



Nonroad Recreational Vehicles

Highway Motorcycle

ANPRM

Office of Transportation and Air Quality


January 2001

Overview




- Historical and Statutory Context
- Schedule and Scope
- Air Quality
- Recreational Vehicles
- On-Highway Motorcycles
- Next steps

Historical & Statutory Context

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- No EPA nonroad program prior to 1990 Clean Air Act (CAA)
 - Section 213 of CAA directed EPA to:
 - evaluate contribution of nonroad sources to urban nonattainment
 - adopt standards if warranted
 - consider comparable highway standards in determining stringency
 - achieve greatest emission reduction possible considering cost, safety, etc.
 - regulate any nonroad category that contributes to air pollution
 - 1991 “NEVES” study found nonroad sources significant to ozone and CO nonattainment, also major source of PM
 - EPA initiated comprehensive nonroad program

History, continued

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- Approach: do what makes sense, get big reductions first
 - model and inventory development
 - finding of contribution
 - regulations
 - “Finding” process complete for all nonroad categories
 - last finding (recreational vehicles and large SI engines) published on November 17, 2000
 - Current nonroad regulations:
 - Large nonroad diesel engines
 - Locomotives
 - Marine engines (commercial/recreational)
 - Lawn & garden engines

Recreational Vehicle Final Finding



- Recreational vehicles and Large SI engines were combined in the same finding

- Emission modeling results for 2000 (thousand tons/year)

<u>Category</u>	<u>HC</u>	<u>CO</u>	<u>NO_x</u>	<u>PM</u>
– Recreational SI	568	4,241	21.3	5.6
– Large SI	121	2,232	294	1.5

- All these engine types are responsible for pollution in multiple nonattainment areas
- With this finding, CAA requires us to propose standards for these engines and vehicles

Schedule and Scope



■ Rulemaking Schedule

- Final Finding : November 17, 2000
- ANPRM: November 17, 2000
- NPRM: September 14, 2001
- FRM: September 13, 2002

■ Scope:

- Large SI engines*
- Recreational gasoline engines/vehicles*
- Recreational marine diesel engines*
- Marine Sterndrive and inboard gasoline engines
- Highway motorcycles

* Court-ordered deadlines apply to indicated engine types



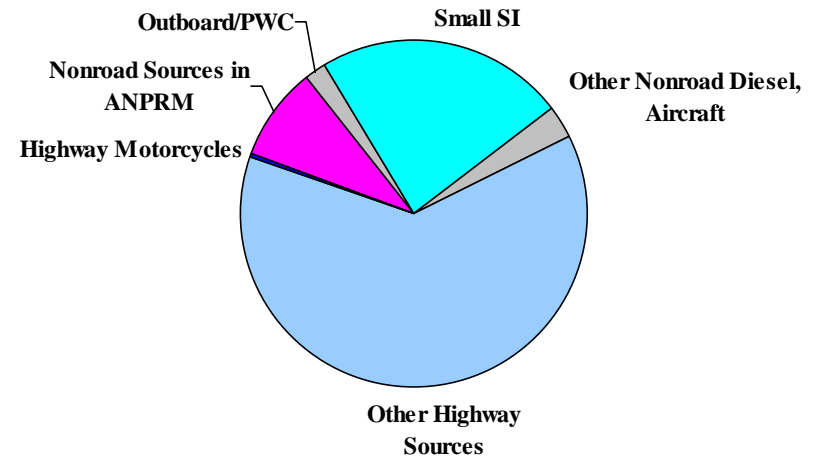
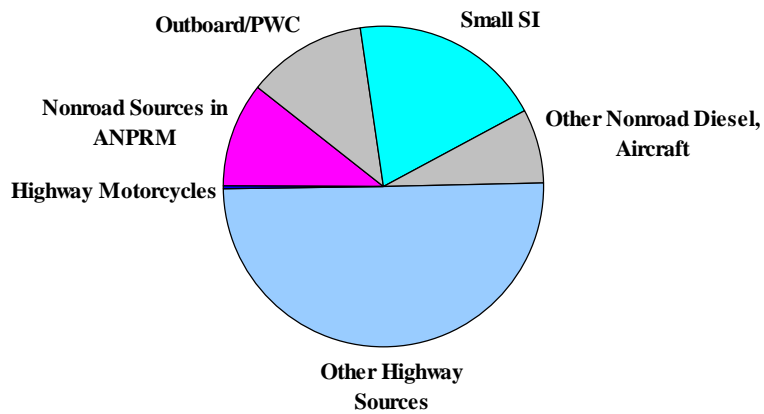
Air Quality

Year 2000 Mobile Source Inventory

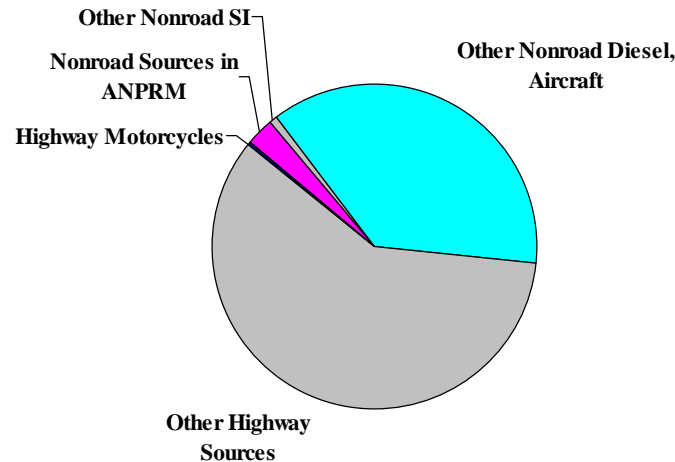


HC: 7,426 thousand tons

CO: 79,163 thousand tons



NOx: 13,437 thousand tons



2000 Nonroad Inventories



Category	NO _x		HC		CO		PM	
	tons	percent of mobile source	tons	percent of mobile source	tons	percent of mobile source	tons	percent of mobile source
Total for sources in finding	327	2%	712	10%	6,525	8%	7.2	1.0%
Nonrecreational nonroad SI > 19 kW*	306	2%	125	2%	2,294	3%	1.6	0.2%
Recreational SI*	21.3	0.16%	587	8%	4,231	5%	5.6	0.8%
Nonroad SI < 19 kW	106	0.8%	1,460	20%	18,359	23%	50	7%
Marine SI	32	0.2%	928	12%	2,144	3%	38	5%
Nonroad CI	2,625	20%	316	4%	1,217	2%	253	36%
Marine CI	1,001	7%	31	0%	133	0.2%	42	6%
Locomotive	1,192	9%	47	1%	119	0.2%	30	4%
Aircraft	178	1%	183	2%	1,017	1%	39	6%
Total Nonroad	5,461	41%	3,677	49%	29,514	37%	459	66%
Total Highway	7,988	59%	3,772	51%	49,701	63%	240	34%
Total Mobile Sources	13,449	100%	7,449	100%	79,215	100%	699	100%

Direct Exposure



- In addition to ozone and CO nonattainment, we are considering personal exposure concerns
- Individual exposure to CO, PM, and other toxics is important
- Recreational vehicles
 - National parks and OSHA documented exposure due to snowmobiles
 - Examined ambient levels, employee exposure, rider exposure
- Recreational marine
 - Coast Guard reports injuries and fatalities from CO exposure
- Large SI
 - Most forklifts today emit ~30,000 ppm CO in enclosed areas
 - even with dilution, high levels represent a risk



Recreational Vehicles




Product Overview



- Annual sales mix
 - Off-road motorcycles: 145,000
 - ATVs: 546,000
 - Snowmobiles 148,000
- All snowmobiles and 63% of off-road motorcycles use higher-emitting 2-stroke engines
- Most manufacturers make multiple product types, one company makes all three
- Scope:
 - considering other applications that may fall within this category, including scooters, mopeds, etc.

Recreational Vehicle Issues

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- **Standards:** potential for significant reductions in HC and CO; potential PM standard to address 2-stroke engine concerns; personal exposure concerns
 - **Test procedure:** chassis testing vs. engine testing
 - **Phase-in:** considering multi-tiered standards, percentage phase-in, and declining fleet average
 - **Competition:** CAA excludes vehicles “used solely for competition”. Many off-highway motorcycles marketed for amateur competition, but used for recreational purposes.
 - **Compliance:** considering production-line and in-use testing
 - **Tampering:** need to address backyard mechanics

Small-Business



- We know of ten U.S. small businesses making recreational engines/vehicles
 - At least seven more are foreign companies

- SBREFA Panel is underway

Why Highway Motorcycles?



- Current EPA standards more than 20 years old (5.0 g/km HC, no NO_x standard)
- California standards have kept pace with technology
 - CARB “Tier 2” standards of 0.8 g/km HC+NO_x in 2008
- Some manufacturers have been selling 50-state certified motorcycles for several years
- Europe has proposed new standards for 2003 and is considering additional reductions for 2006
- May be benefits to manufacturers to aligning highway, nonroad, and California requirements

Product Overview



- Annual sales mix
 - On-Highway 300,000
 - Dual-Sport 13,000
- All U.S. engines are 4-stroke
- Wide variety of engine designs
 - one, two, three, four, and six cylinders
 - in-line, horizontal, and “V” engine configurations
- Some on-highway motorcycles are equipped with catalysts

Highway Motorcycle Issues

- **Emission standards:** considering program similar to California
- **Test procedure:** continued use of FTP test cycle
 - considering SFTP, European cycle
- **Useful life:** considering longer useful life period (~ 18K miles)
- **Tampering:** need to address backyard mechanics, especially with removal of catalysts
- **Evap:** considering evaporative emissions standards
- **SBREFA:** considering small-volume manufacturers provisions
 - California has adopted significant provisions

Next Steps



- Technology assessment
- Test procedure
- Standard development
- Resolution of competition issue
- NPRM by September 14, 2001