

July 20, 1999  
Mail Out #MSC 99-19

\*\*\* State regulations require that this notice be mailed to all persons who submitted comments during the Off-Road Large Spark-Ignition \*\*\* Engine public comment period. This document describes modifications approved by the Board at the October 22, 1998 hearing to be incorporated into the originally proposed regulatory language.

State of California  
AIR RESOURCES BOARD

Notice of Public Availability of Modified Text

PUBLIC HEARING TO CONSIDER ADOPTION OF EMISSION STANDARDS AND TEST PROCEDURES FOR NEW 2001 AND LATER OFF-ROAD LARGE SPARK-IGNITION ENGINES

Public Hearing Date: October 22, 1998  
Internet Public Availability Date: July 23, 1999  
Public Availability Date: July 27, 1999  
Deadline for Public Comment: August 11, 1999

At a public hearing held October 22, 1998, the Air Resources Board (the "Board" or ARB) considered adoption of sections 2430 through 2439, Title 13, California Code of Regulations ("CCR") and the "California Exhaust Emission Standards and Test Procedures for New 2001 and Later Off-Road Large Spark-Ignition Engines" ("Test Procedures"). The purpose of those regulations is to establish exhaust emission standards for hydrocarbons (HC) and oxides of nitrogen (NO<sub>x</sub>) combined, and carbon monoxide (CO) for off-road spark-ignition engines 25 horsepower and above. The regulations also establish emission test procedures, test cycles, and fuel specifications, which are representative of real use, and in-use emissions compliance requirements. The regulations also include: separate emission standards for large (engine displacement greater than 1.0 liter(L)) and small (less than or equal to 1.0 L) large spark-ignition (LSI) engines, an engine certification program, an in-use compliance testing program for the large LSI engines, a three year phase-in period to provide manufacturers with added flexibility in achieving the new standards for large LSI engines, and special provisions for small-volume manufacturers, including exclusion from the pre-2004 large LSI engine requirements. Staff also proposed amendments to the off-highway recreational vehicle (OHRV) regulations (sections 2410-2414, Title 13, CCR) and the associated test procedures. The proposed regulatory action is described in detail in the LSI engine initial statement of reasons (staff report), released September 4, 1998, as part of Mail-Out MSC 98-20.

At the hearing, the Board approved the proposed sections 2430 through 2439, Title 13, CCR, and the associated test procedures, with some modifications to the originally proposed regulatory language. The Board also approved the proposed amendments to section 2411 through 2414, Title 13, CCR, and the amendments to the associated test procedures, with some modifications to the originally proposed regulatory language. Resolution 98-51 is included as Enclosure 1. The regulatory sections, with the modifications noted, are contained in Enclosure 2, while the test procedures, also with modifications noted, are in Enclosure 3. The following describes the modifications, by Section number.

#### REGULATIONS - LSI Engines

##### §2431 - Definitions

The definition of "compliance testing" was renamed "new engine compliance testing" and modified to provide manufacturers the ability to choose a qualified testing facility. This choice must be approved by the Executive Officer.

The definition of "emission durability period" was modified to more accurately define "emission durability period."

The definition of "small volume manufacturer" was added.

The definitions for "scheduled maintenance" and "unscheduled maintenance" were modified to match those provided in the test procedures language.

The definition of "useful life" was added.

##### § 2433 - Exhaust Emission Standards and Test Procedures

Paragraph (b) was modified to reflect 2002 and subsequent model year (MY) standards of 9.0 g/bhp-hr (grams per horsepower-hour) HC plus NO<sub>x</sub> and 410 g/bhp-hr CO with a durability demonstration of 1000 hours for LSI engines 1.0 liter and less. Text concerning engines over 1.0 liter was modified to reflect a 3.0 g/bhp-hr HC+NO<sub>x</sub> and 37 g/bhp-hr CO emission standard with a durability demonstration of 3500 hours and a 4.0 g/bhp-hr HC+NO<sub>x</sub> and 50 g/bhp-hr CO in-use compliance standard in 2004 through 2006. For the 2001, 2002, and 2003 model years, manufacturers may comply with the emission standards by phasing-in complying engines by the percentages 25/50/75, respectively. Provisions allowing small-volume manufacturers an exemption from the pre-2004 standards were also added to this section. The modified standards are shown in Table 1, below.

Exhaust Emission Standards  
(grams per brake horsepower-hour)  
[grams per kilowatt-hour]<sup>(1)</sup>

Model Year	Engine Displacement	Durability Period	Hydrocarbon plus Oxides of Nitrogen	Carbon Monoxide
2002 and subsequent	≤ 1.0 liter	1,000 hours or 2 years	9.0 [12.0]	410 [549]
2001 - 2003 <sup>(2),(3)</sup>	> 1.0 liter	N/A	3.0 [4.0]	37.0 [49.6]
2004 - 2006 <sup>(4)</sup>	> 1.0 liter	3500 hours or 5 years	3.0 [4.0]	37.0 [49.6]
2007 and subsequent	> 1.0 liter	5000 hours or 7 years	3.0 [4.0]	37.0 [49.6]

- Note: (1) Standards in grams per kilowatt-hour are given only as a reference. Pollutant emissions reported to ARB by manufacturers must be in grams per brake horsepower-hour.
- (2) Small volume manufacturers are not required to comply with these emission standards.
- (3) Manufacturers must show that at least 25 percent of its California engine sales comply with the standards in 2001, 50 percent in 2002, and 75 percent in 2003.
- (4) The standards for in-use compliance for engine families certified to the standards in the row noted are 4.0 g/bhp-hr (5.4 g/kW-hr) hydrocarbon plus oxides of nitrogen and 50.0 g/bhp-hr (67.0 g/kW-hr) carbon monoxide, with a useful life of 5000 hours or 7 years. In-use averaging, banking, and trading credits may be generated for engines tested in compliance with these in-use compliance standards. If the in-use compliance level is above 3.0 but does not exceed 4.0 g/bhp-hr hydrocarbon plus oxides of nitrogen or is above 37.0 but does not exceed 50.0 g/bhp-hr carbon monoxide, and based on a review of information derived from a statistically valid and representative sample of engines, the Executive Officer determines that a substantial percentage of any class or category of such engines exhibits within the warranty periods noted in Section 2435, an identifiable, systematic defect in a component listed in that section, which causes a significant increase in emissions above those exhibited by engines free of such defects and of the same class or category and having the same period of use and hours, then the Executive Officer may invoke the enforcement authority under Section 2439, Title 13, California Code of regulations to require remedial action by the engine manufacturer. Such remedial action is limited to owner notification and repair or replacement of defective components, without regard to the requirements set forth in Section 2439(b)(5) or Section 2439(c)(5)(B)(vi). As used in the section, the term “defect” does not include failures that are the result of abuse, neglect, or improper maintenance.

Paragraph (d) was modified such that engines 1.0 liter and less must meet the standards in paragraph (b) and the test procedures specified in the small off-road engine (SORE) regulations.

Paragraph (e) was modified to allow for the continued production of engines for older-model equipment, beginning in 2004.

Paragraphs (e)(2)(B) and (C) were modified such that a description of the physical or performance characteristics of those models of non-certified replacement engines that indicate that a certified replacement is not available must be provided by the manufacturer of replacement engines at the conclusion of the model year, and not at the beginning. The modifications would make these paragraphs identical to the corresponding SORE regulatory text.

#### §2434 - Emission Control Labels

Paragraph (b) was modified to direct manufacturers to the California Code of Regulations, Title 13, Section 2404 for the applicable labeling specifications for 2002 and later model year off-road LSI engines with engine displacement less than or equal to 1.0 liter.

Paragraph (c)(3) was modified to allow for alternative identification methods or tracking numbers for engines and alternative means of attaching these methods of identification, and to require that the date an engine was manufactured be stamped on the engine block or a metal label riveted or permanently attached to the engine block.

Paragraphs (c)(5)(G) and (H) were modified such that the build date and durability period are no longer required on the engine tune-up label.

Paragraph (g) was modified by replacement of "diesel fuel" with "gasoline".

#### §2435 - Defects Warranty Requirements

Paragraph (a) was modified to direct manufacturers to the California Code of Regulations, Title 13, Section 2405 for the applicable warranty requirements for 2002 and later model year off-road LSI engines with engine displacement less than or equal to 1.0 liter.

Subsection (b) was modified to include changes in the required warranty period. For 2001 to 2003 MY, engines greater than 1.0 liter must be warranted for 2 years or 1500 hours. In 2004 and subsequent years, engines greater than 1.0 liter must be warranted for 3 years or 2500 hours, and high cost parts for these engines must be warranted for 5 years or 3500 hours. The regulation language and modifications are similar to the corresponding on-road text in Section 2037.

Paragraph (b)(4) was added such that in the absence of a device to measure hours of use, an engine must be warranted for a period of the years noted in paragraphs (b)(2) and (3). If a device to measure hours is used, the engine must be warranted for the number of hours or the number of years noted above in paragraphs (b)(2) and (3), whichever occurs first.

Paragraphs (c)(1), (c)(2), and (c)(8) were modified to include a reference to paragraph (b)(3) of §2435 as a result of the changes made to §2435(b).

#### §2436 - Emission Control System Warranty Statement

Paragraph (a) was modified to specify that each manufacturer must furnish a copy of the warranty statement as set forth in the California Code of Regulations, Title 13, Section 2406(a) with each new off-road large spark-ignition engine with engine displacement less than or equal to 1.0 liter, using those portions of the statement applicable to the engine. Paragraph (a) was also modified to allow manufacturers to display a range of years instead of only the current model year on warranty statements, therefore manufacturers may not need to print new warranty statements each year.

Paragraph (b) was modified to specify that commencing with the 2002 model year for large off-road large spark-ignition engines with engine displacement less than or equal to 1.0 liter, each manufacturer must furnish with each new engine a warranty statement as set forth in the California Code of Regulations, Title 13, Section 2406(b).

#### §2437 - New Engine Compliance and Production Line Testing (PLT)

The originally proposed regulation mailed out with the staff report inadvertently stated that new engine compliance testing started in 2004. The correct year for which new engine compliance testing begins, as was stated in the staff report, is 2001. Paragraph (a)(1) was modified to correct the typewritten error. The paragraph was also modified to specify that the applicable new engine compliance test procedures for 2002 and later model year large off-road spark-ignition engines with engine displacement less than or equal to 1.0 liter are set forth in the California Code of Regulations, Title 13, Section 2407.

Paragraphs (b) and (b)(1) were modified to correct an error in the year for which PLT is implemented. The year 2004 was corrected to 2001, as stated in the staff report. Paragraph (b)(1) was also modified to specify that the 2002 and subsequent model year off-road large spark-ignition engines with an engine displacement of less than or equal to 1.0 liter, that have been certified for sale in California, are subject to production line testing performed according to the requirements as set forth in the California Code of Regulations, Title 13, Section 2407.

Paragraph (b)(2)(A)(iii) was added to provide reduced PLT requirements beginning with

the 2006 model year if a manufacturer can show that its PLT and in-use test results are consistent and comply with the emission standards. Manufacturers must annually request reduced testing.

Paragraph (b)(4)(K) was added to allow a one percent limit on PLT testing for small volume manufacturers.

Paragraph (f)(1) was modified by removing the word "family" such that this paragraph of the regulation will correctly correspond to §2437(c)(5).

§2438 - In-use testing program.

A new paragraph (a) was added to this section to make specific its applicability. As modified, the section will apply to new 2004 and later model year off-road large spark-ignition engines with engine displacement greater than 1.0 liter.

Paragraph (b), was modified, deleting inapplicable references to "production line".

Paragraph (b)(1) was modified to clarify that the ARB will identify during the production period which engine families will be subject to in-use testing.

Paragraphs (b)(3) and (b)(5) were modified to indicate that in-use engine procurement will occur between 0.50 and 1.0 of the certified engine's useful life period. Also the ARB will require the submission of a plan by the manufacturer as to how engines will be procured for testing.

Paragraphs (b)(3)(A)-(C) were modified to correct all variations of "exceeds any standard", "fails any pollutant", and "fails any standard" such that they are identical and read, "fails any pollutant emission standard." Paragraph (b)(3)(B) was further modified to specify that the production numbers refer to national numbers.

Paragraphs (b)(4) and (5), regarding added testing and remedial action, were moved to section (b)(6) and (7).

Paragraph (b)(5) was modified to specify that testing shall begin within 12 months after receiving notice from ARB and completed within 24 month from the date of the approval of the plan.

Paragraph (c)(2) was modified to allow repairs to be performed on in-use test engines with prior Executive Officer approval.

Paragraph (c)(5) was modified, providing manufacturers with additional time to report failed engines. The manufacturer must report an emission test failure of a test engine within 72 hours after the completion of the test. The report must specify the emission results and identify

the pollutant that failed to comply with the emission standard. The manufacturer must report all such reasons of noncompliance within fifteen business days of an engine family failure. Additional time beyond the initial fifteen days may only be granted if the manufacturer receives prior approval from the Executive Officer.

Paragraph (d)(1)(C) was modified to allow for alternate engine identification methods to be reported by the manufacturer when complying with the in-use testing program.

What had been previously referred to as paragraph (d)(1) and (2), regarding the voluntary recall was moved to (c)(8) and (9).

Paragraph (e)(3)(G), the definition of "compliance level", was moved to (e)(3)(E).

Paragraph (e)(7) was modified to correct a typographical error. All references to a 1.2 liter cut point were changed to a 1.0 liter cut point. All references to the small LSI engines were also deleted.

#### §2439 - Procedures for In-Use Ordered Recalls

The title of this section was modified to include only those LSI engines with an engine displacement of greater than 1.0 liter and also to include voluntary recall protocol. The new title reads, "Procedures for In-Use Engine Recalls for Large Off-Road Spark-Ignition Engines with an Engine Displacement Greater Than 1.0 Liter."

Subsection (b) was added, outlining the voluntary recall protocol. It was fashioned after the existing on-road recall protocol and adjusted for LSI engines.

Subsection (c)(2)(A)-(C) was added to include language which specifies methods by which a manufacturer may show that an emissions-related failure will not result in an exceedance of the emission standards.

Paragraph (c)(7)(B) was modified to clarify that the Executive Officer may require the manufacturer to use motor equipment registration lists, when available, to obtain the names and addresses of equipment or engine owners.

Paragraph (c)(13)(C) was modified to allow manufacturers to submit ordered recall progress reports in six quarterly reports, or two annual reports.

Paragraph (e) was added providing the Executive Officer the ability to waive any or all of

the recall requirements if the Executive Officer determines that the requirement constitutes an unwarranted burden on the manufacturer without a corresponding emission reduction.

#### REGULATIONS - Recreational Vehicles

The Board directed staff to modify the definition of all-terrain vehicle (ATV) within Title 13, Section 2411(a)(1) to remove the 600 pound unladen weight limit restriction. The result is that all ATV's, regardless of weight, are subject to the off-highway recreational vehicle (OHRV) regulation. To accomplish the Board's directive staff included this change as part of a 15-day notice of modified text for the OHRV rule, released March 5, 1999 as Mail-Out MSC 99-03. During the comment period on the LSI item, staff will accept comments on the degree to which the OHRV changes accomplish the Board's directive noted above. We have attached portions of the text of Article 3, Section 2411 which consists of the original text of the OHRV regulation, and: 1) amendments approved by the Board at the December 10, 1998 hearing on OHRV amendments, and 2) additional modifications proposed in the 15-day notice of modified text for that item.

#### TEST PROCEDURES - LSI Engines

In addition to making the test procedures consistent with the above modifications of the regulatory language, staff has made other modifications to clarify and simplify the test procedures. The following is a description of the modifications, by Section number.

##### Part I, 2 - Definitions

The definitions for "alternate fuel", "ARB Enforcement Officer", "basic engine", "compliance testing", "deterioration factor", "emission durability period", "engine family", "off-road large spark-ignition engines", "scheduled maintenance", "Test Procedures", and "unscheduled maintenance" were added or modified to match those provided in the regulation language.

The definition of "useful life" was modified, making the useful life for engines equal to or less than 1.0 liter 2 years or 1000 hours, whichever occurs first.



### Part I, 3 - Abbreviations

Subscripts and symbols missing were added to several abbreviations.

### Part I, 7 - Emission Standards for 2001 and Later Model Year Off-Road Large Spark-Ignition Engines

Paragraph (a) was modified to be consistent with the changes made to Section 2433, Title 13, of the CCR.

### Part I, 9 - Approval of Application for Certification; Test Fleet Selections; Determinations of Parameters Subject to Adjustment for Certification and New Engine Compliance Testing, Adequacy of Limits, and Physically Adjustable Ranges

### Part I, 11 - Test Engines

Paragraph (a)(5) was added to clarify that engines identical in all the respects under the definition of engine family given in paragraph (a)(2) of this section, but which use differing fuels, may be certified as one engine family, provided the engine family be certified using the fuel that would yield the worst-case emission scenario.

Paragraph (d) was modified and subsections were rearranged to revise the method for determining emission deterioration factors (DF). The revised paragraph allows manufacturers to provide their own DF's using good engineering practice. The manufacturers must submit a plan for determining DF's and have it approved, by the Executive Officer, prior to certification. The paragraph was also modified to allow an engine manufacturer the ability to request a reduction in the total amount of service accumulation hours for any durability/service accumulation engine to one half of the engine's defined useful life period.

### Part I, 12 - Maintenance

Paragraph (d) was modified to state that maintenance performed on engines used to determine the deterioration factors must be consistent with the maintenance requirements.

### Part I, 13 - Service Accumulation; Emission Measurements

Paragraph (a)(2) was modified to clarify that a manufacturer shall determine, for each engine family or group of engine families, the number of hours that the engine-system is stabilized for emission-data testing.

### Part I, 16 - Certification

Paragraph (a)(3) was modified to clarify that if the Executive Officer determines that a test engine meets the requirements of the certification procedures, then an Executive Order will be issued for each engine family within the group, not for engine family groups.

Paragraph (b)(1)(ii) was modified to clarify the specifications of an emission data test engine.

#### Part I, 18 - Changes to an Engine Covered by Certification

Paragraph (a) was modified to clarify that the correct references in the paragraph should be 11(a)(1) through 11(a)(4).

#### Part I, 20 - Submission of Engine Identification Numbers

Paragraph (a) was modified to allow for reporting using alternative identification methods.

#### Part I, 21 - Production Engines

This paragraph was modified to remove the term "heavy-duty".

#### Part II - International Standards Organization (ISO) 8178, RIC Engines - Exhaust emission measurement - Part 4: Test cycles for different engine applications

ISO 8178, 8.7 was modified to reflect the changes to small LSI engines, and correct the power rating.

#### TEST PROCEDURES - Recreational Vehicles

In the Test Procedures for OHRV the definition for "All-Terrain Vehicle" was modified to align with the definition in the existing OHRV regulations. As noted above it was also modified to be consistent with the approved changes to section 2411(a)(1).

**ADD:**

*"All-Terrain Vehicle" means a vehicle having 3 or more wheels, utilizing a handlebar style steering, designed to be straddled by the operator, used mainly on unpaved surfaces, and generally weighing less than 1,499 pounds. The vehicle is designed to carry not more than two persons, including the driver; carry not more than 200 pounds payload, excluding the passengers; and is powered by an internal combustion engine. A go-kart, golf cart or specialty vehicle is not, for purposes of this regulation, to be classified as an all-terrain vehicle. An all-*

*terrain vehicle that is not used exclusively in competition/racing events in a closed course is not a competition/racing vehicle for purposes of these regulations.*

was modified to;

*ADD:*

*“All-Terrain Vehicle” means any motorized off-highway vehicle 50 inches (1270 mm) or less in overall width, ~~{with an unladen dry weight of {606 600} pounds (275 kg) or less,}~~ designed to travel on four low pressure tires, having a seat designed to be straddled by the operator and handlebars for steering control, and intended for use by a single operator and no passengers. The vehicle is designed to carry not more than 350 pounds (160 kg) payload, excluding the operator, and is powered by an internal combustion engine. Width ~~{and unladen weight}~~ shall be exclusive of accessories and optional equipment. A ~~{go-kart,}~~ golf cart ~~{or specialty vehicle}~~ is not, for purposes of this regulation, to be classified as an all-terrain vehicle. ~~{An all-terrain vehicle that is not used exclusively in competition/racing events in a closed course is not a competition/racing vehicle for purposes of these regulations.}~~*

Because the definition included in Attachment B of the LSI Staff Report was incorrect the modified definition included in this package is not underlined as this is not a true modification to what was originally proposed.

The term "Total Test Difference" was corrected to align with the definition in the existing language. The definition given as follows;

*"Total Test Distance" is defined as the appropriate distance the vehicle should be driven to stabilize the emission characteristics of the engine.*

was modified to;

*“Total Test Distance” is defined as the appropriate distance the vehicle should be driven to stabilize the emission characteristics of the engine. The manufacturer shall determine the appropriate distance.*

Because the definition included in Attachment B of the LSI Staff Report was incorrect the modified definition included in this package is not underlined as this is not a true modification to what was originally proposed.

Paragraph 86.410-90(c) was modified to align with the definition in the existing language and update as per the March 26, 1998 SORE hearing. The definition given as follows;

*ADD:*

(c) *As an option to the standards set forth in section (a)(1) above, exhaust emissions from 1997 and later all-terrain vehicle engines shall not exceed the equivalent to the off-road motorcycle and all-terrain vehicle standard using the utility test procedures set forth in "California Exhaust Emission Standards and Test Procedures for 1995 and Later Utility and Lawn and Garden Equipment Engines", adopted, March 20, 1992, and last amended April 8, 1993, which is hereby incorporated by reference herein.*

was modified to;

*ADD:*

(c) *As an option to the standards set forth in section (a)(1) above, exhaust emissions from 1997 and later all-terrain vehicle engines ~~shall~~ must not exceed the equivalent to the off-road motorcycle and all-terrain vehicle standard using the ~~utility~~ test procedures set forth in "California Exhaust Emission Standards and Test Procedures for 1995 and Later ~~Utility and Lawn and Garden Equipment~~ Small Off-Road Engines", adopted March 20, 1992, and last amended ~~April 8, 1993~~ March 26, 1998, which is hereby incorporated by reference herein. Compliance with the optional HC standard is based on a manufacturer's corporate average basis, as provided in (b) above.*

Because the definition included in Attachment B of the Staff Report was incorrect the modified definition included within the attachment of this package is not underlined as this is not a true modification to what was originally proposed.

Staff has made several other non-substantial modifications throughout the regulations and test procedures to correct grammatical and typographical errors, correct references and citations, and improve the clarity of the regulations and test procedures.

As noted above, Enclosure 1 contains a copy of Board Resolution 98-51, approving the above described regulatory action. Enclosures 2 and 3 contain the text of the modified proposed regulatory language and associated test procedures, respectively. All of these enclosures, along with the text in its entirety, are available online at the ARB's Internet site for the Off-Road Large Spark-Ignition Engine regulatory documents -- <http://www.arb.ca.gov/regact/lore/lore.htm>. Printed copies are also available and may be obtained from Ms. Joyce Stephanik, Mobile Source Control Division, at telephone (626) 575-6632 or fax (626) 575-6686.

In accordance with section 11346.8 of the Government Code, the Board directed the Executive Officer to adopt sections 2430 through 2439 and amendments to sections 2411 through 2414, as approved, after making the modified regulatory language available to the public for comment for a period of at least 15 days, provided that the Executive Officer shall consider such written comments as may be submitted during this period, shall make such modifications as may be appropriate in light of the comments received, and shall present the regulations to the Board for further consideration if he determines that this is warranted.

July 20, 1999  
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Written comments must be submitted to Mr. Michael W. Carter, Chief, Emission Research and Off-Road Controls Branch, Air Resources Board, 9528 Telstar Avenue, El Monte, California 91731, no later than August 11, 1999 for consideration by the Executive Officer prior

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to final action. Only comments relating to the modifications described in this notice will be considered by the Executive Officer.

The Air Resources Board (ARB) would like to determine the effectiveness of our public outreach effort for this regulatory item and are searching for ways to improve the process. Since you are on our mailing list, we would appreciate your cooperation in completing the enclosed Board Item Development Process Survey (Enclosure 4). Please submit the form by postage-paid mail, or send it by fax, to the ARB's Ombudsman Office. The fax number is (916) 323-2393. We would appreciate it if you return your response by August 21, 1999.

Thank you for participating in our regulatory process. If you have technical questions concerning the regulatory item please contact Jackie Lourenco, Manager, Off-Road Controls Section, at (626) 575-6676 or David Salardino, Staff, at (626) 575-6679. Questions relating to the survey should be directed to Dr. Nancy Steele, Deputy Ombudsman, at (626) 459-4368.

Sincerely,

Robert H. Cross, Chief  
Mobile Source Control Division

Enclosures