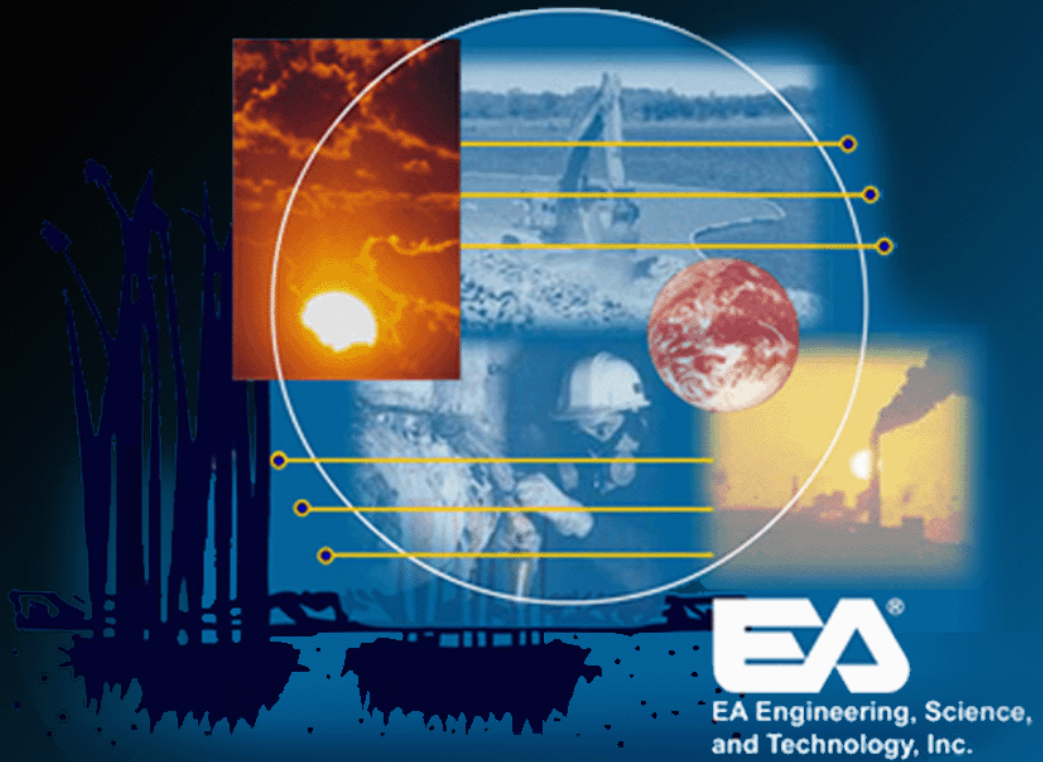
Effectively Managing the General Conformity Process for Port Construction - A Case Study



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Goals of Presentation

- Review of General Conformity
- How General Conformity applies to Ports
- Port of Baltimore case study

First – Air Quality 101

- Air quality regulations are developed both at the Federal and State levels (sometimes local)
- Prominent Federal regulations include NSPS, NESHAPS, NSR, and Conformity
- State regulations are part of State Implementation Plans (SIPS)
- Generally regulations are more difficult in areas deemed “Nonattainment” with National Ambient Air Quality Standards or NAAQS
- Nonattainment air quality areas of primary concern to Ports are Ozone and PM 2.5

What is General Conformity

- Rule issued in 1993 (CAA Section 176)
- Seeks to prohibit federal actions that would contribute to a SIP violation
- The other rule – Transportation Conformity

Definition of “Federal Action”

- Federally financed construction projects on government property
- Water and wastewater plant construction funded by the USEPA
- Construction projects requiring a federal approval (i.e., USACE)

Pollutants of Concern

- Ozone
- $PM_{10}/PM_{2.5}$
- CO
- SO_2
- NO_2
- Lead

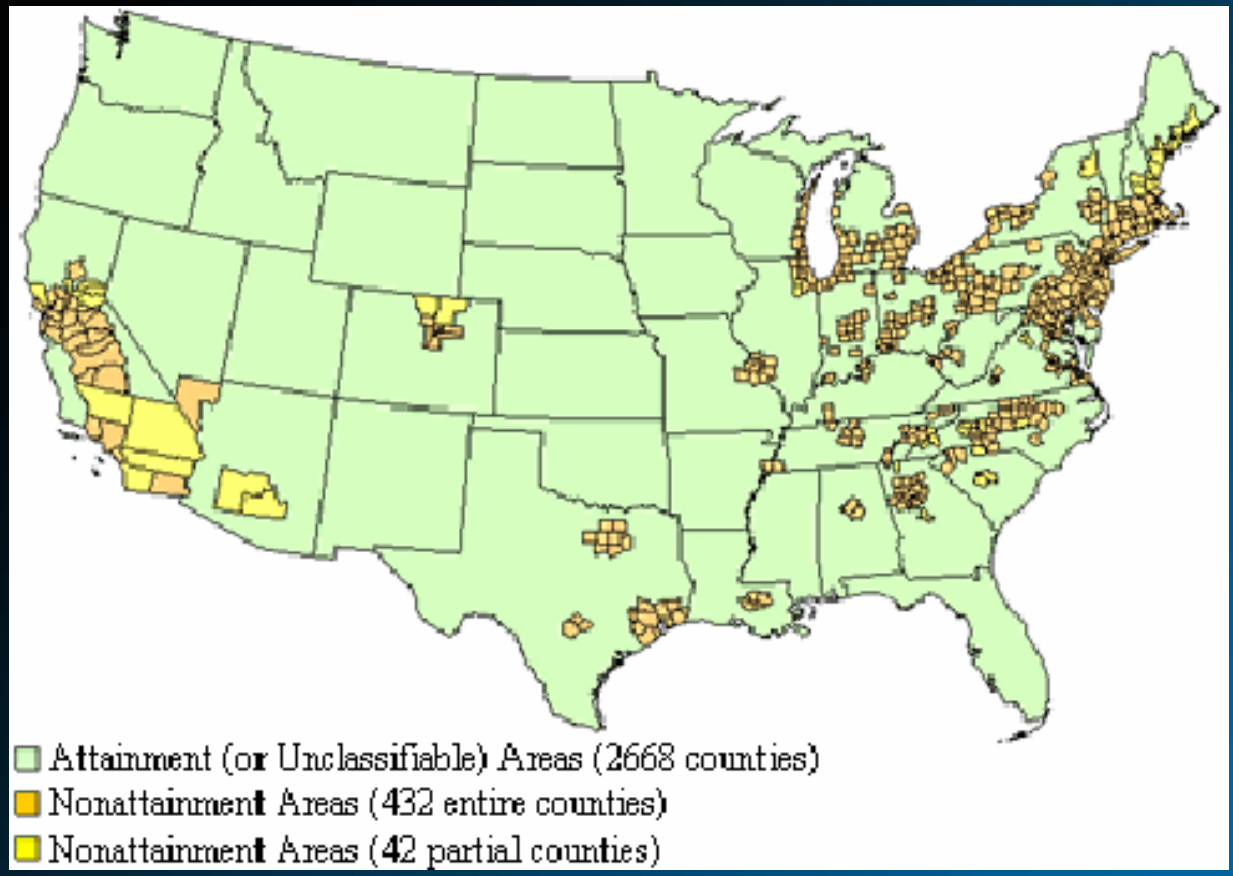
What is a Conformity Review?

- Evaluate the nature of the proposed action and associated air pollutants
- Determine if the action is exempt by rule (e.g., maintenance dredging)
- Calculate air pollutant emissions and impacts
- Mitigate emissions if regulatory thresholds are exceeded
- Prepare formal documentation of findings
- Publish findings for the public and regulatory community

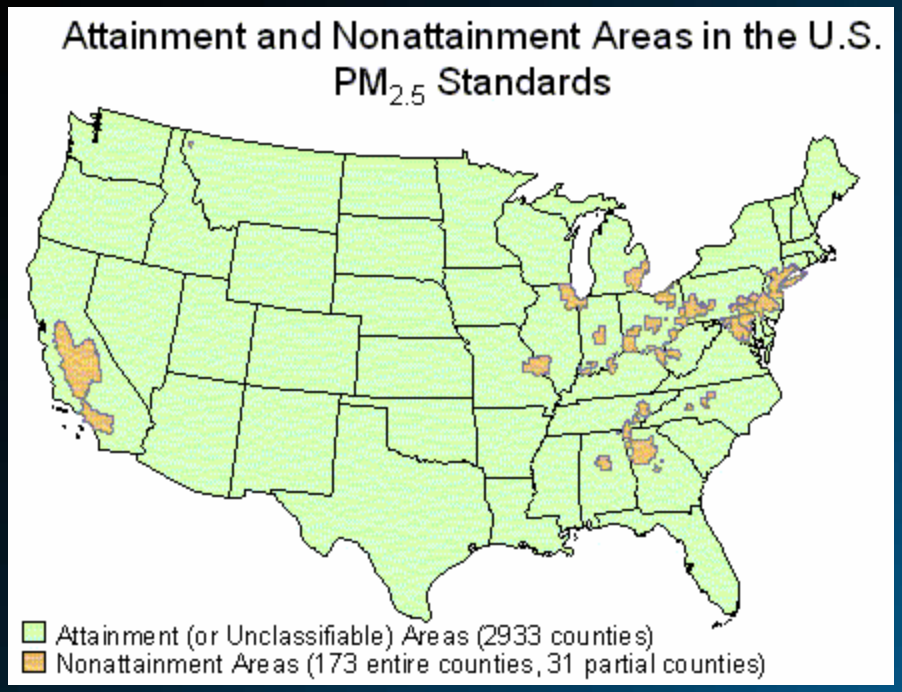
Emission Thresholds

- Ranges from 10 tpy to 100 tpy depending on pollutants
- No official threshold yet exists for $PM_{2.5}$
- Need to consider both direct and indirect emissions
- Concept of “regionally significant”

Nonattainment Regions 8-hr Ozone Standard

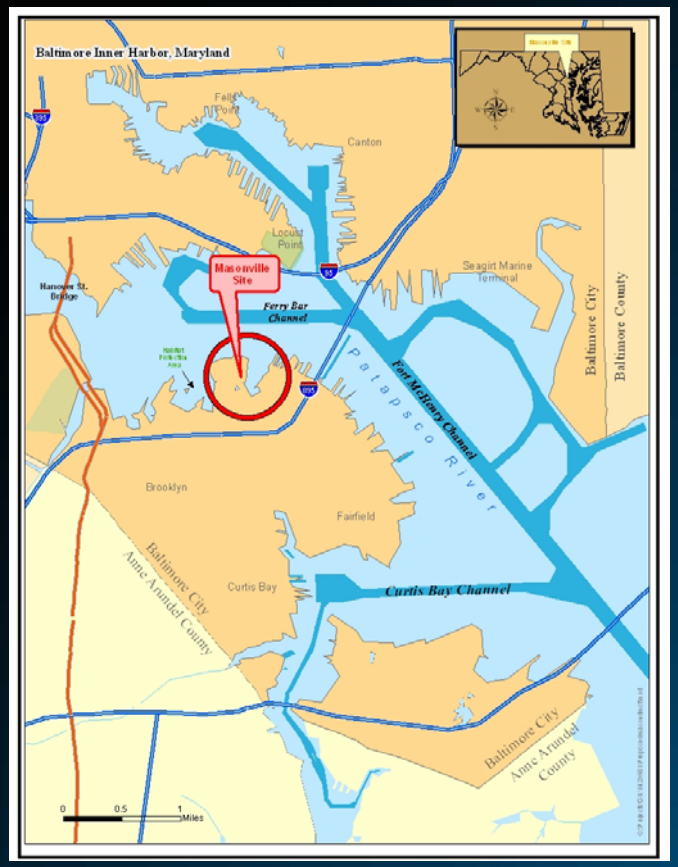


Nonattainment Regions $PM_{2.5}$ Standard

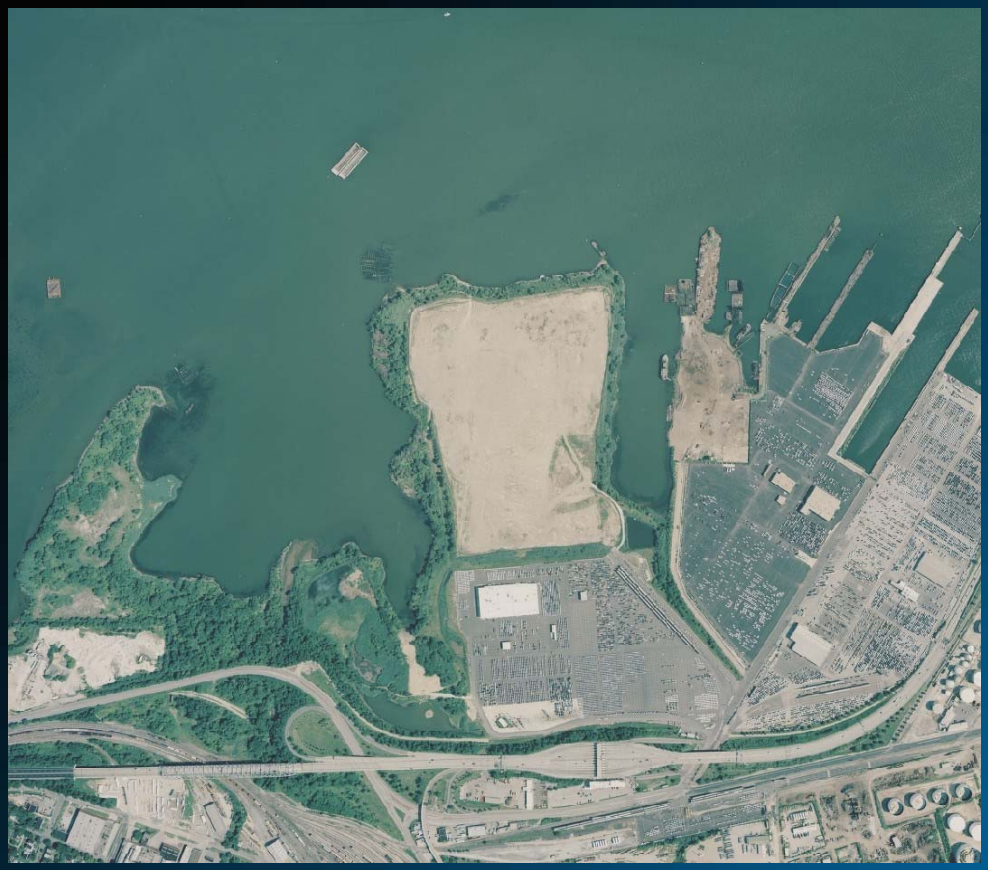


Case Study – Port of Baltimore, Masonville DMCF

- Major proposed DMCF consisting of contained area of 130 acres
- Area presently tidal open water
- High priority project for Baltimore Harbor which has a 1.5 mcy/year placement need
- Existing major DMCF scheduled to close in 2009



300th Anniversary
PORT OF
1706
BALTIMORE
MARYLAND
1706-2006



Project History

- DEIS developed over 2005/2006 timeframe (Draft DEIS issued in May, 2006)
- Many complex environmental issues were addressed
- Air analysis initially of screening nature, immediately went to refined study
- Construction start planned for Fall, 2006
- Completion by 2009

Construction Overview

- Crew A – Demolition activities
- Crew B – Pre-dredging of site
- Crew C, C1 – Dike and spillway construction
- Crew D – Cofferdam and pipeline reconstruction
- Crew E – Storm drain relocation
- Crew F – Mitigation, education center, trail construction

Sources of Air Emissions

- Marine diesel engines (tugs, dredges)
- Off-road equipment (pumps, excavators, etc.)
- On-road mobile sources (indirect sources)

Key Analytical Techniques

- Analysis of Commercial Marine Vessels Emissions and Fuel Consumption Data (EPA 420-R-00-02)
- National Mobile Inventory Emissions Model (NMIM)
- USEPA Mobile 6.2

Marine Operations

- Marine operations consisted of hydraulic dredge, hopper dredge, tugboats, and cranes
- USEPA approach develops load and emission factors for discreet engine types
- Emission factors developed through regression analysis
- Hours of operation projected to calculate annual emissions

Off-Road Emissions

- Performed using the EPA NMIM model (released April, 2006)
- Model requires information on fuel type, period of operation, region, equipment source classification codes, equipment technology, equipment population, and monthly activity distribution

On-Road Emissions

- Typically considered indirect emissions
- Consists of employee and delivery vehicles
- Mobile 6.2 calculates emission in grams/mile. VMT is used to calculate total emissions
- A representative “vehicle mix” was assumed

Total Air Emissions

	CO	NOx	PM2.5	PM10	SO2	VOC
CREW A	1.855	10.032	0.274	0.278	1.674	0.245
CREW B	28.568	149.716	4.337	4.413	24.060	3.588
CREW C	23.215	144.904	3.690	3.696	24.430	2.634
CREW C1	1.420	2.751	0.141	0.153	0.060	0.248
CREW D	8.784	26.481	1.283	1.324	6.126	1.295
CREW E	0.345	0.349	0.018	0.020	0.058	0.043
CREW F	3.020	6.738	0.340	0.370	0.399	0.619
TOTAL	**67.21**	**340.97**	**10.08**	**10.25**	**56.81**	**8.67**

Emissions Percentage Distribution

	CO	NOx	PM2.5	PM10	SO2	VOC
CREW A	3%	3%	3%	3%	3%	3%
CREW B	43%	44%	43%	43%	42%	41%
CREW C	35%	42%	37%	36%	43%	30%
CREW C1	2%	1%	1%	1%	0%	3%
CREW D	13%	8%	13%	13%	11%	15%
CREW E	1%	0%	0%	0%	0%	0%
CREW F	4%	2%	3%	4%	1%	7%
TOTAL	**1.00**	**1.00**	**1.00**	**1.00**	**1.00**	**1.00**

Total Annual Emissions Compared to The General Conformity (GC) Threshold (tons)

Pollutant	GC Threshold	2006	2007	2008	2009	TOTAL
CO	**NA**	12.83	36.29	17.67	0.43	67.21
NOx	**100**	60.66	**180.58**	98.77	0.95	340.97
PM2.5	**100**	1.90	5.47	2.66	0.05	10.08
PM10	**NA**	1.94	5.57	2.69	0.05	10.25
SOx	**NA**	10.38	30.45	15.92	0.06	56.81
VOC	**50**	1.68	4.69	2.21	0.09	8.67

Next Step – Mitigation Planning

- Mitigation by technology implementation to existing port and regional sources
- Mitigation by securing emission credits

Technology Options Being Examined

- Pre-combustion controls (e.g., exhaust gas recirculation)
- Post-combustion controls (e.g., emission catalyst)
- Idling restrictions
- Engine repowering
- Electrification
- Mobile source controls

Emission Reduction Credits Option

- NO_x credits currently scarce and expensive in the Mid-Atlantic region (+ 10,000/ton)
- VOC credits is a untried but attractive option presently being negotiated with the MDE and USEPA
- The potential for reuse of credits after project is complete

Late Breaking News

- A recent gantry crane electrification project has been determined to account for a NOx emission reduction amount of approximately 150 tpy
- A new CNG refueling station has the potential to reduced annual NOx emissions by 30 tpy
- Emissions are presently being verified and if correct will be incorporated into the general conformity mitigation plan

Conclusions

- The General Conformity requirements are as important to understand as any other environmental requirement affecting port construction
- Perform an initial “screening analysis” to determine applicability
- Work closely with regulatory agencies to solicit input especially on SIP issues
- Be creative in developing mitigation options