

Carnival Corporation & plc  
Environmental Management Report  
Fiscal Year 2006

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## The Maritime Legal Environment

Carnival's operations are distinctly different from those of typical shore-based companies and present unique challenges. The laws, regulations and other legal requirements applicable to our operations do not remain static based on a fixed geographic location. These requirements change regularly, sometimes on a daily basis, depending on the itineraries of our ships and the ports and countries visited. Carnival's ships typically visit more than 100 countries and more than 300 ports in a year, and these locations change with itineraries from year to year.

Carnival ensures that all such legal and other requirements are taken into account when establishing, implementing and maintaining its environmental management systems. These requirements include a broad range of international, national, state, regional, and local requirements in the form of statutes, regulations, ordinances, and permits.

A selection of the principal laws and regulations regarding environmental performance with which Carnival must comply on a routine basis is listed below:

- 1) **The International Convention for the Prevention of Pollution from Ships, 1973, as modified by the Protocol of 1978 (MARPOL 73/78).** MARPOL is the primary international convention covering prevention of pollution of the marine environment by ships from routine operational or accidental causes. MARPOL currently includes six technical Annexes, four of which apply to Carnival's operations:
  - a) Annex I, Regulations for the Prevention of Pollution by Oil;
  - b) Annex IV, Regulations for the Prevention of Pollution by Sewage from Ships;
  - c) Annex V, Regulations for the Prevention of Pollution by Garbage from Ships
  - d) Annex VI, Regulations for the Prevention of Air Pollution from Ships.
  
- 2) **The International Management Code for the Safe Operation of Ships and for Pollution Prevention (the ISM Code):**
  - a) The ISM Code is an international standard for the safe management and operation of ships and for pollution prevention and requires the development, implementation and certification of a Safety Management System that includes environmental protection.
  - b) The Safety Management System of each of Carnival's Operating Lines is certified in accordance with the ISM Code.
  - c) The shore office is issued a Document of Compliance (DOC) and each vessel in the operating line fleet is issued a Safety Management Certificate (SMC).

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- 3) **Flag State Marine Environmental Rules and Regulations** of the countries where Carnival's ships are registered ("Flag States") including those of:
  - a) The United Kingdom;
  - b) The Netherlands;
  - c) Italy;
  - d) The Bahamas;
  - e) Bermuda; and
  - f) Panama.
  
- 4) **Port State Marine Environmental Rules and Regulations** of the countries and other geographic areas where Carnival's ships operate ("Port States").
  
- 5) **Directive 2000/59/EC OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 27 November 2000 on port reception facilities for ship-generated waste and cargo residues**, which defines requirements intended to reduce the discharges of ship-generated waste and cargo residues into the sea, especially illegal discharges, from ships using ports in the European Community, by improving the availability and use of port reception facilities for ship-generated waste and cargo residues, thereby enhancing the protection of the marine environment. Specific National regulations implement this directive in all 25 member countries of the EC, many of which are visited by Carnival's ships. These regulations define requirements for the management of all forms of ship-generated waste.
  
- 6) **Council Directive of 12 December 1991 on hazardous waste (91/689/EEC) amending Directive 78/319/EEC on hazardous waste**, which defines and provides a precise and uniform definition of hazardous waste. The Directive requires Member States shall take the necessary measures to ensure that on every site where tipping (discharge) of hazardous waste takes place the waste is recorded and identified. Member States shall take the necessary measures to require that establishment and undertaking which dispose of, recover, collect or transport hazardous waste do not mix different categories of hazardous waste or mix hazardous waste with non-hazardous waste. Member States shall take the necessary measures to ensure that, in the course of collection, transport and temporary storage, waste is properly packaged and labeled in accordance with the international and Community standards in force. Specific National regulations implement this directive in 25 member countries of the EC, many of which are visited by Carnival's ships.
  
- 7) **The U. S. Act to Prevent Pollution from Ships ("APPS")**, as amended, 1980 (33 U.S.C. §§ 1901-1911), and its implementing regulations.
  
- 8) **The U.S. Clean Water Act (CWA)** (40 CFR Parts 50-99), the U. S. regulations which set the standards for effluent discharges to bodies of water to protect drinking water sources.

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- 9) **The U.S. Resource Conservation & Recovery Act (RCRA)** (40 CFR Parts 240 - 299), the U. S. hazardous waste management regulations.
- 10) **Clean Air Act** The U.S. Clean Air Act (CAA), initially issued in 1970 to require development and enforcement of regulations to protect the general public from exposure to airborne contaminants hazardous to human health, supplemented in 1990 by additional legislation to reduce the generation of smog and other forms of atmospheric pollution
- 11) **Alaska Cruise Ship Legislation** including:
- a) U.S. federal law "Title XIV—Certain Alaskan Cruise Ship Operations" which sets effluent standards for blackwater only and allows continuous discharge if secondary treatment standards are met and compliance is demonstrated through semi-monthly sampling;
  - b) Alaskan State Law AS 46.03.460 – 46.03.490 which sets effluent limits for both graywater and blackwater, addresses the offloading and/or disposal of non-hazardous solid wastes (besides sewage) and hazardous wastes in Alaska, and requires vessel owners/ operators to annually submit a description of the non-hazardous and hazardous waste handling procedures used on their vessels; and
  - c) Alaska State Regulation 18 AAC 50.070. "Marine Vessel Visible Emission Standards" which states that within three miles of the Alaska coastline, visible emissions, excluding condensed water vapor, may not reduce visibility through the exhaust effluent of a marine vessel by more than 20 percent with certain specified exceptions.
- 12) **Memoranda of Understanding** with various U.S. States including Florida and Washington.
- 13) **Hawaii Cruise Ship Legislation** On July 12, 2005, Hawaiian House Bill No. 422 "Relating to Cruise Ship" became law as Act 217. The law regulates discharges of sewage, wastewater, and air emissions and the offloading of solid and hazardous wastes from cruise ships.
- 14) **Maine Cruise Ship Legislation** Beginning January 1, 2006, the laws of the State of Maine require that the owner or operator of a large commercial passenger vessel not discharge graywater or a mixture of graywater and blackwater to coastal waters unless the discharge is authorized under a general permit and meets certain specific State requirements and associated rules. The requirements and associated rules permit ships with a U.S. Coast Guard-approved advanced wastewater treatment system, that meet the same wastewater discharge standards applicable in Alaskan waters, to discharge wastewater within Maine's coastal waters, and require that the ships maintain a log of discharges and file discharge information with the state.

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- 15) **Ballast Water Management regulations** and guidelines are designed to reduce the threat to the world's oceans and resultant environmental, economic and public health impacts from invasive aquatic species by addressing the transfer of harmful aquatic organisms and pathogens in ships' ballast water. Such regulations and guidelines are issued by, among others:
- a) The International Maritime Organization (IMO);
  - b) The U.S. Coast Guard (USCG);
  - c) Individual U.S. States, e.g., California, Washington State, Oregon, Port of Oakland, Great Lakes (North America); and
  - d) Individual Port States visited by Carnival Corporation vessels, e.g. Antarctica, Australia, Argentina, Brazil, Canada, Chile, Egypt, Israel, New Zealand, NW Europe, Panama, Peru, Russia, United Kingdom, and Ukraine.

The 55<sup>th</sup> session of the Marine Environment Protection Committee (MEPC) met in London in October 2006 to review Ballast Water Management Convention Regulations and review alternative Ballast Water Management Methods and assessment of Treatment Systems. An update of these and new treatment technologies is scheduled to be reported to MEPC 56 in July 2007.

- 16) **The Montreal Protocol** on Substances that Deplete the Ozone Layer is an international treaty designed to protect the ozone layer by phasing out the production and use of a number of substances believed to be responsible for ozone depletion. The 16<sup>th</sup> Meeting of the Parties to the Montreal Protocol on Substances that Deplete the Ozone Layer concluded on November 26, 2004, in Prague, Czech Republic.

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**Environmental Management Executive (EME)** – Each Operating Line EME is responsible for assuring implementation of the Operating Line's Environmental Management Systems, and for monitoring of environmental performance and compliance with the Corporation's environmental policies, and standards. The EME has direct access to the Operating Line's CEO, and has a line of communication to the Carnival Corporation's VP – MP&C. The EME is independent of direct, day to day responsibility for managing or performing operational activities, and is supported by professional and administrative staff commensurate with the needs of the Operating Line.

**Operating Lines – Shipboard:**

**Ships' Master** – The Master of each Carnival ship is responsible for the safety and care of all persons on board the ship, the ship's seaworthiness, navigation and overall operations, and for pollution prevention. The Master is assisted by three senior officers: the Staff Captain/ Chief Officer, the Chief Engineer/ Chief Technical Officer, and the Hotel Director who manage the Deck, Engine/ Technical, and Hotel Departments, respectively.

**Environmental Officers (EO)** – The EO is a non-watch standing officer responsible for the oversight and verification of shipboard environmental management and compliance. The EO reports directly to the Master and has a line of communication to the Operating Line EME.

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## **Voluntary Environmental Management and Technical Initiatives**

To achieve its goal to be the industry leader for environmental excellence, Carnival has dedicated significant resources to the following environmental management and technical initiatives that go considerably beyond the requirements of current laws and regulations.

### **Environmental Management**

#### **Corporate Environmental Standards**

In order to maintain and improve environmental compliance, management, and performance, Carnival has developed and implemented the following Corporate Environmental Standards:

- CENVS 001, Refrigeration Technician Training
- CENVS 002, Refrigerant Recovery Units
- CENVS 003, Black and Gray Water Management
- CENVS 004, Bilgewater and Oily Waste Management
- CENVS 005, Under Water Paint Coatings
- CENVS 006, Grease Trap – Grease/Oil/Residue Disposal
- CENVS 007, Waste Management
- CENVS 008, Hazardous Materials Management & Hazard Communications
- CENVS 009, Environmental Management System (EMS) Certification
- CENVS 010, Environmental Organization and Reporting Structure
- CENVS 011, Environmental Awareness and Training
- CENVS 012, Corporate Environmental Auditing and Monitoring
- CENVS 013, Environmental Accountability and Reporting

#### **Cruise Line International Association (CLIA) Environmental Standards**

On 15 June 2006, cruise industry associations, CLIA and the International Council of Cruise Lines (ICCL) announced the merger of these two organizations and that the merged organization will continue to be called CLIA.

Carnival has adopted and implemented the CLIA Environmental Standards on all of Carnival's ships. These standards are based on principles that include: designing and constructing cruise ships to be as environmentally friendly as possible, embracing new technology, complying fully with international and U.S. environmental laws, minimizing waste production, and maintaining cooperative relationships with the regulatory community.

The CLIA Environmental Standards includes requirements related to environmentally responsible handling and disposal of:

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- Photo Processing Waste, Including X-Ray Development Fluid;
- Dry-Cleaning Waste Fluids and Contaminated Materials;
- Print Shop Waste Fluids;
- Photo Copying and Laser Printer Cartridges;
- Unused and Outdated Pharmaceuticals;
- Fluorescent and Mercury Vapor Lamp Bulbs;
- Batteries;
- Bilge and Oily Water Residues;
- Glass, Cardboard, Aluminum and Steel Cans;
- Incinerator Ash;
- Graywater; and
- Blackwater.

These CLIA Environmental Standards are incorporated into the Environmental Management Systems of Carnival's Operating Lines.

### Technical Initiatives

**Advanced Waste Water Purification Systems (AWWPS)** – Carnival is conducting an intensive multi-phase investigative study of the various AWWPS's currently available in the marketplace. The systems studied includes purification plants currently installed on some of Carnival's ships, as well as other systems that could meet the strict design specifications set forth by the study group.

The study is evaluating the environmental impact of wastewater discharges on ocean areas in which Carnival's vessels operate in conjunction with the CLIA partnership with Conservation International (CI). The study is intended to assist in identifying vessels and regions of operation that would most benefit from future installation of AWWPS's.

**Vessel Shore Power Installations** – Carnival operates two shore power installations, in Juneau, Alaska and in Seattle, Washington, that permit certain ships that visit these ports to operate on power which is produced and provided by land-based power plants. This enables those Carnival ships to shut down their engines and reduce air emissions while moored in these ports. These land-based power plants use environmental technologies not yet available to ships that enable them to produce power with less environmental impact and take advantage of sustainable resources, such as hydroelectric power.

Princess Cruises has signed an agreement to turn off the engines of its ships and plug them in to shore electrical power when they dock at the Port of Los Angeles. The port's shore power capability will be available in 2008, and the technology is already available on the Princess' ships that will call there.

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**Plasma Incinerator Waste Disposal** – Carnival operates the only shipboard plasma incinerator in the cruise industry. The installed system began as a prototype and has successfully performed in the disposal of a wide range of dry shipboard waste products. Carnival is evaluating the use of the plasma incinerator for disposal of other shipboard wastes. Plasma technology allows the ship to burn waste very efficiently and produce significantly reduced air emissions and ash byproducts of incineration. Carnival is investigating installation of similar systems onboard additional ships.

**Water Lubricated Shaft Bearing Systems** – Several Carnival ships are equipped with water lubricated propeller shaft bearing systems. Traditional systems use oil as a lubricating and cooling medium while these systems use seawater. This technology benefits the environment in the event that a ship experiences a shaft bearing leak. Instead of potentially leaking oil to the marine environment, such leaks from ships with water lubricated systems would only result in seawater reentering the marine environment. These systems are currently installed on a number of Carnival's larger ships.

**Refrigeration Engineer Training** – At least one Refrigeration Engineer on each Carnival ship that visits US ports is trained and certified in accordance with Section 608 of the US Clean Air Act. While this Act does not apply on board Carnival's ships, it is being implemented as a voluntary good environmental practice.

**Refrigeration Recovery Units** – All Carnival ships, whether they visit US ports or not, perform refrigerant gases recovery operations using Chlorofluorocarbon (CFC) recovery units that are certified in accordance with Section 608 of the US Clean Air Act. While this Act does not apply on board Carnival's ships, it is being implemented as a voluntary good environmental practice. Each Carnival Operating Line provides notice of such certification to the US EPA.

**Treated Blackwater Discharge** – Blackwater (sewage) from Carnival's ships is processed through a Marine Sanitation Device (MSD), certified in accordance with US or international regulations, prior to discharge. Discharges take place only when the ship is at a distance of more than 12 nautical miles from the nearest land and only when the ship is travelling at a speed of not less than 6 knots. This policy does not apply to black water processed through Advanced Waste Water Purification Systems (AWWPS).

**Bilge Water Processing System "White Box"** – All Carnival ships ensure that all bilge water destined for overboard discharge, including that stored in clean bilge water holding tanks is routed through a "White Box". The "White Box" is a proprietary system considered to be a tamper resistant fail-safe for overboard discharge of processed bilge water. Its design incorporates an oil content meter (OCM) and return water functions in a central locked location that also includes a regulating valve, flow switches, solenoid valves, a three-way valve, a flow meter, a control box and a recorder. The "White Box" serves as the final monitoring and control device through which bilge water passes prior to reaching the environment.



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**Seawater Scrubber Feasibility Project** – Holland America Line is preparing to conduct a seawater scrubber feasibility project aboard one of its cruise ships with supporting monetary assistance from the EPA/West Coast Collaborative grant and the Puget Sound Clean Air Agency. This innovative project is intended to demonstrate how advanced seawater scrubbing reduces air emissions on large ocean going ships. The results of this project will determine if this is a viable technology for consideration on new ocean going ships or as a retrofit to existing ships.

**Heating, Ventilating, and Air Conditioning (HVAC) Control/Automation System** – Princess Cruises and Carnival Cruise Lines are currently working on new HVAC Control/Automation systems on board their ships. The systems are designed to control onboard HVAC temperatures more effectively. These initiatives are aimed at reducing fuel consumption hence reduce air emissions.

**Use of Anti Fouling Release Coating (Marine Coating) Technology** – Aida Cruises and Carnival Cruise Lines have been testing new anti fouling marine coatings on their vessels to improve ship's speed hence fuel efficiencies, which will result in the reduction of air emissions. This marine coating is biocide-free making it more environmentally acceptable than the use of biocide-releasing technologies.

**Hull Appendage Modification** – Carnival Cruise Lines has been testing the effects of adding a hull appendage (known as an interceptor plate) on one of its Conquest class of ships. This innovation is designed to reduce fuel consumption hence reduce air emissions.

**Evaporator Management** – Carnival Cruise Lines is working on an evaporator management project aimed at optimizing the operation of the Fresh Water Evaporators while utilizing the waste heat generated by its engines more efficiently. This initiative will reduce the fuel burned by the ship's boilers hence reduce air emissions.

**Ship Emissions Abatement and Trading (SEAaT)** – Carnival Corporation is a Sponsoring Member of SEAaT, a cross-industry, unique, pro-active and self funding group, whose mission is to encourage and facilitate efficient reduction of harmful emissions to air from shipping. SEAaT is an industry group formed in 2002 to raise awareness and acceptance of solutions for emissions reductions that are sustainable, cost effective and achievable. SEAaT's founding sponsors are shipping and oil companies committed to exploring and implementing cost effective methods of reducing emissions. SEAaT members represent the broader shipping community, and are ship owners, brokers, technology companies and fuel suppliers ([www.seaat.org](http://www.seaat.org)).

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**FTSE4Good Inclusion** – FTSE is an Independent Global Index Company. The FTSE4Good Index Series launched in 2001 is a series of benchmark and tradable indices for socially responsible investors (SRI). To be included in the indices, companies need to demonstrate that they are:

- Developing positive relationships with stakeholders;
- Working towards environmental sustainability;
- Upholding and supporting universal human rights.

The FTSE4Good Indices appeal to a broad range of institutional and retail socially responsible investors who are looking to:

- Only invest in companies that demonstrate good standards in corporate responsibility;
- Minimize the social, ethical and environmental risks within their portfolios;
- Capitalize on the benefits of good corporate responsibility;
- Avoid investing in traditionally excluded SRI sectors such as tobacco, defense and nuclear power.
- Actively encourage companies to be more responsible.

In January 2006, Carnival Corporation responded to specific requirements to maintain its index listing. Subsequently, Carnival was assessed as meeting all of the FTSE4Good environmental criteria.

**Carbon Disclosure Project** – Carnival participates in the Carbon Disclosure Project (CDP). CDP provides a secretariat for the world's largest institutional investor collaboration on the business implications of climate change, and represents an efficient process whereby many institutional investors collectively sign a single global request for disclosure of information on Greenhouse Gas Emissions. Since 2002 CDP has sent this request to the FT500 largest companies in the world. In 2006, the CDP4 request reached over 1900 companies. Carnival's response and a report based on all responses are publicly available from the CDP website ([www.cdproject.net](http://www.cdproject.net)).

**Governance Metrics International (GMI) Reporting** – GMI was formed in April 2000 by a group who recognized the need for an easy-to-use tool to monitor corporate governance. It is a shareholder advisory rating agency. Ratings for 3,800 companies are available by subscription. GMI rating criteria are based on security regulations, stock exchange listing requirements and various corporate governance codes and principles. The criterion is a series of statements which are responded to by the company and updated as necessary. In August 2006, Carnival provided necessary responses to fifteen statements regarding Environmental, Health and Safety concerns. ([www.gmiratings.com](http://www.gmiratings.com))

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**Training and Communication**

Carnival has established a Corporate Environmental Awareness and Training Standard that requires each Operating Line to develop and implement an environmental training plan and related procedures to ensure that:

- All shipboard and applicable shoreside personnel have environmental awareness training;
- Any person whose job could significantly impact the environment has job-specific training, including comprehensive equipment training, prior to commencing work in that job;
- Any person whose job entails oversight and verification of environmental management, performance or compliance is competent to perform their assigned oversight and verification functions, based on appropriate education, training or experience.
- There are means for sharing knowledge among shipboard and shoreside personnel to communicate best practices, new training requirements, and other information that may enhance environmental awareness and performance.

Based on this standard, Carnival and its Operating Lines have developed and implemented comprehensive environmental training programs. These environmental training programs:

- Are designed to help ensure that any shipboard or shoreside personnel performing tasks that have the potential to cause a significant environmental impact are competent to perform such tasks. Personnel competence is based on education, training, and/ or experience.
- Address the knowledge and skills needed to comply with applicable environmental laws, requirements, regulations and Environmental Management System (EMS) requirements.
- Educate personnel on the environmental impact of operations and the processes, procedures and policies that form the basis of the EMS.
- Ensure that employees understand Carnival's environmental management policies; and are able to integrate environmental management objectives with all applicable environmental procedures in the performance of their jobs.

Carnival's environmental training programs for shipboard and shoreside personnel typically use a multi-tiered approach that includes one or more of the following, based on the job duties of the individuals being trained:

- Environmental Familiarization Training;
- Basic Environmental Training;
- Environmental Training for Management and Supervisory Personnel; and
- Environmental Oversight and Verification Training.

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To promote effective training, the learning objectives of each training course are clearly explained at the beginning of the course and included in handouts as appropriate. In addition, learning objectives for each separate session within multi-session courses are clearly stated at the beginning of that session. The learning objectives typically state what the participants should know or be able to do at the end of each session.

Carnival's training programs include mechanisms for measuring proficiency gained as a result of the training, based on stated learning objectives.

In addition to the training structure outlined above, certain personnel are subject to continuing education requirements.

Carnival and its Operating Lines maintain processes for communicating environmental information, both within and outside of the organization, in conjunction with their respective public relations functions. This includes an environmental compliance telephone "Hotline" and a website ([www.carnivalcompliance.com](http://www.carnivalcompliance.com)).

Procedures are maintained for:

- Internal communication between the various levels and functions of the organization; and
- Receiving, documenting and responding to relevant communication from external interested parties, especially in regards to significant environmental aspects.

Carnival and its Operating Lines regularly communicate with external parties such as governmental agencies, community stakeholders, tenants, contractors, and other organizations. These communications include subjects associated with the management of significant environmental aspects and are governed by regulatory requirements and the professional judgment of Carnival and Operating Line staff.

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**Significant Environmental Aspects**

Carnival maintains processes within each of its Operating Lines for identifying and prioritizing the environmental aspects of its activities, products and services that it can control, or, over which it can expect to have an influence.

Carnival has identified those operations and activities that are associated with the identified significant environmental aspects and plans these activities to ensure that they are carried out under controlled conditions.

The following are typical of the significant environmental aspects of Carnival's activities, products and services and its associated potential/actual environmental impact:

<b>Significant Environmental Aspect</b>	<b>Potential/Actual Environmental Impact</b>
Ballast water/ Invasive species - marine	Inappropriate release or discharge to marine environment
Chemicals	Inadvertent release or spill
Dry cleaning – use of perchloroethylene chemical/solvent	Air pollution, volatile organic compounds
Engine emissions, NO <sub>x</sub> , SO <sub>x</sub> , CO <sub>2</sub> , particulates	Release to air, pollution, smog, global warming
Fire fighting – use of extinguishing gases – Halons, CO <sub>2</sub>	Ozone depletion, global warming potential
Food	Natural resource use, spill during loading.
Fuel	Natural resource use, spill during bunkering
Heat	Release to air, water
Hull paint/ coatings (TBT)	Release to water, release of components to sea
Incinerator Emissions	Release to air, smog, global warming
Invasive species - pests (vermin & insects)	Infestation of ship, release to land
Itinerary plan – human traffic (resource and waste issue)	Local congestion, traffic and resources (including cultural)
Itinerary plan – port development	Disturbance of "green fields", loss of pristine spaces
Lubricants & hydraulic oil	Inadvertent release or spill during loading, release to water
Marine mammals & birds	Marine mammal / bird strike
Noise	Disturbance to local communities
Ozone depleting substances (ODS) – (CFCs / HCFCs / Halons)	Release to environment, ozone depletion, global warming
Odor	Release to air, air quality
Oil/Water leaks	Oil pollution
Packaging	Natural resource use, Inadvertent release to sea
Paint	Natural resource use, Inadvertent release to sea
Pathogens	Sick guests/ Crew

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<b>Significant Environmental Aspect</b>	<b>Potential/Actual Environmental Impact</b>
Printer/copier toner cartridges	Hazardous waste generation, recycling
Reef (striking by grounding; voyage interruption), sediment placed on a reef	Damage to reef
Waste - biohazardous / medical / sharps / pharmaceuticals	Sharps, disease exposure
Waste - food waste/USDA waste, solid (garbage)	Inappropriate release or disposal to sea and shore
Waste - hazardous & regulated (oily waste, chemicals, incinerator ash) universal (batteries, fluorescent bulbs, electronics)	Inappropriate release or disposal to shore
Waste sludge - hydrocarbon	Inappropriate release or disposal to shore
Wastewater – bilge, black, gray, pool soot laden (boiler wash down)	Inappropriate release or discharge, shore disposal
Water	Natural resource use, energy consumption, lack of water

Each of Carnival's Operating Lines sets their own objectives and targets for improvement of their environmental performance. These objectives and targets are reviewed at the Operating Lines' management review meetings. Typical objectives set include:

- Reduction of fuel consumption
- Reduction of on-board water consumption
- Minimization of hazardous and solid waste generation
- Enhancement of recycling programs
- Reduction of invasive species in ballast water discharges
- Reduction of garbage quantity produced per person per day
- Study process for optimization of sewage treatment management
- Study process for optimization of incinerator management
- Reduction of perchloroethylene (PERC) consumption
- Reduction of refrigerant gas consumption
- Creation of work groups for effective itinerary planning

Carnival monitors performance against these objectives and targets.

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**Environmental Performance**

Beginning in December 2004, for Carnival's Fiscal Year 2005, Carnival began to measure and record key parameters regarding resource consumption and waste disposal in a standardized format across all of Carnival's Operating Lines and ships. These data are reported below and provide the basis for establishing year to year environmental performance targets. In future reports, these data will be used to demonstrate trends and to provide a means of visualizing performance improvements.

This performance data is primarily focused on ship operations. The five main aspects of potential environmental impact evaluated are:

1. Air emissions (greenhouse gas emissions and ozone depletors)
2. Water emissions
3. Waste emissions (solid and hazardous waste)
4. Energy consumption
5. Water consumption

PARAMETER	2006 MEASUREMENT	2005 MEASUREMENT	NOTES
<b>AIR EMISSIONS</b>			
CO <sub>2</sub>	173.71 kg CO <sub>2</sub> / ALBD	178.08 kg CO <sub>2</sub> / ALBD	(1), (2) & (3)
	1146.92 kg CO <sub>2</sub> / mile	1148.81 kg CO <sub>2</sub> / mile	(2) & (3)
Ozone Depletors	6.14 x 10 <sup>-5</sup> kg/ ALBD	8.17 x 10 <sup>-5</sup> kg/ ALBD	(1) & (4)
<b>WATER EMISSIONS</b>			
Waste Water Emission	0.0026 tonnes/ ALBD (untreated black water)	0.0051 tonnes/ ALBD (untreated black water)	(1),(5) & (6)
	0.122 tonnes/ ALBD (treated black water)	0.0616 tonnes/ ALBD (treated black water)	
	0.254 tonnes/ ALBD (grey water)	0.257 tonnes/ ALBD (grey water)	(1) & (7)
Untreated Ballast Water Discharged	0.214 tonnes/ mile	0.231 tonnes/ mile	(8)
Solid and Hazardous Waste	0.0066 tonnes/ ALBD (to shore)	0.0077 tonnes/ ALBD (to shore)	(1) & (9)

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PARAMETER	2006 MEASUREMENT	2005 MEASUREMENT	NOTES
Solid Waste	0.0079 tonnes/ ALBD (to sea or incinerated)	0.0083 tonnes/ ALBD (to sea or incinerated)	(1) & (9)
Recyclables	4.77 x 10 <sup>-4</sup> cubic meters/ ALBD	4.94 x 10 <sup>-4</sup> cubic meters/ ALBD	(1) & (10)
<b>ENERGY CONSUMPTION</b>			
Oil Consumption	0.36795 tonnes/ mile	0.36853 tonnes/ mile	(2) & (11)
	0.05573 tonnes/ ALBD	0.05713 tonnes/ ALBD	(1), (2) & (12)
<b>WATER CONSUMPTION</b>			
Water Consumption	0.3798 tonnes/ ALBD	0.3835 tonnes/ ALBD	(1) & (13)
<b>OTHER ENVIRONMENTAL PERFORMANCE METRICS</b>			
Number of Significant Oil or Chemical Spills	32	42	(14)
Volume of Significant Oil or Chemical Spills	1641.75 liters	4352 liters	
Fines and Liabilities	US \$ 15,750	US \$ 365,100	(15)
Expenditures	US\$ 48,895,423	US\$ 59,580,736	(16)

**NOTES:**

1. A number of Year 2005 measurements had referred to PBD - Passenger Berth days (used to normalized data by ship size/capacity). This indicator has been replaced by a more commonly referenced cruise industry indicator called the ALBD - Available Lower Berth Day (also used to normalize data by ship size/capacity). Hence, Year 2005 measurements have been restated substituting ALBD for PBD.
2. Year 2005 fuel consumption related measurements have been restated due to inconsistencies identified in the fuel consumption data collection process.
3. This parameter measures kilograms of CO<sub>2</sub> normalized by miles traveled and by ALBD. Greenhouse gas emissions are a very serious concern to the Global Community. The Global Reporting Initiative (GRI) see website: (<http://www.globalreporting.org/guidelines/2002/c48.asp>). Environmental Performance Indicator EN8 refers to Greenhouse gas emissions. Greenhouse gases are thought to "amplify" the greenhouse effect. Carnival ships emit Carbon Dioxide (CO<sub>2</sub>) which is one of the chemical byproducts of an internal combustion engine or boiler. The equations of chemistry enable the direct conversion of fuel oil consumed to equivalent kilograms of CO<sub>2</sub>. The primary combustion products are CO<sub>2</sub> and water vapor (H<sub>2</sub>O).
4. The GRI Environmental Performance Indicator EN9 refers to the use and emissions of ozone-depleting substances. Carnival ships use a variety of refrigerants most of which are marginally or without ozone depleting potential. Quantities of refrigerants used have been converted to equivalent quantities of CFC-11 which has the highest ozone depletion potential.



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5. **1 tonne** = 1 metric ton = 2204.62 lbs =1000 kilograms.
6. The GRI Environmental Performance Indicator **EN12** refers to significant discharges to water by type. This parameter measures black water discharge normalized by ALBD. Carnival ships consume water and also discharge it to the sea. The significant sea emissions are black water (sewage), grey water (showers, sinks, galleys, pool water) and ballast water (used for the stability of the vessel). There are no international regulations for the discharge of grey water although Carnival ships follow company procedures, CLIA and Corporate Standards for the disposal. Black water is treated and discharged in accordance with MARPOL Annex IV, CLIA and Corporate Standards.
7. Of the water consumed onboard Carnival ships, approximately 75% is discharged as grey water.
8. This parameter is normalized by miles traveled. The concern for Ballast water is the inadvertent transport of non-indigenous species. International, Federal and State regulations require the detailed reporting of ballast water management.
9. This parameter measures solid & hazardous waste disposal normalized by ALBD. Hazardous Waste disposal is normally less than 1 % of total waste disposal. Hazardous waste is landed to shore facilities. There are three disposal methods for Solid Waste namely disposal "ashore or at sea" or incinerated waste. The "at sea" or "incinerated waste" is in accordance with MARPOL and applicable laws and regulations. Incinerated waste includes dry garbage, food waste, and sludge. Plastic is never disposed of at sea.
10. The amount shown includes waste that is landed ashore for recycling (e.g.: aluminum, glass, scrap metal). The GRI Environmental Performance Indicator **EN11** also includes waste that is reused, recycled or recovered.
11. This parameter measures total fuel oil normalized by total nautical miles traveled. Studies have shown that as much as 55% of the fuel consumed on board is for hotel operations including in port (vessel stopped) operations. The primary fuel used onboard Carnival ships is Heavy Fuel Oil (HFO) which typically has an average sulphur content of 2.5%. The ships also use Marine Diesel Oil (MDO) and Marine Gas Oil (MGO). MDO use is less than 1% of HFO use and MGO use is approximately 4% of HFO use.
12. This parameter measures total fuel oil consumed normalized by ALBD.
13. This parameter measures potable water consumption normalized by ALBD. Potable water is a very precious commodity to most of the Earth's inhabitants. Although Carnival vessels consume significant amounts of potable water, a large portion is actually produced from seawater by equipment on board the vessels. The remaining water requirements are met by bunkering during ports of call. The GRI Environmental Performance Indicator **EN5** refers to total water use.
14. The GRI Environmental Performance Indicator **EN13** is for the reporting of significant spills of chemicals, oils, and fuels in terms of total number and total volume. Carnival Corporation has defined "significant" as in excess of 0.5 liter (500 ml). The typical spills refers to the accidental discharge of fuel oil or hydraulic oil.
15. GRI Environmental Performance Indicator **EN16** is for the reporting of Annual Fines & Liabilities for Non Compliance.
16. GRI Environmental Performance Indicator **EN35** is for reporting Environmental Compliance Expenditures; Budget, Capital, and Operating Expenses.