:30	5.5623	99.5	98.8				
PACIFIC PROSPERITY	2006/02/03 12:48	2006/02/03 18:00	1.3753	5.2	4.5				
KANG YAO	2006/02/26 14:25	2006/02/26 21:24	-0.9362	7.0	6.3				
GLOBAL ISLAND	2006/03/06 13:24	2006/03/07 06:24	5.8539	17.0	16.3				
VEGA PIONEER	2006/03/22 09:10	2006/03/22 15:20	0.6701	6.2	5.5				
HUARMY QUEEN	2006/03/31 21:18	2006/04/04 18:56	4.6431	93.6	92.9				
GLORY SANYE	2006/04/11 12:50	2006/04/13 21:55	3.8192	57.1	56.4				
TOP WING	2006/04/24 12:54	2006/05/06 04:35	12.7006	279.7	279.0				
IZOLA	2006/04/23 06:00	2006/05/04 21:30	32.9922	279.5	278.8				
KANG SHENG	2006/05/10 01:30	2006/05/19 19:00	12.3585	233.5	232.8				
GOLDEN HARVEST	2006/05/15 08:00	2006/06/03 09:35	19.3084	457.6	456.9				
TRIPLE EVER	2006/05/27 19:48	2006/06/10 14:05	13.7831	330.3	329.6				
PACIFIC PROSPERITY	2006/06/03 14:18	2006/06/21 22:30	16.2427	440.2	439.5				
SPAR LUPUS	2006/06/12 13:42	2006/06/29 06:30	18.5995	400.8	400.1				
AMARANTH BRIDGE	2006/06/21 07:50	2006/07/10 04:25	22.0192	452.6	451.9				
CONDOR	2006/07/01 13:30	2006/07/21 04:40	20.2776	471.2	470.5				
SUNNY GLOBE	2006/07/07 13:25	2006/08/01 19:50	26.1667	606.4	605.7				
NEW AUSPICIOUS	2006/07/20 12:48	2006/08/15 01:48	25.0211	613.0	612.3				
AYIA MARINA	2006/08/06 07:48	2006/08/23 05:24	16.8034	405.6	404.9				
HUARMY QUEEN	2006/08/17 15:30	2006/09/02 06:36	18.8248	375.1	374.4				
ALAM MAKMUR	2006/09/01 06:42	2006/09/13 15:24	11.6242	296.7	296.0				
GREAT CALM	2006/09/16 20:35	2006/09/18 08:00	4.5399	35.4	34.7				
GIORGOS B	2006/09/22 20:25	2006/09/30 17:30	7.7884	189.1	188.4				
NAVIOS MERCATOR	2006/10/06 14:30	2006/10/09 06:47	3.802	64.3	63.6				
PACIFIC PROSPERITY	2006/10/25 16:00	2006/10/25 18:30	-0.6584	2.5	1.8				
DON FRANE BULIC	2006/11/04 23:20	2006/11/05 01:05	-0.1932	1.8	1.1				
OCEAN ALLIANCE	2006/11/15 10:12	2006/11/15 14:00	-1.7107	3.8	3.1				
SUNNY GLORIA	2006/11/22 23:10	2006/11/24 05:15	0.3056	30.1	29.4				
HUARMY QUEEN	2006/12/06 06:00	2006/12/06 07:55	0.1886	1.9	1.2				
GLOBAL ISLAND	2006/12/13 23:45	2006/12/17 20:55	5.4156	93.2	92.5	32	6438.7	92%	2006
YONG AN 3	2007/01/01 09:30	2007/01/01 12:35	3.0919	3.1	2.4				
PRAIRIE SKY	2007/01/12 02:10	2007/01/14 15:00	5.6803	60.8	60.1				
SUNNY GLOBE	2007/01/20 15:50	2007/01/28 07:45	10.2257	183.9	183.2				
MORNING SKY	2007/02/24 17:00	2007/02/24 18:30	-2.1532	1.5	0.8				
ELEOUSSA	2007/03/09 07:48	2007/03/09 10:00	-1.8362	2.2	1.5				
NEW AUSPICIOUS	2007/03/29 08:00	2007/03/29 09:30	-2.2425	1.5	0.8				
FEDERIKE OLDENDORF	2007/04/10 02:30	2007/04/10 03:30	-2.5869	1.0	0.3				
HUARMY QUEEN	2007/04/15 07:33	2007/04/16 06:35	1.1842	23.0	22.3				
ISLAND OASIS	2007/05/08 08:30	2007/05/08 10:12	-1.8785	1.7	1.0				
VIRGINIA	2007/05/27 19:30	2007/05/27 23:10	0.5524	3.7	3.0				
HANA	2007/05/31 21:30	2007/06/05 13:30	2.1871	112.0	111.3				
GLOBAL ISLAND	2007/06/12 07:52	2007/06/12 09:30	3.4693	1.6	0.9				
COPPER QUEEN	2007/06/28 18:15	2007/06/28 20:45	1.409	2.5	1.8				
ARHIMIDIS SB	2007/07/22 20:00	2007/07/23 01:30	-1.8367	5.5	4.8				
AMARANTH BRIDGE	2007/07/27 14:15	2007/07/30 03:20	3.3251	61.1	60.4				
HUARMY QUEEN	2007/08/12 07:00	2007/08/12 08:15	-2.0992	1.3	0.6				
GENCO MUSE	2007/08/19 02:35	2007/08/19 04:30	0.845	1.9	1.2				
NEW VISION	2007/09/02 12:54	2007/09/02 19:06	2.2007	6.2	5.5				
EMERALD	2007/09/14 08:30	2007/09/16 18:24	5.7591	57.9	57.2				
OCEAN PARADISE	2007/10/05 20:00	2007/10/06 10:00	2.1322	14.0	13.3				
COPPER QUEEN	2007/10/28 06:15	2007/10/28 08:00	-1.8664	1.8	1.1				
MARITIME CUATE	2007/11/22 01:00	2007/11/23 06:36	-2.8833	29.6	28.9	23	563.2	8%	2007
HUARMY QUEEN	2007/12/07 20:45	2007/12/07 22:15	-1.6669	1.5	0.8		Avg Hours		
			total	7040.3	7001.8	55	127.3		

Fuel Sulfur Content for Ocean Going Vessels

