

US EPA ARCHIVE DOCUMENT

REDUCING AIR POLLUTION FROM SHIPS
Report of the
Demonstration of Fuel Switching in the Gulf of Mexico
Friday April 16th, 2010
Salon "La Fragata" at the Officer's Club of the Mexican Navy
Veracruz, Mexico

1. Private press conference

The press conference was facilitated by Walker B. Smith, Director of the Office of Global Affairs and Policy from the United States Environmental Protection Agency (US EPA), Ana Maria Contreras, General Director for Air Quality Management and Emissions Register and Pollutants Transfer from the Ministry of Environment and Natural Resources (SEMARNAT), and Manuel Molina Martínez SEMARNAT's Federal Delegate at the State of Veracruz. Reporters from national and local broadcasts, newspapers and radio were present.

Ms. Smith commenced the discussion by describing the fuel switching project and the importance of the fuel switching demonstration that was scheduled to take place from Veracruz to Altamira and then at Houston. Equipment will be installed on the vessel to monitor emissions on the Hamburg Süd vessel (Cap Son Lorenzo) to demonstrate the benefits from fuel switching.

Ana Maria Contreras mentioned that SEMARNAT was very interested in the project because to Mexico it was important to start thinking how emissions from marine vessels affect public health. She pointed out that controlling emissions from ocean going vessels was something to consider for the future and that the project EPA was sponsoring was an opportunity to know about fuel switching and reducing emissions from marine vessels.

Manuel Molina stated that in an effort to protect marine and coastal areas, the United States and Canada asked the International Maritime Organization (IMO) to establish an Emissions Control Area. The IMO formally accepted the proposal and as a result, large ships in the perimeter are required to use cleaner fuels (low sulfur fuels) to reduce emissions and achieve better air quality.

The Veracruz press highlighted the fuel switching demonstration and emissions control. This information was published in newspapers (i.e. Imagen, AZ Veracruz, La Jornada and El Dictamen) as well as the internet (several notes are posted in Annex I of this report).

2. Technical Workshop

The Workshop consisted of three segments: an opening session, a panel on Federal Agency Experiences and Emissions Estimation Methodologies and a closing session. There were over 50 participants in attendance from various federal and local agencies (PEMEX, SEMARNAT, Communications and Transportation Ministry, Port Authorities, National Ecology Institute, Navy Ministry and Health Agencies) as well as several representatives from the private sector. (A list of registered participants is found in Annex II of this report)

Welcome and introductions

The first segment, Welcome and Introductions, was facilitated by Ana Maria Contreras from SEMARNAT, Walker Smith from EPA, Francisco Luis Moreno Quiroga -Environment Director from the Port of Veracruz Government; Antonio Alvarez Moreno -Planning, Coordination and Evaluation Deputy Director from PEMEX Refinery, and Bryon Griffith -- Director of the EPA Gulf of Mexico Program Office.

Walker Smith opened the meeting acknowledging those involved in developing the workshop. Ms. Smith stated how the EPA was eager to collaborate with SEMARNAT, Veracruz, and the efforts EPA has made to reduce pollution from cars and trucks; she pointed out that little progress has gone toward reducing pollution from ships and there was a need to address this vital issue.

She informed the meeting that, in an effort to protect marine and coastal areas, the United States and Canada presented a proposal to the International Maritime Organization (IMO) to establish an Emissions Control Area (ECA), which was approved in March (2010) and that France decided to join the ECA. She mentioned that the fuel switch on ships was to occur within 200 nautical miles of U.S.-Canada-French territories in North America. She stated that the EPA is looking forward to working with Mexico to highlight the public health benefits of fuel switching.

Walker Smith indicated that the fuel switching demonstration was possible due to the coordinated work of EPA, the U.S. Maritime Administration, SEMARNAT, the Port of Houston Authority, ICF International, the University of California at Riverside, and Hamburg Süd.

She expressed what a pleasure it was to be in Veracruz and said she was very grateful to have representatives from the Navy and PEMEX, as well as from the industry, local and federal agencies. Finally, Walker Smith affirmed EPA was looking forward to working with all of them in the future.

Francisco Luis Moreno gave greetings from the Mayor of Veracruz. He mentioned that the meeting was an opportunity to highlight the interest on environmental policies and concrete results.

Moreno welcomed all participants and acknowledged the ongoing collaborative efforts between the local authorities. This collaboration has resulted in creating a healthier environment by establishing programs such as the reforestation program. The reforestation program has planted more than 650 thousands plants in a zone on kilometer 13.5. He pointed out that with federal support in "La Pinera" 8 hectares were transformed to have demonstrative species with native and outside flora.

He stated that multiple goals could be accomplished when efforts are combined. He concluded his presentation by applauding all those involved in what he qualifies as an important event. He assured the participants that local authorities would enlist in the effort.

Ana Maria Contreras thanked all participants for their interest and mentioned it was a pleasure to be among friends. She thanked the presence of the Mayor's Representative, Walker Smith, Bryon Griffith, Angela Bandemehr (including the other US participants), as well as the Navy and PEMEX officials.

On behalf of Minister Juan Rafael Elvira Quesada and Under Ministry Mauricio Limón, she welcomed everyone.

She stated that among other aspects, the importance of the project was capacity building for Mexico. Contreras informed the meeting that a commercial vessel coming from Colombia, will be at Veracruz and then will proceed to Altamira and Houston. She mentioned that emissions will be monitored on the vessel while using traditional and low sulfur fuels and she mentioned that this would provide accurate data of reductions in sulfur dioxide and particulates.

She stated that the US has had previous experience in collecting data from fuel switching and that the results demonstrate that particulates and sulfur dioxide can be reduced by 88% and 96% respectively. In addition, she informed the participants about the additional information that will be included in the workshop.

Ana Maria Contreras explained how Mexico is part of MARPOL and that the country complies with its commitments to reduce contamination due to oil spills, chemical substances, sewage water and solids. She mentioned that Mexico was Part of MARPOL Annexes IV and V and was not a part of Annex VI, which incorporates atmospheric pollution.

She clarified that, headed by SEMARNAT, the project has the support of several Federal Agencies to learn and, in the future, examine if the country was in a position to join MARPOL Annex VI to reduce pollutants along with EPA. She

highlighted that there is a strong collaboration with the U.S. on other areas such as inventories and actions on Border 2012.

Ana Maria Contreras specified that the technical project will assist in improving Mexico's understanding of this issue and will provide elements for future decision-making. Finally, she mentioned that SEMARNAT would be paying close attention to the results of the fuel switching demonstrating.

The question was posed to Walker Smith pertaining to the possibility of Mexico creating an ECA. Walker Smith confirmed that the US would like Mexico to join the ECA.

Panel on Federal Agency Experiences and Emissions Estimation Methodologies

A) Mexico's Experiences with Marine Emissions and Fuel

Ramiro Barrios, Air Quality Director from SEMARNAT, gave a presentation on Mexican experiences related to ocean going vessels (the presentation can be found in Annex III of this report). He stated that in Mexico the legislation does not specify who is in charge of emissions standards in the costal area, but that it is clear that in the federal zones, SEMARNAT could influence several actions.

He mentioned that emissions from marine sources were included in the first Mexico National Emissions Inventory (MNEI - 1999), where reliable activity data was a major constraint creating inconsistencies in emissions estimates.

He pointed out that in 2005, the Commission for Environmental Cooperation (CEC) financed a project to compile information of activity data in Mexican ports for 2002. The project included information about characteristics and volume of available fuels. He explained that characteristics of engines for each vessel and its auxiliary equipment were obtained from commercial databases (i.e. Lloyd's) and that all information was used to prepare a report about North American emissions.

B) Overview of fuel switching demonstration

Louis Browning, from ICF International, gave a presentation on the U.S.-Mexico Demonstration of Fuel Switching on an Ocean Going Vessel in the Gulf of Mexico (Annex IV of this meeting report). He mentioned that the project objectives were to measure emission reductions, begin a dialog with Mexico about the benefits of fuel switching at Mexican Ports, and present US commitments to establish an Emission Control Area under the International Maritime Organization Treaty for the Prevention of Pollution from Ships.

He commented that ocean going vessels normally operate on bunker fuel with sulfur content between 2.5% and 4.5% (e.g., 25,000 and 45,000 ppm sulfur) and that switching to low sulfur (0.1% or 1,000 ppm) distillate fuel will reduce PM emissions by 88% and SOx emissions by 96%. Lou Browning said that most ships already have additional Marine Distillate Oil/Marine Gas Oil (MDO/MGO) tanks.

On the specific demonstration with the Cap San Lorenzo vessel, which was going to arrive in Veracruz very early the next morning, he informed that emissions were going to be measured in port and at sea on the ship route Veracruz-Altamira-Houston. On emissions reductions per call, he mentioned that at Veracruz the estimated emissions reductions were 90 kg NOx (6%), 130 kg PM2.5 (88%) and 1,192 kg SOx (97%) with an estimated differential fuel Cost of \$3,273 US dollars. In the case of Altamira, he stated that per call the estimated emissions reduction were 93 kg NOx (6%), 137 kg PM2.5 (88%) and 1,259 kg SOx (97%) at an estimated differential fuel cost \$3,465 US dollars.

Louis Browning informed the meeting participants that the University of California at Riverside would conduct measurements of in-use emissions and their reduction from fuel switching. He pointed out that the monitoring methodology would follow the MARPOL NOx Technical Code (NTC) and other established protocols and that the measurement of emissions was going to take place on both high- and low-sulfur fuels at both specific engine loads and transient operations, on the main and auxiliary engines. Monitoring emission from both the main and auxiliary engines enables the development of emission factors for when the ship is underway and using the main engine, as well as hotelling (at berth) in port, when it uses auxiliary engines.

He stated that currently Marine Distillate Oil/Marine Gas Oil (MDO/MGO) costs were approximately \$210/MT (metric ton) more than Intermediate Fuel Oil/Heavy Fuel Oil (HFO). Regarding tank size, he indicated that MDO/MGO tank size might be an issue, stating that ships will need to plan for the tank capacity needed to carry enough fuel for use in the ECA zone. He also mentioned that for the fuel switching procedure, boilers that heat the viscous HFO must be slowly turned down as the lower viscosity MDO/MGO enters the fuel system to prevent problems. Finally, he stated that, according to Hamburg Süd, along the test vessel route low sulfur MGO (0.1% Sulfur) was currently only available at Houston.

Answering a specific question regarding needed changes in vessels, Lou Browning informed that there is a possibility of a greater fuel carrying capacity may be needed to accommodate the lower sulfur fuels needed in the ECA and that new engines would require NOx after treatment to meet ECA requirements to reduce nitrous oxide emissions.

C) Overview of U.S. commitments under MARPOL Annex VI to reduce marine emissions

Walker Smith and Angela Bandemehr made a presentation on the Overview of U.S. Commitments under MARPOL Annex VI (Annex V).

Walker Smith mentioned that MARPOL Annex VI (Air Pollution from Ships) was adopted in 1997 and will start being enforced in July 2010. She explained that according to MARPOL Annex VI, among other aspects, Global PM and SO_x will be controlled by requiring the use of low fuel sulfur of 3.50% fuel sulfur in 2012 and 0.50% fuel sulfur in 2020 but could be delayed to 2025, subject to review on fuel availability in 2018.

She mentioned that according to MARPOL Annex VI, a country or countries could propose to designate an Emission Control Area (ECA), where more standards that are stringent would apply to ships. The U.S. and Canadian Governments submitted a joint ECA proposal in 2009; the proposal that was also joined by France and was approved on March 26, 2010 and considers specific portions of the coastal waters of the United States, Canada and France. Walker Smith stated that area includes waters adjacent to the Pacific coast, the Atlantic/Gulf coast and the eight main Hawaiian Islands, extending generally 200 nautical miles from shore. The exception to this is where a 200 nautical mile ECA would extend into neighboring waters, such near the Mexican Exclusive Economic Zone.

Angela Bandemehr presented the ECA Criteria, explaining how each of the eight designation criteria was approached to make the proposal:

- *a clear delineation of the proposed area of application, along with a reference chart on which the area is marked;*
- *the type or types of emission(s) that is or are being proposed for control (i.e. NO_x or SO_x and particulate matter or all three types of emissions);*
- *a description of the human populations and environmental areas at risk from the impacts of ship emissions*
- *an assessment that emissions from ships operating in the proposed area of application are contributing to ambient concentrations of air pollution or to adverse environmental impacts. Such assessment shall include a description of the impacts of the relevant emissions on human health and the environment, such as adverse impacts to terrestrial and aquatic ecosystems, areas of natural productivity, critical habitats, water quality, human health, and areas of cultural and scientific significance, if applicable. The sources of relevant data including methodologies used shall be identified;*
- *relevant information, pertaining to the meteorological conditions in the proposed area of application, to the human populations and environmental areas at risk, in particular prevailing wind patterns, or to topographical, geological, oceanographic, morphological, or other conditions that contribute to ambient concentrations of air pollution or adverse environmental impacts;*
- *the nature of the ship traffic in the proposed Emission Control Area, including the patterns and density of such traffic;*

- *a description of the control measures taken by the proposing Party or Parties addressing land-based sources of NO_x, SO_x and particulate matter emissions affecting the human populations and environmental areas at risk that are in place and operating concurrent with the consideration of measures to be adopted in relation to provisions of regulations 13 and 14 of Annex VI; and*
- *the relative costs of reducing emissions from ships when compared with land-based controls, and the economic impacts on shipping engaged in international trade.*

Lastly, Angela Bandemehr mentioned that the North American ECA would affect ship operators and ports in the Gulf of Mexico because standards would apply to all oceangoing vessels and that this will increase demand for lower sulfur fuels. She mentioned that the U.S. is prepared to partner with Mexico for ongoing information exchange and dialogue on marine emissions and that the U.S. considers the MARPOL Annex VI standards to be useful tools to address marine emissions.

Participants made particular queries and they received answers from Ana Maria Contreras, Walker Smith and Angela Bandemehr. The information given can be summarized as follows:

- Mexico initiated contacts with EPA to analyze where and how regulatory measures can be applied.
- More information regarding the ECA can be found on the EPA web site.
- A report of the project will be developed in the coming months and will be shared with SEMARNAT and interested partners.
- Currently U.S. monitoring networks are available to monitor air quality, which can assist in evaluating coastal zone emissions impacts. However, the U.S. has modeled those predicted impacts and is not currently planning to conduct any additional monitoring assessments of coastal zone impacts. EPA offered to share data as appropriate with Mexico to assist in conducting an emission inventory and to conduct modeling.
- This project is a first step in collaborating between Mexico and the US regarding air pollution from vessels. It will provide elements to analyze a range of possibilities and if appropriate to make decision concerning MARPOL Annex VI and standards.
- The North American ECA is nascent and the US looks forward to working with Mexico.

D) Emissions Inventory Methodology – ICF

Louis Browning presented information on Current Methodologies and Best Practices for Preparing Ocean Going Vessel Emission Inventories Used in Preparing the U.S. ECA Proposal for U.S. EPA (Annex VI).

He mentioned that ECA Inventory used a model of Dr. James Corbett of the University of Delaware called STEEM (Ship Traffic, Energy, and Environment Model). This grid model is not accurate around ports because it assumes that ships come in at full speed (no maneuvering) and does not include hotelling emissions. He informed that grid cells around ports were replaced with new port inventories and that air quality modeling was performed on the integrated grid.

On emissions inventories for 117 US Ports developed by EPA, he pointed out that the newest port emission inventory methodology was used to model ocean going vessel movements, that transit zones (lower speed areas approaching ports due to navigational hazards) were determined for each port and that time in modes were calculated for: cruise; transit; maneuvering; and hotelling.

Louis Browning mentioned that the sources for new port inventories originated from the EPA guidance document entitled “Current Methodologies and Best Practices from EPA (Methodologies and Best Practices for Preparing Port Emission Inventories)” the Starcrest Inventories and older EPA Guidance Documents. He explained how emissions were calculated; where the data came from and the types of ships and marine engines considered. Finally, he described different emission factors.

In answer to a question, he clarified that the emission factors came from studies that receive data from Lloyds and Environment Canada; and that they were factors considered in current inventories that do not include new vessels and that it was assumed that ports do not use cold ironing.

Regarding black carbon, Louis Browning mentioned that it was only a small part of the particulate emissions from ships on heavy fuel oil.

E) Stack Sampling Methodology (University of California Riverside)

Bill Welch from the University of California Riverside acknowledged the interest of partners. He made a presentation (see Annex VII of this report) in which he mentioned that the goal was to measure emissions from Auxiliary engines (AE) and the Main propulsion engine (ME); he pointed out that the planned approach was to test with distillate (light) and bunker (heavy) oil using the European (IMO) test cycles and the European measurement methods.

He shared with participants that the speed of the vessel at which emissions would be measured with both types of oils when docking and leaving would be 3, 12 and 15 knots. He mentioned that the fuel switching point would be 24 nm from

shore. He showed the audience the type of filters and instruments that were going to be used during the testing.

He also explained in detail the flow diagram of the sampling system, and presented several charts with examples of: real time gas & PM emissions for main engines, gaseous emissions, PM emissions & fractions, and gas & PM emissions going from distillate to heavy-fuel oil.

He mentioned that there were methods developed for measuring emissions on ships at sea, the prior studies illustrated switching from heavy fuel oil to distillate fuel could lower NO_x by 5 – 10% and PM up to 80% since sulfate emissions are directly related to fuel sulfur content and that there is a transition time to convert from one fuel to another.

He ended his presentation by mentioning that this research will provide a measure of the benefits of switching to a cleaner burning fuel.

Panel on Experiences of Other Partners

A) Hamburg Süd

Peter Harris, Technical Superintendent for Hamburg Süd and responsible for the safe, efficient operation and maintenance of six container ships (which sails around the East Coast of the American Continent) gave a presentation entitled “Overcoming Difficulties when using Low Sulfur Marine Gas Oil (MGO) (presented as Annex VIII of this report).”

He gave a brief introduction on the company profile and presented general information on the vessel Cap San Lorenzo, which was the test vessel for the fuel switching demonstration project.

Peter Harris made some comments regarding the need to investigate the feasibility of adding bio fuels to low sulfur MGO (LSMGO) to reduce sulfur levels.

On availability, he mentioned that low sulfur fuels are not yet readily available and oil producers are reluctant to produce until there is sufficient demand, so a difficult situation is developing in addition to the fact that LSMGO is approximately 45% more expensive than HFO.

The representative from Hamburg Süd shared some of the differences between using HFO and LSMGO:

- The calorific value of LSMGO is around 6% greater than HFO and thus could potentially provide more power per unit fuel.

- Because sulfur is a natural lubricant, lower sulfur fuels lose much of their lubrication effect and this could mean seizure of fuel system components, such as gear pumps, high pressure pumps and fuel injectors.
- The viscosity of distillate fuel at ambient temperature is too low for good atomization at the fuel injector. Pump pressures may also be lower than normal and consequently a cooler might be necessary in the fuel supply system to increase the viscosity of the fuel.
- In switching fuels there is a certain amount of mixing of the high and low sulfur fuels and these two completely different types of fuel are not necessarily compatible. The result may be the production of asphaltenes, which will unexpectedly block filters.
- Addition of bio fuels, which is becoming a common practice, could create additional similar problems.

Peter Harris explained that to expand fuel tank capacity for existing vessels there were several key issues to consider: the need for sufficient fuel tank capacity and segregation arrangements for the different grades of fuel to be carried, consideration of the subdivision of existing service tanks or emptying and refilling arrangements of HFO service tanks, fuel pipe designs may have to be arranged to avoid contamination of low sulfur fuel with high sulfur fuel. On new vessels to be constructed in future he mentioned that such fuel switching needs will have to be considered in the design.

On other technical aspects, he pointed out that currently, it is not possible to switch fuels for most boilers, because adjustments have to be made to the burner fuel/air ratio, and flame monitoring sensors need to be suitable for the different spectral emission ranges. However, manufacturers are working on these issues and other related problems.

In answering to a specific question, Peter Harris mentioned that the design of auxiliary boilers will require a burner that can be used with all fuels, but he noted that main engines were the present major concern as far as reducing emissions.

A participant enquired if retrofitting vessels was an alternative to be considered, he informed that the cost would be very high and that there were no studies on retrofitting a vessel. On the same issue, Louis Browning mentioned that it has been considered to install equipment to reduce sulfur, but that retrofitting a vessel with larger tanks requires corresponding space on board the vessel and that the cost could be comparable to that of fuel switching itself. Peter Harris mentioned that twelve new Hamburg Süd ships were equipped with electronic engines, which can be easily adapted to LSMGO and which also have the added benefit of total control over the combustion process and therefore the emissions.

Finally, Peter Harris stated that information obtained from the project will help Hamburg Süd in its business planning.

B) Close of Technical Meeting

Ms. Smith thanked Angela Bandemehr for her diligent work to make the workshop a success. Ms. Smith deemed the workshop as a success because the workshop effectively communicated the utility of the project and the benefits of fuel switching and ECAs. She noted the engineering challenges the vessels may encounter, however the industry partners, such as Hamburg Süd, were willing to participate and overcome the obstacles.

Louis Browning pointed out that information presented shows tremendous benefits and that it was very useful to understand how the University of California Riverside measures emissions. He emphasized the importance of coordinated work, highlighting the significant role of the Navy, such as in enforcing any future fuel switching requirements. He expressed that it was a pleasure to work with the participants and he was sure their dialogue will continue in the future.

Ana Maria Contreras thanked all partners for the opportunity to have these discussions and expressed SEMARNAT's willingness to work together in the future. She considered that the technical information was crucial for capacity building in Mexico, especially regarding pollution from marine sources that impact health and climate change. She said that this first phase was very satisfactory to understand technical information that could support later decision-making.

Ana Maria Contreras thanked participants for their assistance and interest, particularly noting the hospitality of the Navy, highlighting PEMEX as an important player, also noting the role of the marine industry, SEMARNAT's Federal Delegation and EPA for sharing experiences with SEMARNAT. She concluded the workshop by giving a special recognition to Ramiro Barrios, Christian Contreras and Hugo Landa for their work in effectively planning and conducting the Workshop.

REDUCING AIR POLLUTION FROM SHIPS
 Demonstration of Fuel Switching in the Gulf of Mexico
 Friday April 16th, 2010
 Veracruz, Mexico

Time: 9.00 – 14.30

Location: Salon “La Fragata” of the Naval Casino - SEMAR

Moderator: Ramiro Barrios, SEMARNAT

Dress code: Business casual

TECHNICAL WORKSHOP AGENDA

Time	Friday April 16th
9.00 – 9.45	Welcome and introductions <ul style="list-style-type: none"> • Alonso Domínguez Ferráez Coordinador General de Medio Ambiente, (Veracruz State) • Vicealmirante C.G. Dem. Sergio Javier Lara Montellano Tercera Zona Naval Veracruz, SEMAR) • Walker B. Smith (Director Office of Global Affairs and Policy, EPA) • Mauricio Limón Aguirre Subsecretario de Gestión para la Protección Ambiental
9.45 – 10.15	Break
10.15 – 13.15	Panel on Federal Agency Experiences and Emissions Estimation Methodologies – SEMARNAT, EPA, ICF, University of California at Riverside
10.15 – 10.35	Mexico's Experiences with marine emissions and fuel. (Ramiro Barrios, SEMARNAT)
10.35 – 10.45	Question and Answer
10.45 – 11.05	Overview of fuel switching demonstration. (U.S. EPA contractor – ICF)
11.05 – 11.45	Question and Answer
11.45 – 12.05	Overview of U.S. Commitments under MARPOL Annex VI to reduce marine emissions (U.S.EPA)
12.05 – 12.15	Question and Answer
12.15 – 12.35	Emissions Inventory Methodology - ICF
12.35 – 12.45	Question and Answer
12.45 – 13.05	Stack Sampling Methodology (University of California at Riverside)
13.05 – 13.15	Question and Answer
13.15 – 13.30	Break
13.30 – 14.30	Panel on Experiences of Other Partners Presentations by Other Partners – Maritime industry and others.
13.30 – 14.00	Summary of Discussion and Next Steps and Close of Technical Meeting. Partner Recognition Ceremony
14.00 – 14.30	Representatives from U.S.EPA, SEMARNAT, Mexican Marine

REDUCCION DE CONTAMINACION POR EMBARCACIONES

Demonstración de Cambio de Combustible en el Golfo de México

Viernes 16 de abril de 2010

Veracruz, México

Hora: 9.00 – 14.30

Sede: Salon "La Fragata", Casino Naval - SEMAR

Moderador: Ramiro Barrios, SEMARNAT

Vestimenta: Informal de negocios

AGENDA DEL TALLER TECNICO

Hora	Viernes 16 de abril
9.00 – 9.45	Mensajes y Bienvenidas <ul style="list-style-type: none"> • Alonso Domínguez Ferráez Coordinador General de Medio Ambiente, Gobierno del Estado de Veracruz • Vicealmirante C.G. Dem. Sergio Javier Lara Montellano Tercera Zona Naval Veracruz, SEMAR • Walker B. Smith Directora de la Oficina de Asuntos Globales y Política, EPA • Mauricio Limón Aguirre Subsecretario de Gestión para la Protección Ambiental
9.45 – 10.15	Receso
10.15 – 13.15	Panel sobre Experiencias de Agencias Federales y Metodologías para la Estimación de Emisiones – SEMARNAT, EPA, ICF, Universidad de California en Riverside
10.15 – 10.35	Experiencias de México en materia de emisiones y combustibles Ramiro Barrios, SEMARNAT
10.35 – 10.45	Preguntas y respuestas
10.45 – 11.05	Perspectiva general de la demostración sobre cambio de uso de combustible Contratista de EPA – ICF)
11.05 – 11.45	Preguntas y respuestas
11.45 – 12.05	Visión de los compromisos de Estados Unidos al amparo del Anexo VI de MARPOL para reducir emisiones marinas EPA
12.05 – 12.15	Preguntas y respuestas
12.15 – 12.35	Metodología de los Inventarios de Emisiones ICF
12.35 – 12.45	Preguntas y respuestas

12.45 – 13.05	Metodología de muestreo de concentraciones de contaminantes en chimenea Universidad de California en Riverside
13.05 – 13.15	Preguntas y respuestas
13.15 – 13.30	Receso
13.30 – 14.30	Sesión sobre experiencias de otros involucrados Presentaciones de asociados – Industria Marítima y otros.
13.30 – 14.00	Resumen de los debates, próximos pasos y clausura del Taller.
14.00 – 14.30	Ceremonia de reconocimiento a los asociados Representantes de EPA, SEMARNAT, SEMAR, Industria Marítima

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 Friday April 16th, 2010
 Veracruz, Mexico

PARALLEL EVENT

Time	Friday April 16th
10.15 – 11.00	Private press conference. Alonso Domínguez Ferráez Coordinador General de Medio Ambiente, (Veracruz State) Walker B. Smith Director Office of Global Affairs and Policy, EPA Mauricio Limón Aguirre Subsecretario de Gestión para la Protección Ambiental

REDUCCION DE CONTAMINACION POR EMBARCACIONES
 Demostración de Cambio de Combustible en el Golfo de México
 Viernes 16 de abril de 2010
 Veracruz, México

EVENTO PARALELO

Hora	Viernes 16 de Abril
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10.15 – 11.00	Conferencia de Prensa Privada. Alonso Domínguez Ferráez Coordinador General de Medio Ambiente, Gobierno del Estado de Veracruz Walker B. Smith Directora de la Oficina de Asuntos Globales y Política, EPA Mauricio Limón Aguirre Subsecretario de Gestión para la Protección Ambiental
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