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*SAN DIEGO UNIFIED PORT DISTRICT 2007 CLEAN AIR PROGRAM DRAFT REPORT
APPENDIX A*



APPENDIX A

ADDITIONAL AIR QUALITY BACKGROUND INFORMATION

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This appendix provides additional relevant background information in support of Chapter 2 of the 2007 CAP Draft Report: "Clean Air Program Background". The sections below contain additional details on the topics introduced in the report and/or references for further information.

A.1 SAN DIEGO UNIFIED PORT DISTRICT OPERATIONS

Further information about the Port of San Diego and its operations can be found in the references listed below, available on the Port's web site at <http://www.portofsandiego.org>.

§ COMPASS Strategic Plans

The Port's strategic plans are five year planning documents that present high-level strategic elements that guide the Port as a whole as well as the Port's vision, mission and value statements. The first COMPASS Strategic plan covers fiscal years 2002 through 2006 and the second covers 2007 through 2011.

- Charting Our Future...COMPASS STRATEGIC PLAN. Fiscal Years 2007 – 2011

http://www.portofsandiego.org/sandiego_about/assets/documents/compass/2007-2011-compass.pdf

- Charting Our Future...COMPASS Strategic Plan 2002 – 2006.

http://www.portofsandiego.org/sandiego_maritime/overview.asp

§ Maritime Business Plan

An update to the 1999 "Port of San Diego Marine Terminal Master Plan" the updated plan was developed to provide a document the Port can use to present their vision for potential opportunities for maritime activity through 2030, and provide clarity to Port customers regarding the future of maritime commerce at the two marine terminals.

- Final Draft San Diego Unified Port District Maritime Business Plan Update. Produced by TEC Inc. April 2007

http://www.portofsandiego.org/sandiego_maritime/assets/documents/sdupd-maritime-business-plan-update.pdf

A.2 SAN DIEGO REGIONAL AIR QUALITY

A.2.1 Criteria Pollutants

As discussed in Section 2.2.1 of the 2007 Draft CAP Report, the National Ambient Air Quality Standards (NAAQS) and California Ambient Air Quality Standards (CAAQS) establish limits for certain principal pollutants that are protective of public health. Regions are evaluated on the basis of their ambient air quality and designated as Nonattainment, Attainment, or Unclassifiable based on the NAAQS or CAAQS.

§ National Ambient Air Quality Standards (NAAQS)

Background information from the EPA on the NAAQS, tables of current NAAQS values, descriptions of the process for reviewing NAAQS, and other supporting information can be found on the EPA Technology Transfer Network's National Ambient Air Quality Standards web page:

<http://www.epa.gov/ttn/naaqs/>

Designations for California counties based on the USEPA 8-hour Ozone Standard are available at the following web page:

<http://www.epa.gov/ozonedesignations/regions/region9desig.htm>

§ California Ambient Air Quality Standards (CAAQS)

Background information from the ARB on the CAAQS, current CAAQS values, information on the pollutants for which standards have been established, and other supporting information can be found on the ARB California Ambient Air Quality Standards web page:

<http://www.arb.ca.gov/research/aaqs/caaqs/caaqs.htm>

§ San Diego County Air Quality

Several documents are available from the San Diego Air Pollution Control District discussing current air quality and air quality planning in San Diego.

- 2006 Annual Report: Air Quality in San Diego

<http://www.sdapcd.org/info/reports/ANNUAL.pdf>

- Five Year Air Quality Summary

<http://www.sdapcd.org/air/reports/smog.pdf>

- Air Quality Management in San Diego County

<http://www.sdapcd.org/planning/AirQualityManagementinSDCounty.pdf>

A.2.2 Toxic Air Contaminants

As discussed in Section 2.2.2 of the 2007 Draft CAP Report, toxic air contaminants (TACs) differ from criteria pollutants in that they may have health impacts even at low levels and may accumulate in the body through repeated exposure. Consequently, levels that are considered protective of public health ("criteria") are not established for these pollutants. Information on state and local programs addressing TACs as well as local air quality information is available from the references below.

§ California addresses toxic air contaminants in part through two programs, the "Hot Spots" program, which addresses reporting of emissions, and the Toxic Air Contaminant Program, which deals with identification and public awareness.

- The Air Toxics "Hot Spots" Information and Assessment Act (AB 2588) was enacted in 1987, and requires stationary sources to report the types and quantities of certain substances routinely released into the air.

<http://www.arb.ca.gov/ab2588/ab2588.htm>

- The California Air Toxics Program (AB 1807) establishes the process for the identification and control of toxic air contaminants and includes provisions to make the public aware of significant toxic exposures and for reducing risk.

<http://www.arb.ca.gov/toxics/toxics.htm>

§ The San Diego Air Pollution Control District also has a program to identify and control sources of air toxics in the District and inform the public. As part of AB2588, local districts are required to provide the public with annual reports. These reports are available from the SDAPCD web page at http://www.sdapcd.org/toxics/air_toxics.html

- 2005 Air Toxics "Hot Spots" Program Report for San Diego County

<http://www.sdapcd.org/toxics/hotspots/Toxics05Rpt.pdf>

A.3 EXISTING LOCAL HEALTH RISK INFORMATION

This section provides additional details on the results of several air quality monitoring and health risk assessment studies conducted in the vicinity of the Port of San Diego by SDAPCD and ARB, beyond the information provided in Section 2.3 of the 2007 Draft CAP Report.

A.3.1 SDAPCD Air Toxics Monitoring

As discussed in Section 2.3 of the 2007 Draft CAP Report, the SDAPCD collects air toxics monitoring data at five locations in the San Diego metropolitan area as part of the San Diego County Air Toxics

“Hot Spots” Program (described previously in section A.2.2). Two of the current monitoring sites, El Cajon and Chula Vista, have been monitoring air toxics since the mid 1980’s. Because there are no reliable methods to directly monitor DPM, incremental cancer risks estimated from air toxics monitoring data at these sites do not include risks due to DPM. Excluding DPM, incremental cancer risks from air toxics at these stations have decreased approximately 70% from 1989 to 2005, from 483 in one million to 143 in one million at Chula Vista and from 545 in one million to 169 in one million at El Cajon.

- The 2005 Air Toxics “Hot Spots” Program Report for San Diego County

<http://www.sdapcd.org/toxics/hotspots/Toxics05Rpt.pdf>

§ ARB has estimated that incremental cancer risk due to DPM at these two stations has decreased over 50% (from approximately 870 in one million to 420 in one million) from 1990 to 1999.

- The 2001 California Almanac of Emissions and Air Quality

<http://www.arb.ca.gov/aqd/almanac/almanac01/almanac01.htm>

A.3.2 ARB Community Health Study

§ ARB’s Community Health Study in Barrio Logan also characterized health risks due to TACs in the Barrio Logan neighborhood. This study, designed by ARB in conjunction with SDAPCD and the Environmental Health Coalition (EHC), evaluated health risks from TAC monitoring data and air dispersion modeling of local TAC emission sources (e.g., local facilities, shipyards, and vehicles on roadways). Numerous documents related to the Barrio Logan health studies are available from ARB’s Community Health web page on the study.

<http://www.arb.ca.gov/ch/communities/studies/barriologan/barriologan.htm>

- Barrio Logan Report: A Compilation of Air Quality Studies in Barrio Logan

http://arb.ca.gov/ch/programs/bl_11_04.pdf

§ The monitoring component of the study measured the ambient concentrations of 40 TACs at a single location (Memorial Academy Charter School) in Barrio Logan from October 1999 to February 2001. Health risks were evaluated for the nine TACs that were found to be the largest contributors to total risk at the monitoring site, which accounted for approximately 95% of the risk. Similar to the SDAPCD monitoring stations at El Cajon and Chula Vista, DPM concentrations were not measured at the Barrio Logan site. Excluding DPM, the total incremental cancer risk due to TACs at the Barrio Logan site (210 in one million) was nearly the same as the El Cajon site (206 in a million) and slightly higher than the Chula Vista site (170 in a million) for a similar time period (October 1999 through September 2000). Based on the results of the monitoring studies, ARB concluded that overall air quality levels at Barrio Logan were similar to other areas in the San Diego region and that measured levels of toxic pollutants are typical of urban areas in California.

- Air Quality at Memorial Academy Charter School in Barrio Logan, a Neighborhood Community in San Diego

http://www.arb.ca.gov/ch/qa_result/barriologan/bl_public_report_07-02_final.doc

§ ARB also conducted micro-scale and regional air dispersion modeling using U.S. Environmental Protection Agency's (USEPA's) Industrial Source Complex Short-Term (ISCST3) model and ARB's California Photochemical Grid Model (CALGRID), respectively, coupled with a local and regional emissions inventory. The results of this modeling were used to generate estimates of cancer risk. When compared to cancer risks derived from ambient monitoring data at the Barrio Logan site, the micro-scale modeling significantly under-predicted total cancer risk and the regional modeling over-predicted total cancer risk. Based on the monitoring data, air dispersion modeling results, and information from the 2001 California Almanac of Emissions and Air Quality (<http://www.arb.ca.gov/aqd/almanac/almanac01/almanac01.htm>), most of the risk due to air toxics in the Barrio Logan area is due to diesel PM (approximately 70%, 1,3-butadiene (approximately 10%), and benzene (approximately 10%). Details of this evaluation are discussed in the final Barrio Logan listed above.

A.4 GREENHOUSE GASES

As discussed in section 2.4 of the 2007 Draft CAP Report, greenhouse gases (GHGs) are gases that absorb radiative heat in the atmosphere, leading to an increase in the earth's temperature.

§ The California Climate Action Registry web site provides additional information on greenhouse gases, including some of the potential impacts in California of global warming.

- <http://www.climateregistry.org/ABOUTUS/>

§ Information on California's and San Diego's contributions to global warming is available through multiple sources.

- The California Energy Commission's Inventory of California Greenhouse Gas Emissions and Sinks

<http://www.energy.ca.gov/2006publications/CEC-600-2006-013/CEC-600-2006-013-SF.PDF>

- The City of San Diego Greenhouse Gas Emission Inventory

<http://www.sandiego.gov/environmentalservices/sustainable/pdf/ghginventory.pdf>

A.4.1 The California Global Warming Solutions Act of 2006 (AB32)

AB32 instructs the ARB to set new reporting requirements for GHG emissions and devise rules and regulations to achieve the maximum feasible and cost-effective emissions reductions. The regulation text is available through ARB: <http://www.arb.ca.gov/cc/docs/ab32text.pdf>

§ AB 32 defines the following compounds as GHGs subject to emissions regulation: carbon dioxide (CO₂), methane (CH₄), nitrous oxide (N₂O), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), and sulfur hexafluoride (SF₆). Emissions of CO₂ are largely by-products of fossil fuel combustion, whereas methane results from off-gassing associated with agricultural practices and landfills. Under AB 32, by January 1, 2008, the ARB is required to determine statewide GHG emissions in 1990 and set the 2020 limit equivalent to that level. In addition, also by January 1, 2008, the ARB is required to adopt mandatory reporting and verification regulations.

- Since the passage of AB 32 last year, ARB has been conducting a number of public workshops to solicit input from all interested parties on the determination of the 1990 GHG inventory and the mandatory reporting and verification requirements. Port-related sources are not currently among those under consideration for mandatory reporting requirements at this time. Staff reports are available through ARB.

<http://www.arb.ca.gov/regact/2007/ghg2007/ghg2007.htm>

§ The first set of GHG emission reduction measures, known as “early action measures”, was presented to the Board in June 2007. Early action measures are measures that are currently underway or are to be initiated by the ARB in the 2007-2012 timeframe. The early action measures cover a number of sectors including residential, transportation, fuels, and agriculture.

- A subset of these measures must be adopted by regulation by January 1, 2010 as required by AB 32. One of these is the “Green Ports” measure, described as a strategy that involves providing an alternative source of power for ships while they are docked. The implementation of this measure is proposed to be through the shore power regulation that is currently under development to control NO_x and DPM emissions. The regulation will include quantification of the associated CO₂ emission reductions.

http://www.arb.ca.gov/cc/ccea/meetings/091707workshop/ea_ii_report.pdf

A.4.2 California Environmental Quality Act (CEQA)

CEQA (California Public Resources Code section 21000 et seq., passed in 1970) requires state and local public agencies to identify the environmental impacts of proposed discretionary activities or projects, determine if the impacts will be significant, and identify alternatives and mitigation measures that will substantially reduce or eliminate significant impacts to the environment. With respect to CEQA and greenhouse gases, the California Legislature passed Senate Bill 97 (SB 97) which addresses GHG analysis under CEQA. The bill exempts transportation projects funded under the Highway Safety, Traffic Reduction, Air Quality and Port Security Bond Act of 2006 and projects funded under the Disaster Preparedness and Flood Prevention Bond Act of 2006 from having to analyze GHG emissions for CEQA documents.

§ California Environmental Quality Act. Additional information about CEQA can be found at the following website:

- <http://ceres.ca.gov/ceqa/>

§ Information about SB 97 can be found at the California Senate web site:

- http://info.sen.ca.gov/cgi-bin/postquery?bill_number=sb_97&sess=CUR&house=B&site=sen

A.5 GOODS MOVEMENT AND PORTS' INITIATIVES

A.5.1 United States EPA

As mentioned in section 2.5.1 of the 2007 CAP Draft, the USEPA's Office of Transportation and Air Quality (OTAQ) has several regulatory and non-regulatory programs designed to reduce diesel emissions, many of which address emissions from port-related sources.

§ National Clean Diesel Campaign: <http://www.epa.gov/otaq/diesel/index.htm>

§ Clean Ports USA: <http://www.epa.gov/otaq/diesel/ports/index.htm>

§ SmartWay Transport program: <http://www.epa.gov/otaq/smartway/index.htm>

§ Verification Program for Diesel Retrofit Technologies: <http://www.epa.gov/otaq/retrofit/verification-process.htm>

§ Heavy Duty Highway Diesel Program (2007 Highway Diesel Rule):
<http://www.epa.gov/otaq/highway-diesel/index.htm>

§ Nonroad Diesel Rule: <http://www.epa.gov/nonroad-diesel/2004fr.htm>

A.5.2 California

A.5.2.1 Diesel Risk Reduction Plan

The DRRP comprises a main report and nine appendices. The main report provides a summary of current regulations that address DPM emissions from diesel-fueled engines and vehicles, present and future emission inventory, and associated potential cancer risk as well as available control measures. The report is available at

<http://www.arb.ca.gov/diesel/documents/rrpFinal.pdf>

Specific airborne toxic control measures (ATCM) and fuel or vehicular emissions regulations designed to reduce DPM emissions were developed following ARB approval of the DRRP. The cost-effectiveness and technological feasibility of each recommended measure are assessed during the actual rulemaking process. Each recommended measure is developed through a public process to provide full opportunity for stakeholders to participate before a rule is finalized.

Appendix III, entitled "Mobile Diesel-Fueled Engines: Report on the Need for Further Regulation of Particulate Matter Emissions," contains the information most relevant to port-related sources: an emission inventory, summary of existing regulations, and the recommended measures for further action as described below:

- § Control measures discussed in the DRRP for Heavy-Duty Vehicles (HDVs) included low emission standards for new engines and retrofits for existing on-road engines. In addition, the DRRP proposed controlling emissions from in-use HDVs with compliance testing, on-board diagnostic systems (OBD), and inspection and maintenance programs.
- § Control measures offroad engines, which may apply to CHE at ports, also included low emission standards for new engines, retrofit for existing engines, and control of emissions from in-use engines by compliance testing. In addition, the DRRP suggested adoption of diesel PM emission standards for new diesel pleasure craft engines. The standards were proposed to apply to both inboard and auxiliary engines used for power generation and propulsion.
- § For locomotives, the DRRP recommended retrofits of locomotive engines, and use of after-treatment technology such as diesel particulate filters.
- § For commercial marine vessels the DRRP proposed voluntary speed reduction for ocean-going ships operating in California waters, a mandatory reduction in fuel sulfur levels, a federal incentive program to provide funds for repowering with cleaner engines and retrofits, and federal engine standards for commercial marine engines when rebuilt or repowered.

A.5.2.2 Goods Movement Action Plan

The Goods Movement Action Plan is a strategy to address the economic and environmental issues associated with goods movement in California via highways, railways and ports.

<http://www.arb.ca.gov/gmp/docs/gmap-1-11-07.pdf>

A.5.3 West Coast Port Initiatives

Further information on other port initiatives can be found through the references listed below from the individual ports.

- § The San Pedro Bay Ports' CAAP POLA and POLB combine to form the fifth-busiest port complex in the world, with over 8,000 vessels calling each year. They move over 40% of the nation's containerized trade, valued at more than \$260 billion a year

http://www.polb.com/environment/air_quality/clean_air_action_plan.asp

The SPBP CAAP tackles emissions at three interrelated levels: ports-wide, projectspecific, and source-specific. Ports-wide standards address port-related mobile sources, the ports' fair share of excess regional pollutant levels, and meeting state and federal air quality standards at on-port monitoring stations. Project-specific standards include residential cancer risk thresholds and required mitigation measures for

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projects exceeding significance thresholds for criteria pollutants. Source-specific performance standards target all emissions categories (ocean-going vessels, harbor craft, rail, cargo-handling equipment, and trucks) and will be met through lease requirements, tariffs, incentives, and other mechanisms.

§ The Northwest Ports Clean Air Strategy

http://www.portseattle.org/downloads/community/environment/NWCleanAirStrat_20071.pdf

§ Bay Area Air Quality Management District's (BAAQMD's) Green Ports Initiative

http://www.baaqmd.gov/pln/ruledev/ports_rgcpts_041807.pdf

§ The Port of Oakland is voluntarily developing a Maritime Air Quality Improvement Plan (MAQIP), in collaboration with the BAAQMD and the West Oakland Environmental Indicators Project. The MAQIP is intended to serve the dual purpose of developing mechanisms for tracking and qualifying the benefits of regulatory action and identifying additional emissions reductions measures and a framework for implementing them.

- Materials from the meetings of the MAQIP task force and other materials related to the process are available on-line at the Port of Oakland web site.

http://www.portofoakland.com/environm/prog_04c.asp

- The MAQIP is designed to provide a source of options from which port tenants and operators can draw

http://www.portofoakland.com/pdf/maqip071105_03.pdf

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APPENDIX B

PORT OF SAN DIEGO 2006 EMISSIONS INVENTORY

Appendix B contains the Executive Summary of the Port of San Diego 2006 Emissions Inventory. The full report is available from the San Diego Unified Port District Website:

http://www.portofsandiego.org/sandiego_environment/documents/2006_air_emissions_inventory-september_2007.pdf

EXECUTIVE SUMMARY

The Port of San Diego, created in the early 1960's, is a self-supporting public entity that oversees the protection and development of public lands surrounding San Diego Bay. The Port balances economic growth, environmental stewardship, community services and public safety. San Diego Bay is located about 96 nautical miles southeast of Los Angeles and is just north of the United States-Mexico border. The Port serves as a transshipment facility for the region which includes San Diego, Orange, Riverside, San Bernardino and Imperial counties, in addition to northern Baja California, Arizona and other points east of California. The purpose of the Port of San Diego 2006 Emissions Inventory is to develop baseline emissions estimates based on maritime-related activities that occurred in calendar year 2006. The 2006 EI includes the Port-owned marine terminals:

- Ø Tenth Avenue Marine Terminal
- Ø National City Marine Terminal
- Ø B Street Cruise Ship Terminal

Emissions from cargo handling equipment (CHE) were estimated for the three Port-owned marine terminals. Emissions from switching and line haul railroad locomotives were estimated for the on-dock rail yards and the rail lines linking to the facilities. For heavy-duty trucks related to the hauling of cargo, emissions from queuing at terminal entry gates, for travel and idling within the terminals, and for queuing at the terminal exit gates have been included. In addition to the emissions that occur inside the Port facilities, emissions for Port-related activity that occurs within the San Diego County boundary have been estimated up to the first point of rest within the San Diego County boundary. For marine vessels, ocean-going vessels and commercial harbor craft, the geographical extent of the EI is:

- Ø Southern boundary: U.S.-Mexico international border extended over water
- Ø Northern boundary: San Diego County line extended over the water
- Ø Western boundary: 24 nautical miles west of the coastline

The inventory does not include stationary sources, as these are included in stationary source permitting programs administered by the San Diego Air Pollution Control District (SDAPCD). Due to security concerns and the scope of the inventory, emissions from the military vessels and related military activity are not included in the inventory. In summary, the inventory does not include emissions from:

- Ø Stationary sources
- Ø Military vessels
- Ø Recreational vessels
- Ø Facilities in San Diego Bay that are not in Port-owned land

The emission results for the Port of San Diego for calendar year 2006 are presented below. Tables ES.1 and ES.2 summarize the 2006 emissions for the criteria pollutants and greenhouse gases, respectively.

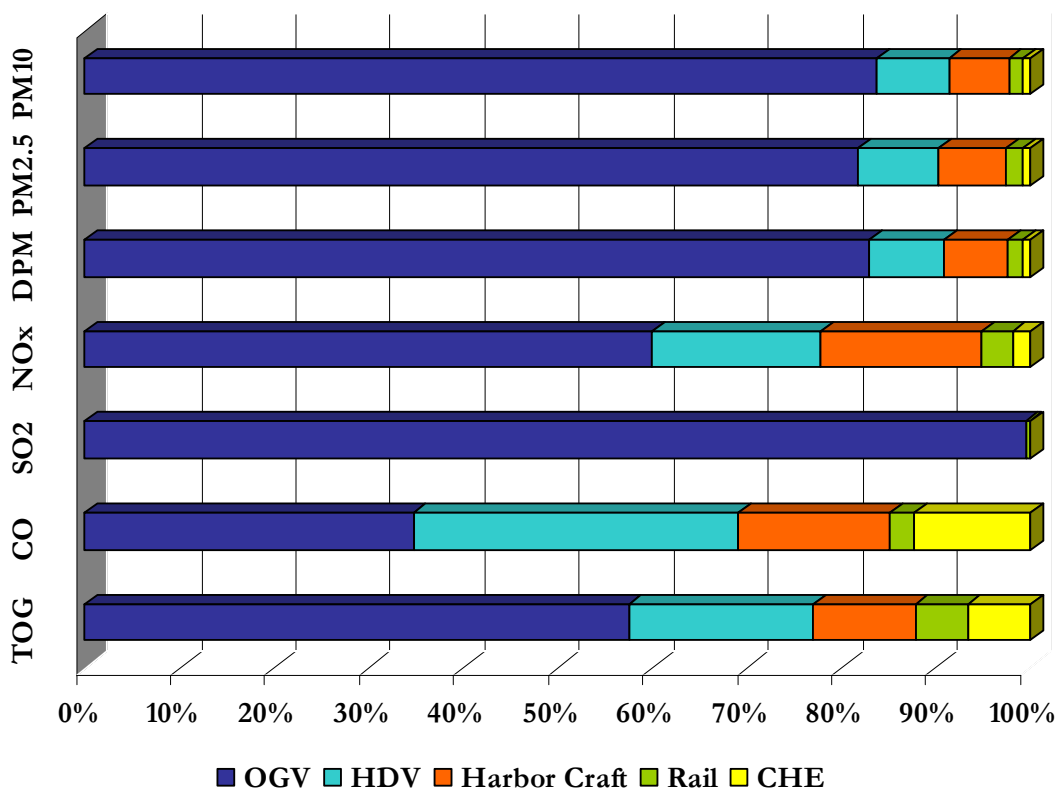
Table ES.1: 2006 Total Port-Related Emissions by Category, tpy

Source Category	PM ₁₀	PM _{2.5}	DPM	NO _x	SO ₂	CO	HC
Ocean-going Vessels	116.4	93.1	108.7	1,107.8	1,009.3	120.1	35.5
Harbor Craft	8.8	8.1	8.8	313.5	0.2	55.3	6.7
Cargo Handling Equipment	1.0	0.9	0.9	33.4	0.0	42.5	4.0
Rail Locomotives	2.1	2.0	2.1	61.4	4.1	8.9	3.4
Heavy-Duty Vehicles	10.5	9.7	10.5	331.0	0.1	119.2	12.1
Cruise Terminal Transportation	0.1	0.1	0.0	6.7	0.1	54.3	3.4
Total	139.0	113.9	131.0	1,853.8	1,013.8	400.4	65.2

Table ES.2: 2006 Total Port-Related Greenhouse Gas Emissions by Category, tpy

Source Category	CO ₂	N ₂ O	CH ₄	CO ₂ Equivalents			Total
				CO ₂	N ₂ O	CH ₄	
Ocean-going Vessels	59,859.9	3.0	0.3	59,859.9	939.1	7.1	60,806.1
Harbor Craft	22,700.8	0.7	3.0	22,700.8	204.0	62.2	22,966.9
Cargo Handling Equipment	4,411.7	0.1	0.2	4,411.7	35.9	4.5	4,452.2
Rail Locomotives	3,368.3	0.1	0.3	3,368.3	26.4	5.6	3,400.3
Heavy-Duty Vehicles	31,958.5	1.2	0.7	31,958.5	372.0	14.6	32,345.1
Cruise Terminal Transportation	4,209.6	0.0	0.5	4,209.6	2.3	9.5	4,221.5
Total	126,508.9	5.1	4.9	126,508.9	1,579.7	103.5	128,192.1

Figure ES.1: Distribution of 2006 Port-related Emissions by Category



In terms of population, San Diego is the sixth largest of California’s fifty-eight counties and the City of San Diego is second only to Los Angeles. Established on February 18 of 1850, San Diego County covers some 4,200 square miles bordered by Orange and Riverside counties to the north, Imperial County to the east, Mexico to the South and the Pacific Ocean to the west.

The San Diego Air Pollution Control District (SDAPCD) encompasses all of San Diego county and is currently designated as a non-attainment area for Ozone and Particulate Matter (PM₁₀) having exceeded the Federal and State eight hour ozone standards on 14 and 68 days, respectively in 2006, and the one hour state ozone standard on 23 days in that same year. An area is deemed to be in non-attainment when it fails to achieve compliance with Federal or State Ambient air quality standards established by the United States Environmental Protection Agency (U.S. EPA) or the State of California Air Resources Board (CARB). According to CARB, the various emission sources within the SDAPCD contributed over 200 tons per day of Oxides of Nitrogen (an ozone precursor) and PM in 2006.

The highest emitting source categories in San Diego County are: on-road vehicles which include gas and diesel powered cars and trucks; off-road vehicles which include ships and aircraft; and processes associated with the generation of electricity. In order to put into perspective the emissions from Port related operations, Table ES.3 presents the emissions in tons per year for the Port as well as for other major emitting sources in the region.

NASSCO is the National Steel and Shipbuilding Company. The “other sources” category includes on-road vehicles along with other emissions not listed separately in the table.

Table ES.3: Comparison of Emissions for San Diego County, tpy

Source		PM ₁₀	NO _x	SO ₂	CO	HC
Port of San Diego	2006 Emissions (Sep 07 Report)	139	1,854	1,014	400	65
South Bay Power Plant	2006 AFC, CEC	138	295	122	2,898	113
San Diego International Airport	Draft EIR Airport Master Plan 2005	13	716	67	1,082	140
NASSCO	2004 APCD	25	45	0	0	0
Other Sources		42,974	74,142	3,834	329,376	60,929
Total Emissions SDAPCD		43,289	77,052	5,037	333,756	61,247

Figure ES.2 illustrates that the Port of San Diego is not a large contributor to PM, NO_x, and hydrocarbon emissions in San Diego County when compared to total emissions in the San Diego Air Pollution Control District. Approximately 18% of the SO_x emissions in San Diego County are attributed to Port of San Diego operations due to the type of fuel used by ocean going vessels which has much higher sulfur content than the on-road vehicles.

Figure ES.2: Comparison of Emissions for San Diego County

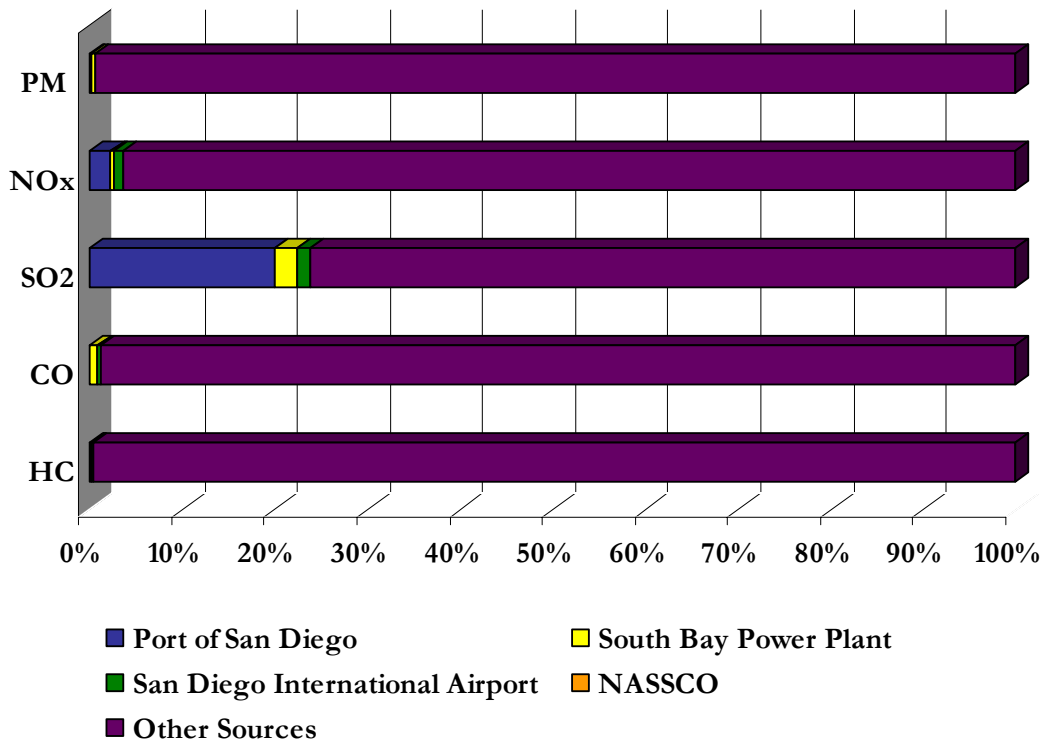
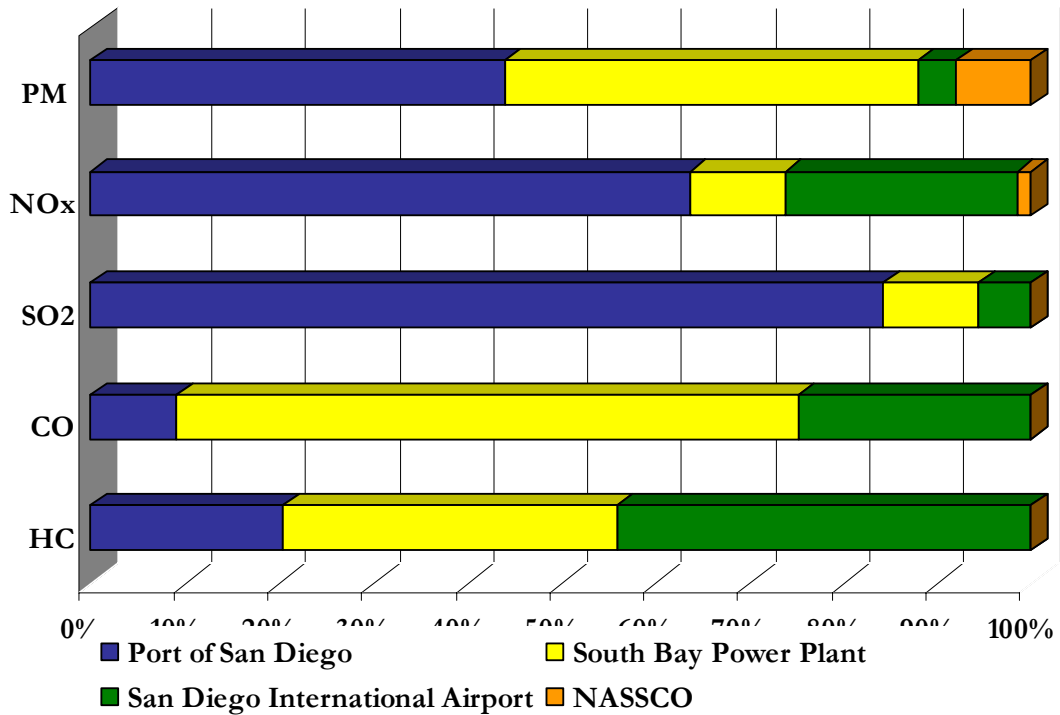


Figure ES.3 compares the Port of San Diego, South Bay Power Plant, the San Diego International Airport and the shipbuilding company (NASSCO), but excludes the “other sources” in San Diego County.

Figure ES.3: Comparison of Emissions in San Diego County



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APPENDIX C

REGULATORY SUMMARY INFORMATION

Table C - 1. Summary of Current and Proposed Regulations Related to Ocean Going Vessels

Ocean Going Vessels (OGVs)

Regulatory Activity	Agency	Description	Current Status	Adoption Date	Link
ATCM – Auxiliary Engines (Low Sulfur Fuel Rule)	ARB	Sets interim (2007) and future (2010) emission limits for auxiliary engines within 24 nm of coast. Compliance can be achieved by meeting low-sulfur fuel guidelines: effective 2007, MGO with ≤0.5% sulfur by weight or MGO with ≤1.5% sulfur; effective 2010, MGO ≤0.1% sulfur.	Unenforceable based on District Court decision on August 31st. Rule was not enforced from August 30 through October 23 due to injunction. A stay of the injunction was granted on October 23, 2007 and enforcement resumed on October 24, 2007. 2007 and 2010 Phase-in 2010 standards open to review in 2008.	12/31/2006	http://www.arb.ca.gov/regact/marine2005/marine2005.htm
ATCM – Main Engines (Low Sulfur Fuel Rule)	ARB	Brings main engine fuel requirements in line with auxiliary engine requirements. The two proposed phase-in alternatives are: (1) require MGO with 0.1% sulfur by weight in 2010, or (2) require MGO with 1.5% sulfur by weight or MDO with 0.5% sulfur by weight in 2009 and update to MGO with 0.1% sulfur by weight in 2012.	Proposed for adoption in 2007. Latest information from 9/24/2007 workshop. Potential rule under consideration for 2009 effective date	Proposed 2007	http://www.arb.ca.gov/ports/marinevess/marinevess.htm http://www.arb.ca.gov/ports/marinevess/documents/092407ogvdraftreg.pdf
ATCM – Shore power	ARB	Control hoteling emissions by requiring shore power for 50% of visits by 2014 and 80% by 2020, or achieve equivalent terminal emissions reductions.	Adopted after presented to the Board on Dec. 6 2007. Latest information from 11/09/2007 workshop.	12/01/2007	http://www.arb.ca.gov/ports/shorepower/shorepower.htm http://www.arb.ca.gov/newsrel/nr120507.htm
ATCM - Cruise Ship Onboard Incineration	ARB	Prohibition against incinerating within 3 nm of coast.	Currently in effect. Amendment in development to expand to OGVs.	11/17/2005	http://www.arb.ca.gov/ports/shipincin/shipincin.htm
ATCM – Vessel speed reduction	ARB	Sets a speed limit (e.g. 12 knots) within a distance threshold (e.g. 20 nm) from port. Speed and distance TBD.	Was a voluntary agreement between ARB, POLA, and POLB between 2001 and 2004. Currently under development. Latest information from July 12, 2007 workshop.	Proposed 2008	http://www.arb.ca.gov/ports/marinevess/vsr/vsr.htm
EPA Marine Diesel Engine Rule (Tier 3 and Tier 4 Standards)	EPA	Sets new Tier 3 regulations on small, Cat. 1, and Cat. 2 marine diesel engines (<30 L) to decrease PM emissions by approximately 73% and NOx emissions by 67%, effective 2009-2012. Also sets a Tier 4 standard for commercial engines > 800 hp and recreational engines > 2,000 hp effective 2014.	Under development; final rule expected end of 2007. Scheduled to be effective for smallest engines 2009, other engines 2012. Tier 4 standards would apply starting in 2014.	Proposed 2007	http://www.epa.gov/otaq/marine.htm#proposed http://www.epa.gov/otaq/regs/nonroad/420f07015.pdf
EPA Large Marine Diesel Engine Rule	EPA	Sets new Tier 2 regulations on Cat. 3 marine diesel engines (≥30 L), using high-efficiency catalytic after treatment to reduce emissions. Exact limits TBD. Will update and improve upon the standards set in MARPOL Annex VI and ratified in April 2006 (described below)	Under development. Change in regulatory deadline and advance notice on November 29, 2007	Proposed 12/17/2009	http://www.epa.gov/otaq/oceanvessels.htm http://www.epa.gov/otaq/regs/nonroad/marine/ci/420f07067.htm

Table C - 1. Summary of Current and Proposed Regulations Related to Ocean Going Vessels

Ocean Going Vessels (OGVs)

Regulatory Activity	Agency	Description	Current Status	Adoption Date	Link
EPA Tier 1 Standards for New Marine Diesel Engines	EPA	Sets mandatory Tier 1 emissions standards for Cat. 1, Cat. 2, and Cat. 3 engines built 2004 and later. Standards range from 9.8 to 17 g NOx/kW-hr, depending on engine speed.	Update from 1999 voluntary Cat. 1 and Cat. 2 standards. Standards are identical to those set by MARPOL Annex VI 2000 NOx Standard.	01/01/2003	http://www.epa.gov/otaq/oceanvessels.htm
MARPOL Annex VI 2000 NOx Standard	IMO (EPA lead)	Tier 1 International emission standards for marine diesel engines greater than 130 kW built on or after 2000. Mandates NOx and SOx emission limits on OGVs.	Adopted by IMO September 1997 and effective for initial ratifying countries May 2005. U.S. ratified Annex VI April 2006. Standards are identical to EPA standards already in effect since 2004 (see EPA Tier 1 Standards). EPA-led amendments currently under development (see EPA Large Marine Diesel Engine Rule).	Ratified by U.S. April 2006	http://www.epa.gov/otaq/oceanvessels.htm
MARPOL Annex VI US Designated Sulfur Emissions Control Area	IMO (EPA lead)	U.S. application for a SOx Emission Control Areas (SECA). In a SECA, fuel sulfur levels are capped at 1.5% or less potentially within 200 nm of shore as defined by Exclusive Economic Area (EEA)	Under development; US EPA preparing justification and other background materials.		http://www.arb.ca.gov/research/seca/seca.htm

Abbreviations:

- ATCM: Airborne Toxic Control
- ARB: (California) Air Resources
- EPA: Environmental Protection
- IMO: International Maritime
- MDO: Marine Diesel Oil
- MGO: Marine Gas Oil
- nm: nautical mile
- NOx: Nitrogen Oxides
- OGV: Ocean Going Vessel
- PM: Particulate Matter
- POLA: Port of Los Angeles
- POLB: Port of Long Beach
- SECA: SOx Emission Control Area
- TBD: To be determined

Table C - 2. Summary of Current and Proposed Regulations Related to Harbor Craft

Harbor Craft

Regulatory Activity	Agency	Description	Current Status	Adoption Date	Link
California Diesel Regulation for Harbor Craft and Intrastate Locomotives	ARB	Requires Ultra-Low Sulfur Diesel (<15 ppm sulfur) fuel use in harbor craft and diesel-electric locomotives.	Currently in effect (since January 2006).	07/05/2005	http://www.arb.ca.gov/regact/carblohc/carblohc.htm http://www.arb.ca.gov/regact/carblohc/rfro.pdf
ATCM – Main and auxiliary engines Harbor Craft rule	ARB	Reduce PM and NOx from in-use and new commercial harbor craft to comply with EPA Marine Emissions Standards Tier 2 or Tier 3, depending on model year.	Under development; draft published 9/11/2007. Proposed phase-in 2009-2020, depending on model year.	Proposed 2009	http://www.arb.ca.gov/regact/2007/chc07/chc07.htm
EPA proposed Tier 3 and Tier 4 standards	EPA	EPA marine diesel Tier 3 and Tier 4 rules (see "Ocean Going Vessels" category, "EPA Marine Diesel Rule" regulatory activity) will apply to harbor craft as well.	Under development; final rule expected end of 2007. Scheduled to be effective for smallest engines 2009, other engines 2012. Tier 4 standards would apply starting in 2014.	Proposed 2007	http://www.epa.gov/otaq/marine.htm

Abbreviations:

- ATCM: Airborne Toxic Control Measure
- ARB: (California) Air Resources Board
- EPA: Environmental Protection Agency
- nm: nautical mile
- NOx: Nitrogen Oxides
- PM: Particulate Matter
- TBD: To be determined

Table C-3. Summary of Current and Proposed Regulations Related to Mobile Source Categories

Heavy Duty On-Road Vehicles

Regulatory Activity	Agency	Description	Current Status	Adoption Date	Link
ATCM – Heavy-Duty Trucks at Port and Intermodal Rail Facilities (ARB Port Truck Rule)	ARB	Requires port trucks to meet either 1994 - 2003, 2004, or 2007 federal HDDE standards, depending on engine model year. After 12/31/2013, every truck should meet or exceed 2007 federal standards.	Adopted after presented to the Board on Dec. 6 2007. Latest information from 11/28/2007 update to 10/11/2007 draft language.	12/06/2007	http://www.arb.ca.gov/msprog/onroad/porttruck/porttruck.htm http://www.arb.ca.gov/newsrel/nr120507.htm
ATCM – On-Road Heavy-Duty Diesel Vehicles (in-use)	ARB	Require private fleet operators to replace/retrofit diesel trucks greater than 14,000 GVWR to meet emission standards. Phase 1 compliance will take place 2010-2013; Phase 2 2017-2021. Requirements applicable to port truck fleets would likely be superseded by the ARB Port Truck Rule.	Under development; latest information from October 2007 workshop.	Proposed mid-2008	http://www.arb.ca.gov/msprog/onrdiesel/onrdiesel.htm
ARB On-Road (New) Heavy-Duty Truck Emission Standards	EPA/ARB	Coordinated MY 2007 ARB and EPA standards require use of diesel particulate filters, bringing PM rates to near-zero levels. MY 2010 standards will bring emissions to near-zero rates for NOx. Some natural gas engines are already compliant with MY 2010 standards.	Currently in effect. 2007 and 2010 phase-in.	2002	http://www.arb.ca.gov/regact/HDDE2007/hdde2007.htm
California Diesel Fuel Standards §2281 Sulfur content of diesel fuels	ARB	Require less than 15 ppm sulfur diesel fuel starting 2006.	Currently in effect (since June 2006)	2003	http://www.arb.ca.gov/regact/ulsd2003/ulsd2003.htm http://www.arb.ca.gov/regact/ulsd2003/fro2.pdf
Heavy Duty Vehicle Idling Emission Reduction Program	ARB	2008 and newer model year trucks must have 5 min. auto shutdown or meet stringent NOx emission standards while idling.	Currently in effect.	10/20/2005	http://www.arb.ca.gov/msprog/truck-idling/truck-idling.htm
ATCM - In-use Commercial Vehicle Idling	ARB	Limits idling of commercial trucks and buses to no more than 5 minutes	Currently in effect. Expands to Sleeper Berth trucks	02/01/2005 01/01/2008	http://www.arb.ca.gov/toxics/idling/idling.htm
On-Board Diagnostic System Requirements for 2010 and Subsequent Model-Year Heavy-Duty Engines (HD OBD)	ARB	Onboard Diagnostic System Initial requirements for MY2010 engines. Requires installation of a system to monitor emissions related components of the vehicle.	Currently in effect.	02/15/2006	http://www.arb.ca.gov/regact/hdodb05/hdodb05.htm
Heavy duty vehicle inspections	ARB	Requires heavy-duty trucks and buses to be inspected for excessive smoke and tampering and expired low NOx software.	Currently in effect.	1998	http://www.arb.ca.gov/msprog/hdvp/hdvp.htm#regulations

Abbreviations:
 ATCM: Airborne Toxic Control Measure
 ARB: (California) Air Resources Board
 EPA: Environmental Protection Agency
 GVWR: Gross Vehicle Weight Rating
 HDDE: Heavy duty diesel engine
 MY: Model year
 NOx: Nitrogen Oxides
 OBD: On-board Diagnostics
 PM: Particulate Matter
 ppm: parts per million
 TBD: To be determined

Table C-4. Summary of Current and Proposed Regulations Related to Mobile Source Categories

Cargo Handling Equipment

Regulatory Activity	Agency	Description	Current Status	Adoption Date	Link
ATCM - Cargo Handling Equipment	ARB	The general compliance pattern is that engines must either meet on-road certifications or Tier 4 certification, or else use the best engine and VDECS possible, at least until better engines/VDECS become available. Specifics vary according to engine age, VDECS use, and fleet size.	Currently in effect, since 2007	12/31/2006	http://www.arb.ca.gov/regact/cargo2005/cargo2005.htm http://www.arb.ca.gov/ports/cargo/documents/chefactsheet0207.pdf
Off-Road Emissions Regulation for Compression Ignition Engines and Equipment	EPA/ARB	Coordinate CARB and EPA standards adopted in 2000 and 2004, with varying compliance timelines depending on horsepower. Final Tier 4 standards will bring emissions down to near-zero levels by 2015 on average.	Phase-in 2008 through 2015	2004	http://www.arb.ca.gov/regact/offrdcie/offrdcie.htm
Clean Fuels Requirement	ARB	Ultra Low Sulfur Fuel, Require less than 15 ppm sulfur diesel fuel	Currently in effect, Effective June 2006	06/01/2006	http://www.arb.ca.gov/fuels/diesel/diesel.htm#currentreg
ATCM – Transportation Refrigeration Units	ARB	Sets Low and Ultra-Low Emission TRU In-Use Performance Standards. Compliance is either through meeting PM emission limit, VDECS, or an alternative compliant system.	Currently in effect, since 2004. Compliance phased from 2008-2020, based on engine model year.	12/10/2004	http://www.arb.ca.gov/regact/trude03/fro1.pdf



Table C-4. Summary of Current and Proposed Regulations Related to Mobile Source Categories

Off-Road Diesel Vehicles

Regulatory Activity	Agency	Description	Current Status	Adoption Date	Link
California DPM and NOx emission standards for off-road diesel vehicle fleets	ARB	Sets yearly fleet-average NOx and diesel PM emission standards, idling limits, and BACT/VDECS rules.	2010 - 2015 phase-in	7/26/2007	http://www.arb.ca.gov/regact/2007/ordiesl07/tsdappa.pdf

Abbreviations:

- ATCM: Airborne Toxic Control Measure
- ARB: (California) Air Resources Board
- BACT: Best available control technology
- DPM: Diesel Particulate Matter
- EPA: Environmental Protection Agency
- HDDE: Heavy-Duty Diesel Engine
- NOx: Nitrogen Oxides



Table C - 5. Summary of Current and Proposed Regulations Related to Other Source Categories

Locomotives

Regulatory Activity	Agency	Description	Current Status	Adoption Date	Link
Tier 0 - Tier 2 remanufactured engine emissions standards	EPA	The original Tier 2 for new engines took effect in 2005. This proposes emission standards for remanufactured engines, to take effect as early as 2008 but no later than 2010.	Proposed by EPA to be effective 2008.	Proposed 2008+	http://www.epa.gov/otaq/regs/nonroad/420f07015.pdf
Tier 3 - Tier 4 New engine emissions standards	EPA	Additional long-term emission standards for new engines (based on use of 15 ppm sulfur fuel). Planned phase-in is 2009 for Tier 3, 2012 or later for Tier 4.	Proposed by EPA to take effect 2009.	Proposed 2008+	http://www.epa.gov/otaq/regs/nonroad/420f07015.pdf
Memorandum of Understanding between ARB and railroads	ARB	BNSF and UPRR agree to comply with idling limits, use low sulfur fuel, reduce visible pollution, monitor health risks, etc.	BNSF and UPRR agree to reduce idling emissions from 99% of locomotives by 2008; community notices; health risk assessments; visible smoke limits	06/30/2005	http://www.arb.ca.gov/railyard/ryagreement/083005mouexecuted.pdf
California Diesel Regulation for Harbor Craft and Intrastate Locomotives	ARB	Requires use of off-road low (less than 15 ppm) sulfur fuel for engines used 90% in-state (mostly switcher engines)	Currently in effect (since January 2007).	05/16/2005	http://www.arb.ca.gov/regact/carblohc/carblohc.htm http://www.arb.ca.gov/regact/carblohc/rfro.pdf

Abbreviations:

- ATCM: Airborne Toxic Control Measure
- ARB: (California) Air Resources Board
- EPA: Environmental Protection Agency
- ppm: parts per million
- UP: Union Pacific Railroad
- VDECS: Verified Diesel Emission

DRAFT

*SAN DIEGO UNIFIED PORT DISTRICT 2007 CLEAN AIR PROGRAM DRAFT REPORT
APPENDIX D*



APPENDIX D

SUPPLEMENTARY INFORMATION ON CONTROL MEASURES

APPENDIX D:

SUPPLEMENTARY INFORMATION ON CONTROL MEASURES

This appendix provides additional relevant background information in support of Chapter 4 of the 2007 CAP Draft Report: "Control Measures". The sections below contain details on the topics introduced in the report and/or references for further information.

D.1 OCEAN GOING VESSELS – HOTELING

D.1.1 Low Sulfur Fuel

Emissions reductions can be achieved through the combustion of fuels with lower sulfur content in the auxiliary engines while at berth. The use of low sulfur fuel results in a direct reduction in particulate matter (PM) emissions, but also significantly improves the emissions reduction efficiency of passive diesel particulate filters (DPFs) (NREL 2002). Current regulations require the use of Marine Gas Oil (MGO) containing less than 1.5% sulfur by weight or Marine Diesel Oil (MDO) containing less than 0.5% sulfur by weight in the auxiliary engine. A stricter limit requiring use of MGO with less than 0.1% sulfur by weight goes into effect in 2010.

- Additional information on this regulation can be found on the Air Resources Board (ARB) web page: Rulemaking to Consider the Adoption of Proposed Regulations to Reduce Emissions from Auxiliary Diesel Engines
<http://www.arb.ca.gov/regact/marine2005/marine2005.htm>
- This regulation was determined to be unenforceable based on a District Court decision on August 31, 2007 (*Pacific Merchant Shipping Ass'n v. Thomas A. Cackette* (E.D. Cal. Aug. 30, 2007), No. Civ. S-06-2791-WBS-KJM.). A stay of the injunction was granted on October 23, 2007 and enforcement resumed on October 24, 2007 (*Pacific Merchant Shipping Ass'n v. Thomas A. Cackette*, No. 07-16695 (9th Cir. Oct. 23, 2007)). The District Court decision was not vacated and is currently undergoing review at the appeals level.
 - ARB's Notice to Ship Owners and Operators
<http://www.arb.ca.gov/ports/marinevess/documents/auxenforce102407.pdf>
- The San Pedro Bay Ports' (SPBP's) Clean Air Action Plan (CAAP)
The SPBP's CAAP expands the measures in the existing auxiliary engine fuel regulation by specifying fuel oil of less than 0.2% sulfur by weight, rather than 0.5%. An overview of the CAAP control measure can be found in the "Control Measures and Initiatives" section of the CAAP Overview.

- Final 2006 San Pedro Bay Ports Clean Air Action Plan. Overview.

<http://www.cleanairactionplan.org/reports/documents.asp>

- The Northwest Ports Clean Air Strategy

The Northwest Ports Clean Air Strategy performance measure for OGVs for the short-term includes use of distillate fuels (e.g. MDO) with less than 0.5% sulfur for ships excluding cruise ships. The goal for home-ported cruise ships is use of fuels with a maximum sulfur content of 1.5%, or use of shore power. The long term goals reduce the sulfur content to less than 0.1%. These sulfur content goals are behind the time table set out in the adopted California regulations.

- Northwest Ports Clean Air Strategy. November 8, 2007 Draft.

http://www.portseattle.org/downloads/community/environment/NWCleanAirStrat_20071.pdf

D.1.2 Shore Power

Shore power refers to the practice of shutting off engines and connecting to power on shore while at berth. The emissions produced by the combustion of fuel in the auxiliary engines are avoided.

There are significant technological difficulties related to the implementation of shore power. Both vessels and terminals must develop a tremendous amount of new infrastructure to support the use of shore power. There is also an issue of developing an international standard of compatible ship and shore equipment. Shore power has been used for several decades by the US Navy, which has been able to implement uniform infrastructure throughout the fleet, but is much more challenging to implement among international cargo and cruise ships.

ARB adopted the ATCM – Shore Power regulation at the December 6-7 2007 Board meeting. The measure will require vessels subject to the rule to use shore power while at berth for 50% of their visits by 2014 and 80% of their visits by 2020. Current proposed regulations apply to container ships, passenger ships, and Reefers; 2008 regulations will address bulk cargo ships, tankers, and vehicle carriers. In addition, the regulation has been adopted as a discrete early action measure under AB32 as the Green Ports measure. As such, it must be implemented by January 2010. The regulation allows a choice of implementation paths: distributed generation, grid power, and a combination of the two.

- San Diego Gas and Electric Study

In January 2007, the Port released a study conducted by SDG&E: *Cold Ironing Feasibility Study for Electric Services at Cruise Ship & 10th Ave. Marine Terminals*. The study estimated the feasibility and costs of expanding Port electrical infrastructure to provide shore power capability. Of the five options SDG&E considered, it recommended: a 69/12kV substation, located near the 10th Ave. Marine Terminal and five 12kV circuits. Two of the 12kV circuits would serve the 10th Ave. Marine

Terminal and three would off-load the existing SDG&E Station B substation. From the Station B substation, three 12kV circuits would serve the Cruise Ship Terminal. The initial cost of this system was estimated at \$32.2 million in 2008 valuation. In September 2007, the Port requested a revised cost estimate for a more limited cold ironing scenario. The new scenario would provide power for only one cruise ship at a time at the CST, rather than two, and only one ship at a time at TAMT. Consequently, the new substation would not need to be constructed and 1 ½ miles of electrical line would not be needed. The revised cost estimate was of the order of \$1.9 million. The construction of on-terminal, shore-side equipment is still estimated to be \$3 to \$5 million per terminal. The original study is available from the Port of San Diego's Clean Air Program web site:

http://www.portofsandiego.org/sandiego_environment/clean-air-program.asp

- Cold Ironing Feasibility Study for Electric Services at Cruise Ship & 10th Ave. Marine Terminals.

http://www.portofsandiego.org/sandiego_environment/documents/sdgande_draft_report_cold_ironing_feasibility_study.pdf

- Yorke Cold Ironing Study

In May 2007, the Port released *Port of San Diego: Cold Ironing Study*, an initial look into the feasibility of adopting shore power. The study assessed the cost effectiveness of implementation on a cost per emission reduction basis for cruise ships at the Cruise Ship Pier B Terminal and Dole Reefer vessels at the 10th Ave. Marine Terminal. Cruise ships were estimated to require \$23,500 per ton of oxides of nitrogen (NO_x) reduced and Dole Reefer vessels \$13,700 per ton of NO_x reduced. The bulk of the estimated costs were shore-side power infrastructure, ship electrical modifications, and net vessel operator energy costs.

In general, the Yorke report considers cost effectiveness for entire vessel classes (i.e., cruise ships and Dole Reefers) rather than for individual ships. In reality, the effectiveness for cold-ironing varies widely depending on time at berth and call frequency. Ships that are infrequent or short-duration callers have the same cost of implementation but smaller emission reduction. For example, 9 of the 23 cruise vessels studied call on the Port two or fewer times per year, and some ships only stay at berth for a few hours. These vessels drive up estimated the cost per emission reduction and may not be good candidates. Cost-effectiveness will have to be evaluated on a ship-by-ship basis.

Furthermore, the Yorke report only presents cost effectiveness on a NO_x emission reduction basis. Other air pollutants, such DPM, are also important factors in quantifying emission reduction effectiveness. The state Carl Moyer program's cost effectiveness analysis includes all three pollutants: NO_x, DPM, and volatile organic compounds (VOC). Expanding the pollutants considered will give a cost effectiveness value that is more comprehensive and more consistent with regulatory methodology.

- Port of San Diego Cold Ironing Study. May 2007.

http://www.portofsandiego.org/sandiego_environment/documents/port_of_sd_cold_ironing_study_march_2007.pdf

D.1.3 After-Treatment

Additional control measures to reduce OGV emissions are currently under development based on utilization of catalytic after-treatment technologies. The EPA Marine Diesel Engine Rule aims to reduce emissions from engines of less than 30 liters per cylinder through such technologies (USEPA 2007). The goals of the regulation are emissions reductions of 73% for DPM and 67% for NO_x. The EPA expects a final decision on the rule at the end of 2007, with anticipated implementation for Tier 3 standards beginning in 2009 for smaller engines and 2012 for remaining engines. Tier 4 standards will be implemented beginning in 2014.

Smaller engines have rated power less than 75 kW. Remaining engines subject to the rule have rated power between 75 kW and 3700 kW.

<http://www.epa.gov/otaq/regs/nonroad/420d07001.pdf>

Some of the technological advancements which may be useful in the future are not readily available at this time. After-treatment technologies, such as those prescribed in the EPA Marine Diesel Engine Rule, are currently under development. It may take substantial time before such technologies are widely available and economically feasible. Once available, it will also take time for the technology to penetrate the market, as the ship turnover rate is low.

The CAAP also includes a funded Technology Advancement Program to encourage the development and use of new cleaner marine strategies.

D.2 OCEAN GOING VESSELS – TRANSITING

The issue of the impact of off-shore emissions on on-shore air quality has been studied by many regional organizations as well as the International Maritime Organization (IMO). An ARB summary of this information can be found as Appendix F to the Initial Statement of Reasons for the Proposed Regulation for Auxiliary Diesel Engines and Diesel-Electric Engines Operated on Ocean-Going Vessels within California Waters and 24 Nautical Miles of the California Baseline.

<http://www.arb.ca.gov/regact/marine2005/appf.pdf>

D.2.1 Low Sulfur Fuel

Similar to the current regulation for auxiliary engines, low-sulfur fuel can be used in main engines during transiting to reduce off-shore emissions of diesel particulate matter DPM. The proposed Airborne Toxic Control Measure (ATCM) – Main Engines regulation aims to bring main engine fuel requirements in line with the requirements for auxiliary engines.

There are currently two proposed alternatives for main engine fuel requirements: (1) require MGO with 0.1% sulfur by weight in 2010, or (2) require MGO with 1.5% sulfur by weight or MDO with 0.5% sulfur by weight in 2009 and update to MGO with 0.1% sulfur by weight in 2012. Expected emissions reductions are 83% for DPM and less than 10% for NO_x.

- Additional information on this regulation can be found on the ARB webpage: Commercial Marine Vessels
<http://www.arb.ca.gov/ports/marinevess/marinevess.htm>
- The current draft proposal from September 24, 2007 is available through the ARB webpage.
 - Draft Proposed Regulation: Fuel Sulfur and Other In-Use Operational Requirements for Main Propulsion Diesel Engines and Auxiliary Boilers Operated on Ocean-Going Vessels Within California Waters and 24 Nautical Miles of the California Baseline
<http://www.arb.ca.gov/ports/marinevess/documents/092407ogvdraftreg.pdf>
- The San Pedro Bay Ports' CAAP
The San Pedro Bay Ports' CAAP proposes lower sulfur concentrations in the fuel and earlier implementation dates than those specified by ARB.
 - Final 2006 San Pedro Bay Ports Clean Air Action Plan. Overview.
<http://www.cleanairactionplan.org/reports/documents.asp>

D.2.2 Vessel Speed Reduction

The proposed ATCM – Vessel Speed Reduction is modeled after a voluntary agreement between ARB and the Port of Los Angeles (POLA) and Port of Long Beach (POLB) that existed from 2001 to 2004. Estimated emissions reductions from this agreement ranged from 40% to 50% for both DPM and NO_x.

- The precise speeds and distances have yet to be finalized, but the proposed measure is scheduled to take effect in 2008.
 - Vessel Speed Reduction for Ocean-Going Vessels
<http://www.arb.ca.gov/ports/marinevess/vsr/vsr.htm>
- The San Pedro Bay Ports' CAAP
The San Pedro Bay Ports' CAAP also proposes a VSR measure that expands the 2001-2004 voluntary VSR program to 40 nautical miles from the coast (compared to 24 nautical miles) by the first quarter of 2008.
 - Final 2006 San Pedro Bay Ports Clean Air Action Plan. Overview.
<http://www.cleanairactionplan.org/reports/documents.asp>

D.2.3 Engine Design

The IMO and EPA are both developing regulations that affect engine design to reduce emissions from transiting OGVs.

- MARPOL Annex VI 2000 NO_x Standard

In September 1997, the IMO adopted Tier 1 international emission standards for marine diesel engines greater than 130 kW built on or after 2000. This regulation became effective for initial ratifying countries in May 2005, and the U.S. ratified in April 2006.

- Information on the IMO MARPOL Annex VI Amendments can be found through the EPA webpage

<http://www.epa.gov/otaq/oceanvessels.htm#imo>

- EPA Tier 1 Standards for New Marine Diesel Engines

Before the U.S. ratified the MARPOL Annex VI 2000 NO_x Standard, the EPA had already set identical mandatory Tier 1 emissions standards for Category 1, Category 2, and Category 3 engines built in 2004 or later. The standards range from 9.8 to 17 grams NO_x/kW-hr, depending on engine speed.

- Details of the EPA regulations are available through the EPA webpage

<http://www.epa.gov/otaq/oceanvessels.htm#regs>

- Emission Standards for New Marine Diesel Engines: Relationship Between EPA's Control Program and MARPOL Annex VI

<http://www.epa.gov/otaq/regs/nonroad/marine/ci/f02004.pdf>

- EPA Federal Register 40 CFR Parts 9 and 94. Control of Emissions from New Marine Compression-Ignition Engines at or Above 30 Liters per Cylinder; Final Rule. February 28, 2003.

<http://www.epa.gov/otaq/url-fr/fr28fe03.pdf> (pg. 9761)

- EPA Large Marine Diesel Engine Rule

The EPA is developing Tier 2 regulations to improve upon the MARPOL Annex VI 2000 NO_x Standard and the EPA Tier 1 Standards for New Marine Diesel Engines. The regulations will apply to Category 3 marine diesel engines (≥30 liters per cylinder) and will employ the use of high-efficiency catalytic after-treatment technologies to reduce emissions.

- The regulation is under development; there was a change in the regulatory deadline on November 28, 2007.

<http://www.epa.gov/otaq/oceanvessels.htm>

<http://www.epa.gov/otaq/regs/nonroad/marine/ci/420f07067.htm>

- MARPOL Annex VI US Designated Sulfur Emissions Control Area

With Sulfur Emissions Control Areas (SECA), fuel sulfur levels are capped at 1.5% or less to regulate sulfur emissions from international ships. The EPA is currently preparing background materials and justification for the U.S. application for a SECA.

- More information can be found on the ARB webpage SO_x Emission Control Area (SECA)

<http://www.arb.ca.gov/research/seca/seca.htm>

- The San Pedro Bay Ports' CAAP

To supplement the emissions reductions achieved by federal regulations, the San Pedro Bay Ports' CAAP includes a Technology Advancement Program that will foster technologies applicable to transiting emissions.

- Final 2006 San Pedro Bay Ports Clean Air Action Plan. Overview.

<http://www.cleanairactionplan.org/reports/documents.asp>

- The Northwest Ports Clean Air Strategy

The Northwest Ports Strategy proposes after-market technologies such as scrubbing to further reduce emissions. The Northwest Ports also plan to support research into hybrid engines that will produce electricity during transit.

- Northwest Ports Clean Air Strategy. November 8, 2007 Draft.

http://www.portseattle.org/downloads/community/environment/NWCleanAirStrat_20071.pdf

D.3 OCEAN GOING VESSELS – MANEUVERING

Maneuvering emissions for OGVs occur between transiting and hoteling, when the vessel is moving within the harbor at a slow speed and with a low engine load. There are no explicit measures for maneuvering.

D.4 HARBOR CRAFT

D.4.1 Low Sulfur Fuel

To reduce DPM and NO_x emissions, ARB controls the fuel allowed for use in harbor craft. The California Diesel Regulation for Harbor Craft and Intrastate Locomotives requires that harbor craft use Ultra Low-Sulfur Diesel (ULSD) with less than 15 parts per million (ppm) sulfur. This regulation will result in estimated emissions reductions statewide from harbor craft of 4.5% for DPM, 1.7% for NO_x, and 71% for SO_x.

- Information on this ruling is available through the ARB webpage Amendments Extending the California Standards for Motor Vehicle Diesel Fuel to Diesel Fuel Used in Harborcraft and Intrastate Locomotives

<http://www.arb.ca.gov/regact/carblohc/carblohc.htm>

- ARB Staff Report. Initial Statement of Reasons. Proposed Regulatory Amendments Extending the California Standards for Motor Vehicle Diesel Fuel to Diesel Fuel Used in Harborcraft and Intrastate Locomotives. October 1, 2004.

<http://www.arb.ca.gov/regact/carblohc/isor.pdf>.

- Final Regulation Order: Proposed Extension of the California Standards for Motor Vehicle Diesel Fuel to Diesel Fuel Used for Intrastate Diesel-Electric Locomotives and Harborcraft.

<http://www.arb.ca.gov/regact/carblohc/rfro.pdf>

D.4.2 Replacement and Retrofit

- The ATCM – Main and Auxiliary Engines In-Use Harbor Craft Rule aims to reduce PM and NO_x emissions from in-use and new commercial harbor craft. There are four components to the regulation: (1) new engines must comply with EPA Marine Emissions Standards (Tier 2 or Tier 3), with implementation dates ranging from 2009 to 2020; (2) beginning in 2009, new ferries (or ferries with new engines) must implement Best Available Control Technology (BACT); (3) pre-Tier 1 and Tier 1 harbor craft are prohibited from operating within California waters unless their engines comply with Tier 2 or Tier 3 emissions standards; and (4) beginning in 2009, harbor craft must use low-sulfur fuel (either ARB diesel alternative diesel fuels or fuels that meet the verification requirements for emission control strategies). ARB expects emissions reductions of 74% for DPM and 62% for NO_x as a result of this regulation.

- The September 2007 Initial Statement of Reasons and Appendices are available through the ARB webpage:

<http://www.arb.ca.gov/regact/2007/chc07/chc07.htm>

- ARB approved a measure on November 15, 2007 to replace older, dirtier engines on ferries, excursion vessels, tugboats, and towboats with new engines that meet more stringent EPA marine engine standards.

- ARB News Release. November 15, 2007.

<http://www.arb.ca.gov/newsrel/nr111507.htm>

D.4.3 After-Treatment

The EPA Marine Diesel Engine Rule, described previously in section D.1.3 as an after-treatment method to control emissions from hoteling OGVs, also applies to harbor craft. This regulation utilizes catalytic after-treatment technologies to reduce emissions and is expected to be implemented between 2009 and 2012 for Tier 3 standards and in 2014 for Tier 4 standards.

- Diesel Boats and Ships

<http://www.epa.gov/otaq/marine.htm>

D.5 HEAVY DUTY VEHICLES

D.5.1 Low Sulfur Fuel

In parallel to the regulations regarding fuel use in OGVs and harbor craft, ARB regulates the fuel used in HDVs. Under the California Diesel Fuel Standards §2281 Sulfur Content of Diesel Fuels, starting in 2006 the sale or supply of diesel fuel with greater than 15 ppm sulfur was prohibited.

- Regulatory Documents for the Amendments to the California Diesel Fuel Regulations
<http://www.arb.ca.gov/regact/ulsd2003/ulsd2003.htm>
- Final Regulations Order: Amendments to the California Diesel Fuel Regulations
<http://www.arb.ca.gov/regact/ulsd2003/fro2.pdf>

D.5.2 Idling

ARB is focusing on reducing emissions from HDV idling since this operational parameter can be readily controlled.

- The 2005 ATCM – In-use Commercial Vehicle Idling regulation prohibits main engine idling of more than 5 minutes. The regulation will expand to sleeper berth trucks beginning in 2008.
 - Commercial Idling Restrictions
<http://www.arb.ca.gov/toxics/idling/idling.htm>
- The Heavy Duty Vehicle Idling Emission Reduction Program, adopted in 2005, requires vehicles of model-years 2008+ to have a 5-minute idle auto-shut down.
 - Heavy-Duty Vehicle Idling Emission Reduction Program
<http://www.arb.ca.gov/msprog/truck-idling/truck-idling.htm>

D.5.3 Other Technological Methods

ARB has already implemented various technological improvements to control emissions from HDVs and is continuing to develop additional regulations.

- ARB Heavy Duty Vehicle Inspections
HDV inspections have been required since 1998 to identify tampering, excessive smoke, and expired low-NO_x equipment.
 - Amendments to the Regulations Governing the Heavy-Duty Vehicle Inspection and Periodic Smoke Inspection Programs

<http://www.arb.ca.gov/msprog/hdvp/hdvp.htm#regulations>

- ARB On-Road (New) Heavy-Duty Truck Emission Standards

This 2002 measure with a 2007 – 2010 phase in sets emissions standards in coordination with EPA standards and requires the use of diesel particulate filters.

- Regulatory Documents for the Heavy-Duty Diesel Engine Emission Standard Regulations for 2007 and Subsequent Model Years

<http://www.arb.ca.gov/regact/HDDE2007/hdde2007.htm>

- On-Board Diagnostic System Requirements for 2010 and Subsequent Model-Year Heavy-Duty Engines (HD OBD)

This regulation requires engines of 2010 and later model-years to be equipped with on-board diagnostic equipment in order to help facilitate regulatory compliance.

- Rulemaking to Consider Onboard Diagnostic System Requirements for 2010 and Subsequent Model Year Heavy Duty Engines

<http://www.arb.ca.gov/regact/hdobd05/hdobd05.htm>

- ATCM – Heavy-Duty Trucks at Port and Intermodal Rail Facilities (ARB Port Truck Rule)

The proposed measure will require port trucks to meet either 1994 - 2003, 2004, or 2007 federal Heavy Duty Diesel Engines (HDDE) standards, depending on engine model year. After December 31, 2013, every truck will be required to meet or exceed 2007 federal standards.

- Intermodal Truck – Regulatory Development Page

<http://www.arb.ca.gov/msprog/onroad/porttruck/porttruck.htm>

- ARB News Release. December 15, 2007.

<http://www.arb.ca.gov/newsrel/nr120507.htm>

- ATCM – On-Road Heavy-Duty Diesel Vehicles (in-use)

Diesel trucks with a gross vehicle weight rating (GVWR) of greater than 14,000 pounds must be replaced or retrofitted to meet emissions standards. Phase 1 and Phase 2 compliance will take place 2010-2013 and 2017-2021, respectively. The regulation is proposed for adoption in mid-2008.

- On-Road Heavy-Duty Diesel Vehicles (In-Use) Regulation

<http://www.arb.ca.gov/msprog/onrdiesel/onrdiesel.htm>

- The San Pedro Bay Ports' CAAP

The San Pedro Bay Port's CAAP specifies modernization and retrofit strategies with earlier implementation dates than those specified by ARB and aims to replace all

frequent caller and older semi-frequent caller trucks with vehicles of model years 2007 or later.

- Final 2006 San Pedro Bay Ports Clean Air Action Plan. Overview.

<http://www.cleanairactionplan.org/reports/documents.asp>

- The Northwest Ports Clean Air Strategy

The Northwest Ports Strategy aims to reduce emissions through the measures explained above and through additional strategies which include cruise passenger bus anti-idling, electric and hybrid technologies, and systems to decrease gate congestion (i.e., paperless gate, reservation system, extended gate hours, etc.).

- Northwest Ports Clean Air Strategy. November 8, 2007 Draft.

<http://www.portseattle.org/downloads/community/environment/NWCleanAirStrat20071.pdf>

D.6 CARGO HANDLING EQUIPMENT

D.6.1 Low Sulfur Fuel

The California Diesel Fuel Standards §2281 Sulfur Content of Diesel Fuels, discussed in section D.5.1 for HDVs, also applies to cargo handling equipment.

- Regulatory Documents for the Amendments to the California Diesel Fuel Regulations

<http://www.arb.ca.gov/regact/ulsd2003/ulsd2003.htm>

- Final Regulations Order: Amendments to the California Diesel Fuel Regulations

<http://www.arb.ca.gov/regact/ulsd2003/fro2.pdf>

D.6.2 Emission Standards

- Off-Road Emissions Regulation for Compression-Ignition Engines and Equipment

This regulation will coordinate ARB emissions standards with those established by the EPA in 2000 and 2004, with varying compliance timelines depending on horsepower. Final Tier 4 standards will bring emissions down to near-zero levels by 2015 on average.

- Amendments to the California Off-Road Emissions Regulation for Compression-Ignition Engines and Equipment

<http://www.arb.ca.gov/regact/offrdcie/offrdcie.htm>

- ATCM - Cargo Handling Equipment

Effective since the beginning of 2007, engines must either meet on-road certifications or Tier 4 certification, or else use the best engine and VDECS possible, at least until

better engines/VDECS become available. Specifics vary according to engine age, VDECS use, and fleet size.

- Rulemaking to Consider the Adoption of a Proposed Regulation for Mobile Cargo Handling Equipment at Ports and Intermodal Rail Yards

<http://www.arb.ca.gov/regact/cargo2005/cargo2005.htm>

- Fact Sheet: Regulation for Mobile Cargo Handling Equipment at Ports and Intermodal Rail Yards

<http://www.arb.ca.gov/ports/cargo/documents/chefactsheet0207.pdf>

- ATCM – Transportation Refrigeration Units

ARB regulates Transportation Refrigeration Units: refrigeration systems powered by diesel internal combustion engines designed to refrigerate or heat perishable products. The 2004 ATCM – Transportation Refrigeration Units (TRUs) regulation requires TRUs with model years 2001 and 2002 to meet Low Emission TRU In-Use Performance Standards and those with model years 2003 and higher to meet Ultra-Low Emission TRU In-Use Performance Standards. As a result, DPM emissions from TRUs statewide are expected to decrease by 50% – 85%.

- Rulemaking on the Adoption of Proposed Airborne Toxic Control Measure

<http://www.arb.ca.gov/regact/trude03/trude03.htm>

- Final Regulation Order: Airborne Toxic Control Measure for In-Use Diesel-Fueled Transport Refrigeration Units (TRU) and TRU Generator Sets, and Facilities Where TRUs Operate

<http://www.arb.ca.gov/regact/trude03/fro1.pdf>

D.7 LOCOMOTIVES

D.7.1 Low Sulfur Fuel

The ARB California Diesel Regulation for Harbor Craft and Intrastate Locomotives measure, discussed in section D.4.1, requires locomotive fuel to meet California standards for motor vehicle diesel fuel: the fuel must have a sulfur content of less than 15 ppm. This regulation applies to locomotives that are used 90% in state, which can include locomotives used for operations such as passenger and intercity commuter, short haul, line haul, switch, industrial, port, and terminal.

- ARB rulemaking page on the proposed regulatory amendments extending the California standards for motor vehicle diesel fuel to diesel fuel used in harbor craft and intrastate locomotives.

<http://www.arb.ca.gov/regact/carblohc/carblohc.htm>

- Final Regulation Order approved on July 5, 2005
<http://www.arb.ca.gov/regact/carblohc/rfro.pdf>

D.7.2 Engine Design

EPA is developing two regulations to further reduce emissions from locomotives. Together, these measures are expected to lower DPM emissions by 90% and NO_x emissions by 80%.

- EPA Proposal for More Stringent Emissions Standards for Locomotives and Marine Compression-Ignition Engines
<http://www.epa.gov/otaq/regs/nonroad/420f07015.pdf>
- Tier 0 - Tier 2 Remanufactured Engine Emissions Standards
This measure establishes Tier 0 – Tier 2 emissions standards for remanufactured locomotives, for implementation between 2008 and 2010.
- Tier 3 - Tier 4 New Engine Emissions Standards
This measure establishes Tier 3 – Tier 4 emissions standards for new locomotives to be implemented between 2008 and 2012.

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*SAN DIEGO UNIFIED PORT DISTRICT 2007 CLEAN AIR PROGRAM DRAFT REPORT
APPENDIX E*



APPENDIX E

STAKEHOLDER WORK GROUP MEETING DOCUMENTS

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STAKEHOLDER WORKING GROUP MEETING DOCUMENTS

MEETING 1: SEPTEMBER 13, 2007

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