



The American Association of Port Authorities 2005 Environmental Awards Competition



CARGO HANDLING EQUIPMENT EMISSIONS INVENTORY UPDATE

Submitted by:

The Port Authority of New York and New Jersey

Port Commerce Department

Contact Person: Joseph Monaco
Sr. Environmental Program Specialist
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1. INTRODUCTION – PAPER HIGHLIGHTS

The Port Commerce Department of the Port Authority of New York & New Jersey voluntarily undertook a Cargo Handling Equipment Emissions Inventory Update in order to determine whether air emissions from the 2004 off-road fleets of its five terminal operators have improved since originally measured in 2002. The 2002 report was conducted as part of our effort to meet air conformity requirements for harbor deepening projects, while the 2004 update was conducted as a cooperative, voluntary effort among members of the port community that have been modernizing their off-road fleet with new machines powered by USEPA certified on-road engines, thereby transcending environmental requirements for off-road equipment. Because of industry competitiveness issues, reporting was kept confidential among the tenants by not linking any terminal to its specific equipment or emission estimates. Although the number of pieces in the tenants' 2004 off-road fleets increased 19% since 2002, average operating hours 5%, and the total number of containers 25%, overall emission estimates for key pollutants in tons per year have decreased significantly. NO_x emissions decreased - 31%; VOC - 32%; CO - 32%; PM - 32% (10 ppm); and SO₂ - 35%. According to the report, these drastic reductions were the result of the voluntary fleet modernization achieved by our tenants. The Cargo Handling Emissions Inventory cost the Port Commerce Department less than \$20,000, a truly great value considering that (1) it verifies Port of New York & New Jersey emissions are improving dramatically through voluntary action rather than as a result of regulation or litigation; (2) that it will be highlighted by USEPA as a tool to help other ports in their emission reduction efforts; and (3) that it serves to promote fleet modernization as a viable candidate for federal incentives under USEPA's Diesel Retrofit Program.

The Port Authority of New York and New Jersey is a bi-state agency (operated pursuant to an interstate compact) that runs most of the regional transportation infrastructure

including the bridges, tunnels, airports and seaports within the New York-New Jersey Port District. This 1500 square mile region is defined as a circle with a 25-mile radius centered on the Statue of Liberty in New York harbor. Established on April 30, 1921 as the Port of New York Authority, the name of the agency and its form of operation were changed to their present form in 1972. Figure 1 shows the domain of facilities and services of the Port Authority of New York and New Jersey.



Figure 1 – Domain of Facilities and Services of the Port Authority of New York and New Jersey

The Port Authority of New York and New Jersey's Mission Statement is to identify and meet the critical transportation infrastructure needs of the bi-state region's businesses, residents, and visitors: providing the highest quality, most efficient transportation and port commerce facilities and services that move people and goods within the region, providing access to the rest of the nation and to the world, and strengthening the economic competitiveness of the New York-New Jersey metropolitan region.

The Port Authority of New York and New Jersey's Environmental Policy correlates to its Mission Statement: "Consistent with The Port Authority of New York and New Jersey's mandate as owner, operator and developer of facilities of commerce and transportation within the Port District, the Port Authority develops, operates and maintains its facilities in a manner reflecting a high standard of care for the health and safety of its tenants, patrons and employees and for the prudent protection of natural resources within, abutting, or proximate to its facilities or which may otherwise be affected by its activities."

The Port of New York and New Jersey is the gateway to the most concentrated and affluent consumer market in the world. Each year, more than 25 million tons of ocean borne general cargo moves through our port, including 4.5 million TEUs (twenty-foot equivalent units) of containerized cargo in 2004. The Port Newark/Elizabeth-Port Authority Marine Terminal complex (NJ), the PA Auto Marine Terminal (NJ), Brooklyn Piers and Red Hook Container Terminal (NY) and New York Container Terminal (NY) handle most of the cargo and these facilities are managed by the Port Authority of New York and New Jersey. In addition, there are private operators such as Global Marine Terminal in New Jersey and a number of marine terminals operated by private bulk cargo operators. The New York Cruise Terminal is operated by P&O Ports North America for the City of New York.

Given the sheer size and diversity of the operations at its maritime facilities, the Port of NY & NJ must balance its economic and environmental considerations at all times. The Port Authority of NY & NJ conducts its businesses in the midst of a major metropolitan region that has not met Federal Air Quality Standards for Nitrous Oxides. Accordingly, the Cargo Handling Equipment Emissions Inventory Update is one way that the Port Authority of NY & NJ is seeking to be proactive in enhancing the region's air quality. Figure 2 depicts the domain of Port Commerce facilities.



Figure 2 - PANY/NJ Maritime Facilities

2. GOALS AND OBJECTIVES

The ultimate goal of the Port Commerce Department's Cargo Handling Equipment Emissions Inventory Update is to quantify air quality enhancements resulting from tenants voluntarily modernizing their off road fleet with new machines powered by USEPA certified on-road engines. A secondary goal of the inventory update is to demonstrate that dramatic air quality emissions are achievable through voluntary action rather than as a result of regulation and litigation. A third goal is to provide USEPA with information that demonstrates fleet modernization may prove a viable option for federal incentives. Lastly, the results of the inventory update are to serve as a baseline against which to measure improvements, such as, through use of lower sulfur fuels and the next generation of diesel-powered engines, which are expected to kick in within the next couple of years. The supporting objectives of this goal are:

Objective 1: Identify Principal sources of air emissions at the terminals;

Objective 2: Obtain extensive data from terminal operators

Objective 3: Establish confidentiality of the data to address concerns over business competitiveness

Objective 4: Impart inventory results at the AAPA-USEPA Clean Ports USA Workshop

Objective 5: Release the Final Report to members of the FACA (Federal Advisory Committee Act) Retrofit Working Group

3. DISCUSSION

3.1 BACKGROUND

Much has been written about potential health effects relative to air quality. There are many entities that contribute to air quality degradation including diesel engines, which reliably power most off-road equipment, while emitting nitrogen oxides, volatile organic compounds, carbon monoxide, particulate matter and sulfur dioxide. The Port District, described above, is surrounded by areas that have been designated by USEPA as not being in attainment with the

National Air Quality Attainment Standards. The States of New York and New Jersey are striving to rectify this non-attainment status through their State Implementation Plans.

One of the ways that USEPA works to reduce diesel pollution is by setting tougher emission standards for future model years. However, new emission standards do not apply to current equipment, requiring voluntary action if we are to achieve near-term air quality improvements in older equipment. Focusing such voluntary efforts on off-road equipment could go a long way toward improving air quality, since USEPA off-road emission standards are lower than for on-road engines. This is why the Port Commerce Department determined that it is crucial to quantify air quality enhancements resulting from tenants' voluntarily modernizing their off-road fleet with new machines powered by USEPA certified on-road engines, which transcend air emission requirements.

3.2 Objectives and Methodology

In order to achieve the objectives mentioned above, the Port Commerce Department engaged in the methodologies that follow.

Objective 1: Identify principal sources of air emissions at the terminals

Methodology: Analyze year 2002 cargo handling equipment fleet data from the original Cargo Handling Equipment Emissions Inventory, which looked at Auto Handling, Container Terminal and On-Dock Rail Operations, in order to identify principal sources of emission. The findings of the inventory indicated Container Handling Equipment as a major contributor of air emissions at the terminals.

Objective 2: Obtain extensive data from terminal operators

Methodology: The Port Commerce Department initiated the Green Practices Task Force, which is a voluntary, informal partnership between the port and its tenants to share information on

environmental practices that transcend the regulations. Among other “green” practices, the container terminal operators have indicated that they’ve been replacing spent pieces of cargo handling equipment with new models equipped with clean-burning on-road engines. The sharing of similar information on green environmental practices over the ensuing months between the port and its tenants, through the Green Practices Task Force, strengthened a sense of trust and ownership among the participants. This led to the container terminal operators’ ambitious cooperation in providing extensive data for the inventory update, such as their 2004 cargo handling equipment inventories, fuel types, engine types, operating hours etc.

Objective 3: Establish confidentiality of the data to address concerns over business competitiveness

Methodology: The container cargo terminal business is extremely competitive, which raised concerns over disclosing equipment inventories. In order to maintain confidentiality, each terminal operator submitted their data directly to a Port Commerce Department sub-consultant. The sub-consultant grouped the data, while masking terminal operator identifications, and forwarded it to a sub-consultant statistician. The formatted data was then submitted by the statistician to the Port Commerce Department’s principal consultant, who formulated the report.

Objective 4: Impart inventory results at the AAPA-USEPA Clean Ports USA Workshop

Methodology: Imparting the results of the Cargo Handling Equipment Inventory Update at the AAPA-USEPA Clean Ports USA Workshop was considered crucial towards gaining consensus on fleet modernization as a viable option within the realm of “retrofit technology”. In order to present the findings of the Cargo Handling Equipment Inventory Update in time for the January 2005 AAPA-USEPA Clean Ports USA Workshop, the work needed to be completed within three weeks, so that extrapolation of year 2004 data would be minimized (to the last week of December 2004). This required a difficult timeframe, considering that the original inventory took many

months to complete. Accordingly, we chose to use the same consultant that did the original inventory, who was familiar with the tenants' operations and the required mathematical modeling. We also decreased the scope to focus on the chief area of concern: the container handling equipment. Lastly, the sense of partnership gained through the Green Practices Task Force lead to an enhanced degree of cooperation by the tenants, who swiftly provided their data to the sub-consultant. Credit is also due to Starcrest Consulting, who worked through weekends and off-hours to make things happen.

Objective 5: Release the Final Report to members of the FACA (Federal Advisory Committee Act) Retrofit Working Group

Methodology: Timely release of the of the final Cargo Handling Equipment Emissions Inventory Update Report to members of the FACA Retrofit Working Group was crucial towards promoting modernization as a viable option for federal incentives under USEPA's Diesel Retrofit Program. Meeting the time frame required that appropriate administrative protocols had to be met in a very timely fashion. The final report quickly gained the support of the participating container terminal operators because they were given the chance to review up-front "their" sections of the report, in addition to commenting on the overall final draft, and they were very comfortable with the protocols followed to maintain confidentiality. The final report was also given an expeditious internal review and approval because it served to accentuate the Port Authority's overall focus on environmental responsibility.

3.3 How the Project Fulfills the Award Criteria

3.3.1 Level and Nature of Benefits to Environmental Quality, Beautification or Community Involvement

The Cargo Handling Equipment Inventory Update demonstrates that air quality has been enhanced dramatically over the last two years strictly due to the tenants' voluntary

actions. The successful completion of the inventory update was made possible through the cooperative contributions of the tenants that came out of the maritime community outreach efforts of the Port Commerce Department's Green Practices Task Force. Due to the tenants' successful voluntary actions, local environmental quality was enhanced due to reductions in air quality emissions from their cargo handling equipment fleet by well over a third within a mere two years.

3.3.2 Level of Independent Involvement and Effort by the Port Commerce Department

The Cargo Handling Equipment Inventory Update was conducted independent of any regulatory requirement or facility permit. Instead, it is an extension of the Port Commerce Department's corporate commitment toward promoting pollution prevention and environmental awareness among tenants; the agency's overall focus on a high standard of care for the health and safety of its tenants, patrons and employees, and for the prudent protection of natural resources within, abutting, or proximate to its facilities or which may otherwise be affected by its activities.

3.3.3 Creativity of the Solutions or Programs

This Cargo Handling Equipment Inventory Update was developed by taking a regulatory-driven report (i.e. the original Cargo Handling Equipment Inventory) one step further in order to determine where emission reduction efforts should be focused, which were found to be the tenants' container handling equipment. The development of this approach is also tied into the Port Commerce Department's unique voluntary Green Practices Task Force, where tenants shared anecdotal information about gradual changeover to cleaner burning equipment. These two efforts were combined to justify a Cargo Handling

Equipment Inventory Update that successfully quantified significant air quality enhancements at the terminals.

3.3.4 Results

Although the number of pieces in the terminals' 2004 container handling equipment fleets have increased since 2002 by 19%, average operating hours by 5%, and the total number of containers by 25%, overall emission estimates for key pollutants in tons per year have decreased significantly as follows: NO_x - 31% reduction; VOC - 32% reduction; CO - 32% reduction; PM - 32% reduction (10 ppm); and SO₂ - 35% reduction. According to the report, these drastic reductions have occurred because of fleet modernization voluntarily achieved by our tenants. Therefore, the final report effectively quantifies the air emission enhancements that have resulted from the container terminal operators' voluntary efforts. It also demonstrates that fleet modernization is a potential option for federal incentives under USEPA's Diesel Retrofit Program. Lastly, USEPA has proposed to use the Cargo Handling Emissions Inventory Update Report as an example for use by other ports.

3.3.5 Cost Effectiveness

The Cargo Handling Emissions Inventory Update cost the Port Commerce Department less than \$20,000, a truly great value considering it verifies that Port of New York & New Jersey emissions are improving dramatically because of voluntary action rather than as a result of regulation or litigation. The inventory update serves to promote fleet modernization as a viable candidate for federal incentives under USEPA's Diesel Retrofit Program, which should benefit the tenants. In addition, USEPA has proposed to use the Cargo Handling Emissions Inventory Update Report as an example for use by other ports.

3.3.6 Transfer of Technology or Idea to Port Industry

USEPA has expressed an interest in having their consultant, ICF, make note of the Cargo Handling Emissions Inventory Update Report as an example of a “best practice” in their document “Best Practices in Preparing Port Emission Inventories”, which ports will use to develop their emission inventories for which they create emission reduction strategies. Additionally, USEPA plans to use the Cargo Handling Emissions Inventory Update Report as an example of quantifying environmental results, and highlight those results in this year’s version of the Sector Strategies Performance Report.

4.0 Conclusion

The Cargo Handling Equipment Emissions Inventory Update was undertaken voluntarily to quantify air quality enhancements that were anticipated because of anecdotal information that members of the port community have been modernizing their off-road fleet with new machines powered by USEPA certified on-road engines. Reporting has been kept confidential and quantified these improvements. Although the number of pieces in the 2004 fleet has increased since 2002 by 19%, average operating hours have increased by 5%, and the total number of containers has increased by 25%, overall emission estimates for key pollutants in tons per year have decreased significantly as follows: NO_x - 31% reduction; VOC - 32% reduction; CO - 32% reduction; PM - 32% reduction (10 ppm); and SO₂ - 35% reduction.

In summary, the Cargo Handling Equipment Emissions Inventory Update:

- (1) Verifies that Port of New York & New Jersey emissions are improving dramatically through voluntary action rather than as a result of regulation or litigation;
- (2) Will be highlighted by USEPA as a tool to serve other ports in their emission reduction efforts; and
- (3) Serves to promote fleet modernization as a viable candidate for federal incentives under USEPA’s Diesel Retrofit Program.