

Draft Regulatory Impact Analysis: Control of Hazardous Air Pollutants from Mobile Sources

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Assessment and Standards Division
Office of Transportation and Air Quality
U.S. Environmental Protection Agency

NOTICE

*This Technical Report does not necessarily represent final EPA decisions or positions.
It is intended to present technical analysis of issues using data that are currently available.
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Table of Contents

| | |
|--|------|
| <i>Executive Summary</i> | ES-1 |
| Chapter 1: Mobile Source Air Toxics Health Information | 1-1 |
| Chapter 2: Emission Inventories | 2-1 |
| Chapter 3: Air Quality and Resulting Health and Welfare Effects of Air Pollution from Mobile Sources | 3-1 |
| Chapter 4: Industry Characterization | 4-1 |
| Chapter 5: Vehicle Technological Feasibility..... | 5-1 |
| Chapter 6: Feasibility of Complying with a Benzene and Other Control Standards | 6-1 |
| Chapter 7: Gas Can Feasibility and Test Procedures..... | 7-1 |
| Chapter 8: Impact of New Requirements on Vehicle Costs | 8-1 |
| Chapter 9: Cost of Proposed Gasoline Benzene Standard and Other Control Options Considered | 9-1 |
| Chapter 10: Gas Can Costs | 10-1 |
| Chapter 11: Cost per Ton of Emissions Reduced | 11-1 |
| Chapter 12: Cost-Benefit Analysis | 12-1 |
| Chapter 13: Economic Impact Analysis | 13-1 |
| Chapter 14: Small-Business Flexibility Analysis | 14-1 |

List of Acronyms

| | |
|------------------------------------|--|
| $\mu\text{g}/\text{kg}\text{-day}$ | Micrograms per kilogram day |
| $\mu\text{g}/\text{m}^3$ | Microgram per cubic meter |
| AAM | Alliance of Automobile Manufacturers |
| ABT | Averaging, Banking, and Trading |
| ACS | American Cancer Society |
| AEO | Annual Energy Outlook (an EIA publication) |
| AGO | Atmospheric Gas Oil (a refinery stream) |
| ALTP | Absolute Level Trigger Point |
| AMS/EPA | Regulatory Model AERMOD |
| APHEA | Air Pollution and Health: A European Approach |
| API | American Petroleum Institute |
| AQMTSD | Air Quality Modeling Technical Support Document |
| ARB | (California) Air Resources Board |
| ASPEN | Assessment System for Population Exposure Nationwide |
| ASTM | American Society of Testing Materials |
| ATB | Atmospheric Tower Bottoms (a refinery stream) |
| ATSDR | Agency for Toxic Substances and Disease Registry |
| ATV | All-Terrain Vehicles |
| BBL | Barrel |
| BC | Black Carbon |
| BenMAP | Environmental Benefits Mapping and Analysis Program |
| BPCD | Barrels Per Calendar Day |
| BPD | Barrels Per Day |
| BTEX | Benzene, Toluene, Ethylbenzene, and Xylene isomers |
| BTX | Benzene, Toluene, and Xylene isomers |
| BZ | Benzene |
| C | Celsius |
| C ₆ or C ₆ | A hydrocarbon molecule with a specified number of carbon atoms, in this case 6 carbons |
| CA | California |
| CAA | Clean Air Act |
| CAIR | Clean Air Interstate Rule |
| California EPA | California Environmental Protection Agency |
| CAMR | Clean Air Mercury Rule |
| CAMx | Comprehensive Air Quality Model with Extension |
| CAND | Clean Air Nonroad Diesel |
| CARB | California Air Resources Board |
| CASAC | Clean Air Science Advisory Committee |
| CAVR | Clean Air Visibility Rule |
| CB | Chronic Bronchitis |
| CD | Criteria Document |
| CDC | Center for Disease Control |
| CE10 | Gasoline with 10 percent ethanol content |
| CEA | Cost-Effectiveness Analysis |
| CFEIS | Certification and Fuel Economy Information System |
| CFR | Code of Federal Regulations |
| CG | Conventional Gasoline |
| CHAD | Consolidated Human Activity Database |
| CI | Compression Ignition |
| CIIT | Chemical Industry Institute of Toxicology |
| CIMT | Carotid Intima-Media Thickness |
| CM15 | Gasoline with 15 percent methanol content |
| CMAI | Chemical Market Associates Incorporated |
| CMAQ | Community Multiscale Air Quality Model |

| | |
|-----------------|---|
| CNG | Compressed Natural Gas |
| CNS | Central Nervous System |
| CO | Carbon Monoxide |
| CO ₂ | Carbon Dioxide |
| COI | Cost-of-Illness |
| COPD | Chronic Obstructive Pulmonary Disease |
| C-R | Concentration-Response |
| CRC E-55/E-59 | Coordinating Research Council Emission Test Program for Heavy Duty Trucks |
| CUA | Cost-Utility Analysis |
| DCS | Distributed Control System |
| DEOG | Diesel Exhaust Organic Gases |
| DOE | Department of Energy |
| DPM | Diesel Particulate |
| E&C | Engineering and Construction |
| E10 | Gasoline Blend with Nominal 10 volume percent Ethanol |
| E200 | Percent of Fuel Evaporated at 200 Degrees F (ASTM D 86) |
| E300 | Percent of Fuel Evaporated at 300 Degrees F (ASTM D 86) |
| EAC | Early Action Compact |
| EC/OC | Elemental/Organic Carbon |
| ECM | Engine Control Module |
| EGU | Electrical Generating Utility |
| EIA | Economic Impact Analysis |
| EIA | Energy Information Administration (part of the U.S. Department of Energy) |
| EIM | Economic Impact Model |
| EMS-HAP | Emissions Modeling System for Hazardous Air Pollutants |
| EO | Executive Order |
| EPA | Environmental Protection Agency |
| EPAct | Energy Policy Act of 2005 |
| ETBE | Ethyl Tertiary Butyl Ether |
| ETC | Electronic Throttle Control |
| ETS | Environmental Tobacco Smoke |
| EVOH | Ethylene vinyl alcohol |
| F | Fahrenheit |
| FACES | Fresno Asthmatic Children's Environment Study |
| FBP | Feed Boiling Point (also Final Boiling Point) |
| FCC | Fluidized Catalytic Cracker |
| FCCU | Fluidized Catalytic Cracking Unit |
| FEL | Family Emission Level |
| FHWA | Federal Highway Administration |
| FOEB | Fuel Oil Equivalent Barrel |
| FRM | Final Rulemaking |
| FRTP | Fixed Reduction Trigger Point |
| FTC | Federal Trade Commission |
| FTP | Federal Test Procedure |
| g/gal/day | Grams per gallon per day |
| GDP | Gross Domestic Product |
| GIS | Geographic Information System |
| GM | General Motors |
| GPA | Geographic Phase-in Area |
| GVW | Gross Vehicle Weight |
| GVWR | Gross Vehicle Weight Rating |
| H ₂ | Hydrogen gas |
| HAD | Diesel Health Assessment Document |
| HAP | Hazardous Air Pollutant |
| HAPEM5 | Hazardous Air Pollutant Exposure Model version 5 |
| HC | Hydrocarbon |

| | |
|-------------------|---|
| HCO | Heavy Cycle Oil (a refinery stream) |
| HDN | Naphtha Hydrotreater (also Hydro-Denitrogenation Unit) |
| HDPE | High density polyethylene |
| HDS | Hydro-Desulfurization Unit |
| HDT | Hydrotreater |
| HEGO | (Heated) Exhaust Gas Oxygen |
| HHDDT | Heavy Heavy-Duty Diesel Truck |
| HI | Hazard Index |
| HLDT | Heavy Light-Duty Truck |
| HQ | Hazard Quotient |
| HSR | Heavy Straight Run (a refinery stream) |
| HVGO | Heavy Vacuum Gas Oil (a refinery stream) |
| IBP | Initial Boiling Point |
| ICAO | International Civil Aviation Organization |
| ICD-9 | International Classification of Diseases - Ninth Revision |
| ICI | Independent Commercial Importer |
| IFP | Institute Francais du Petrole |
| IMO | International Maritime Organization |
| IMPROVE | Interagency Monitoring of Protected Visual Environments |
| IRFA | Initial Regulatory Flexibility Analysis |
| IRIS | Integrated Risk Information System |
| ISC | Integrated Source Complex |
| ISCST | Industrial Source Complex Short Term |
| JAMA | Journal of the American Medical Association |
| K | Thousand |
| KBBL | Thousand barrels |
| KWH | Kilowatt Hour |
| LB | Pound |
| LCO | Light Cycle Oil (a refinery stream) |
| LDGT | Light Duty Gasoline Truck |
| LDGV | Light Duty Gasoline Vehicle |
| LDT | Light-Duty Truck |
| LDV | Light-Duty Vehicle |
| LEV I | Low Emission Vehicle I |
| LEV II | Low Emission Vehicle II |
| LEV | Low Emission Vehicle |
| LLDT | Light Light-Duty Truck |
| LLE | Liquid-Liquid Extraction |
| LNS | Light Naphtha Splitter |
| LP | Linear Programming (a type of refinery model) |
| LPG | Liquefied Petroleum Gas |
| LRS | Lower Respiratory Symptom |
| LSR | Light Straight Run (a refinery stream) |
| MAF | (Engine) Mass Air Flow |
| MAP | (Engine) Manifold Absolute Pressure |
| MDPV | Medium-Duty Passenger Vehicle |
| mg/m ³ | Milligrams per cubic meter |
| MHDDT | Diesel-Fueled Medium Heavy-Duty Truck |
| MHDT | Medium Heavy-Duty Truck |
| MI | Myocardial Infarction |
| MILY | Morbidity Inclusive Life Years |
| MLE | Maximum Likelihood Estimate |
| MM | Million |
| MNCPES | Minnesota Children's Pesticide Exposure Study |
| MOBILE6.2 | EPA's Highway Vehicle Emission Model |
| MON | Motor Octane Number |

| | |
|-------------------|--|
| MRAD | Minor Restricted Activity Days |
| MRL | Minimum Risk Level |
| MSAT | Mobile Source Air Toxics |
| MSAT1 | 2001 Mobile Source Air Toxics Rule |
| MTBE | Methyl Tertiary-Butyl Ether |
| NAAQS | National Ambient Air Quality Standards |
| NAICS | North American Industrial Classification System |
| NAS | National Academy of Science |
| NATA | National Scale Air Toxics Assessment |
| NATTS | National Air Toxics Trends Sites |
| NCI | National Cancer Institute |
| NCLAN | National Crop Loss Assessment Network |
| NEI | National Emissions Inventory |
| NEMS | National Energy Modeling System |
| NESCAUM | Northeast States for Coordinated Air Use Management |
| NESHAP | National Emissions Standards for Hazardous Air Pollutants |
| NHAPS | National Human Activity Pattern Survey |
| NHEXAS | National Human EXposure Assessment Survey |
| NIOSH | National Institute for Occupational Safety and Health |
| NLEV | National Low Emission Vehicle |
| NMHC | Non-Methane Hydrocarbons |
| NMIM | National Mobile Inventory Model (EPA software tool) |
| NMIM2005 | National Mobile Inventory Model Released in 2005 |
| NMMAPS | National Mortality, Morbidity and Air Pollution |
| NMOG | Non-Methane Organic Gases |
| NO ₂ | Nitrogen Dioxide |
| NONROAD | EPA's Non-road Engine Emission Model |
| NONROAD2005 | EPA's Non-road Engine Emission Model Released in 2005 |
| NO _x | Oxides of Nitrogen |
| NPRA | National Petroleum Refiners Association |
| NPRM | Notice of Proposed Rulemaking |
| NRC | National Research Council |
| NSTC | National Science and Technology Council |
| O&M | Operating and maintenance |
| OEHHA | Office of Environmental Health Hazard Assessment |
| OGJ | Oil and Gas Journal |
| OMB | Office of Management and Budget |
| OP | Original Production |
| OSHA | U.S. Department of Labor Occupational Safety and Health Organization |
| OTAQ | Office of Transportation and Air Quality |
| PADD | Petroleum Administration for Defense District |
| PAH | Polycyclic Aromatic Hydrocarbon |
| PC | Particle Count |
| PC | Passenger car |
| PFC | Portable Fuel Containers |
| PM | Particulate Matter |
| PM/NMHC | Particulate Matter to Non-Methane Hydrocarbon Ratio |
| PM ₁₀ | Coarse Particle |
| PM _{2.5} | Fine Particle |
| POM | Polycyclic Organic Matter |
| PONA | Paraffin, Olefin, Naphthene, Aromatic |
| PPM | Parts Per Million |
| PRTP | Percentage Reduction Trigger Point |
| PSI | Pounds per Square Inch |
| PSR | Power Systems Research |
| QALY | Quality-Adjusted Life Year |

| | |
|----------------------------|---|
| R&D | Research and Development |
| RAMS | Regional Atmospheric Modeling System |
| RBOB | Reformulated Blendstock for Oxygenate Blending |
| REMSAD | Regional Modeling System for Aerosols and Deposition |
| RfC | Reference Concentration |
| RfD | Oral reference dose |
| RFG | Reformulated Gasoline |
| RFS | Renewable Fuels Standard |
| RIA | Regulatory Impact Analysis |
| RIOPA | Relationship Between Indoor, Outdoor and Personal Air |
| ROI | Return on Investment |
| RON | Research Octane Number |
| RSM | Response Surface Metamodel |
| RVP | Reid Vapor Pressure |
| SAB | Science Advisory Board |
| SAB-HES | Science Advisory Board - Health Effects Subcommittee |
| SAE | Society of Automotive Engineers |
| SBA | Small Business Administration |
| SBAR Panel, or 'the Panel' | Small Business Advocacy Review Panel |
| SBREFA | Small Business Regulatory Enforcement Fairness Act of 1996 |
| SCF | Standard Cubic Foot |
| SECA | SO _x Emission Control Area |
| SER | Small Entity Representative |
| SFTP | Supplemental Federal Test Procedure |
| SHED | Sealed Housing for Evaporative Determination |
| SI | Spark Ignition |
| SPECIATE | EPA's repository of Total Organic Compound (TOC) & Particulate Matter (PM) speciated profiles |
| SUV | Sports-Utility Vehicle |
| SVM | Small Vehicle Manufacturer |
| SVOC | Semi-Volatile Organic Compound |
| SwRI | Southwest Research Institute |
| TDM | Travel Demand Model |
| TEACH | Toxic Exposure Assessment – Columbia/Harvard |
| TEAM | Total Exposure Assessment Methodology |
| THC | Total Hydrocarbon |
| TMP | 2,2,4-Trimethylpentane |
| TSP | Total Suspended Particulate Matter |
| TWC | Three-Way Catalyst |
| UC | Unified Cycle Emission Test Procedure from ARB |
| UCL | Upper Confidence Limit |
| ULSD | Ultra-Low Sulfur Diesel |
| URE | Unit Risk Estimate |
| URS | Upper Respiratory Symptom |
| UV | Ultraviolet |
| UVb | Ultraviolet-b |
| VGO | Vacuum Gas Oil (a refinery stream) |
| VMT | Vehicle Miles Traveled |
| VOC | Volatile Organic Compound |
| VSL | Value of a Statistical Life |
| VTB | Vacuum Tower Bottoms (a refinery stream) |
| WLD | Work Loss Days |
| WTP | Willingness-to-Pay |