

NH₃ as a Potential Alternative Fuel for California



NH₃ FUEL CONFERENCE

**SEPTEMBER 24, 2013
SACRAMENTO, CA**

**JIM AGUILA, MANAGER
Substance Evaluation Section
Alternative Fuels Branch
Stationary Source Division**

California Environmental Protection Agency

 **Air Resources Board**

Setting the Landscape



- **ARB neutral on motor vehicle fuels**
- **Motor vehicle fuels subject to the Low Carbon Fuel Standard**
- **Staff proposing new regulation for Alternative Diesel Fuels**
- **ARB adopted fuel specifications subject to multimedia assessment**



Low Carbon Fuel Standard

Global Warming Solution Act (AB32)



- **Signed in 2006**
- **Reduce GHG emission in California to 1990 levels by 2020**
- **Directed California Air Resources Board to identify and adopt actions to achieve the goal**

Low Carbon Fuel Standard (LCFS)



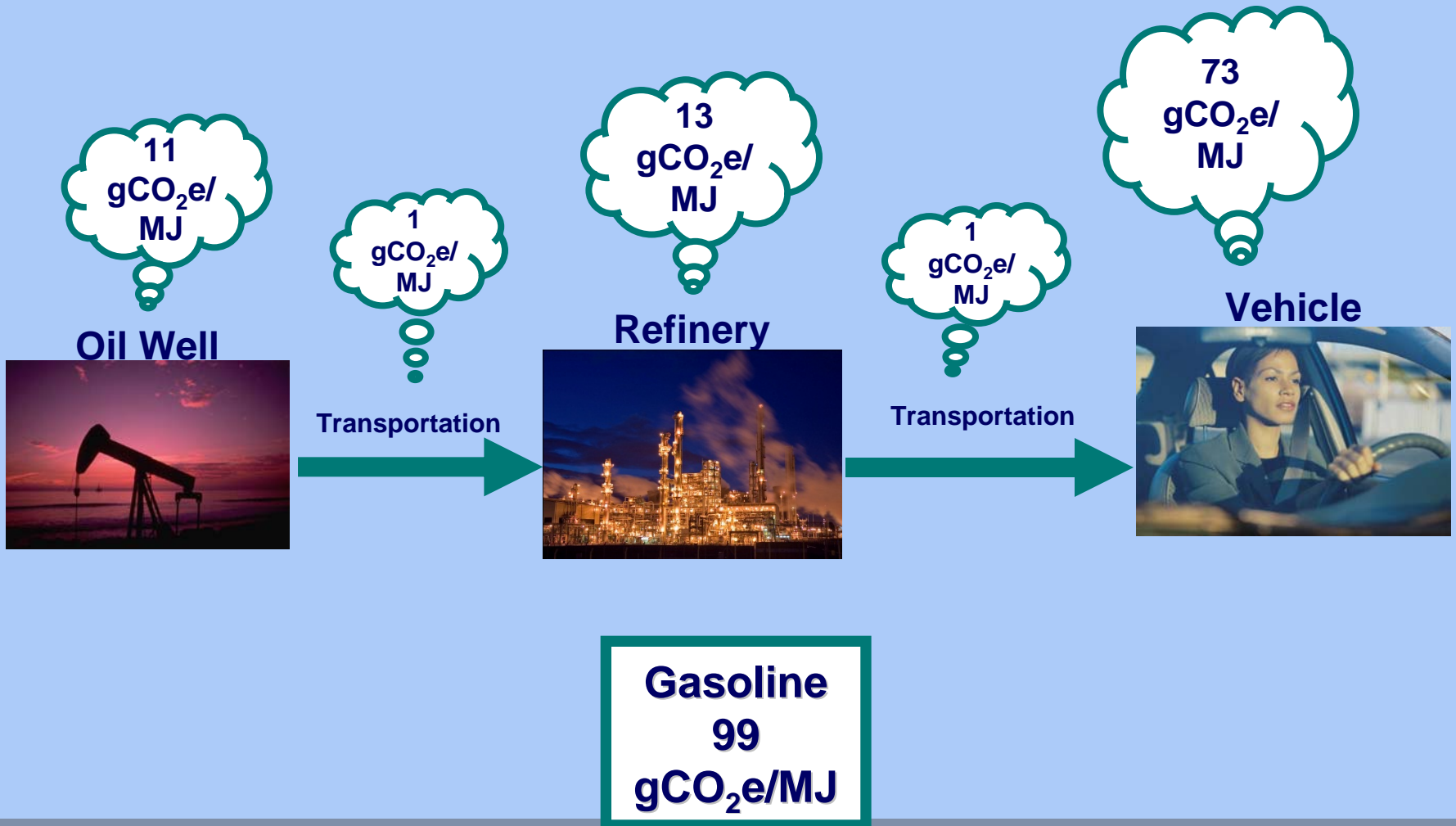
- **Low Carbon Fuel Standard identified as early action measure under Scoping Plan**
- **Reduce carbon intensity of transportation fuel pool by 10% by 2020**
- **Fuel neutral**
- **Transform States' fuel supply, reducing GHG emissions, and enhancing energy independence/security**

Basic LCFS Requirements



- Sets annual carbon intensity standards for gasoline, diesel, and the fuels that replace them
- Carbon intensity (CI) is the measure of GHG emissions associated with producing, transporting, and consuming a fuel (gCO₂e/MJ)
- CI based on complete life cycle analysis

Fuel Life Cycle - Gasoline

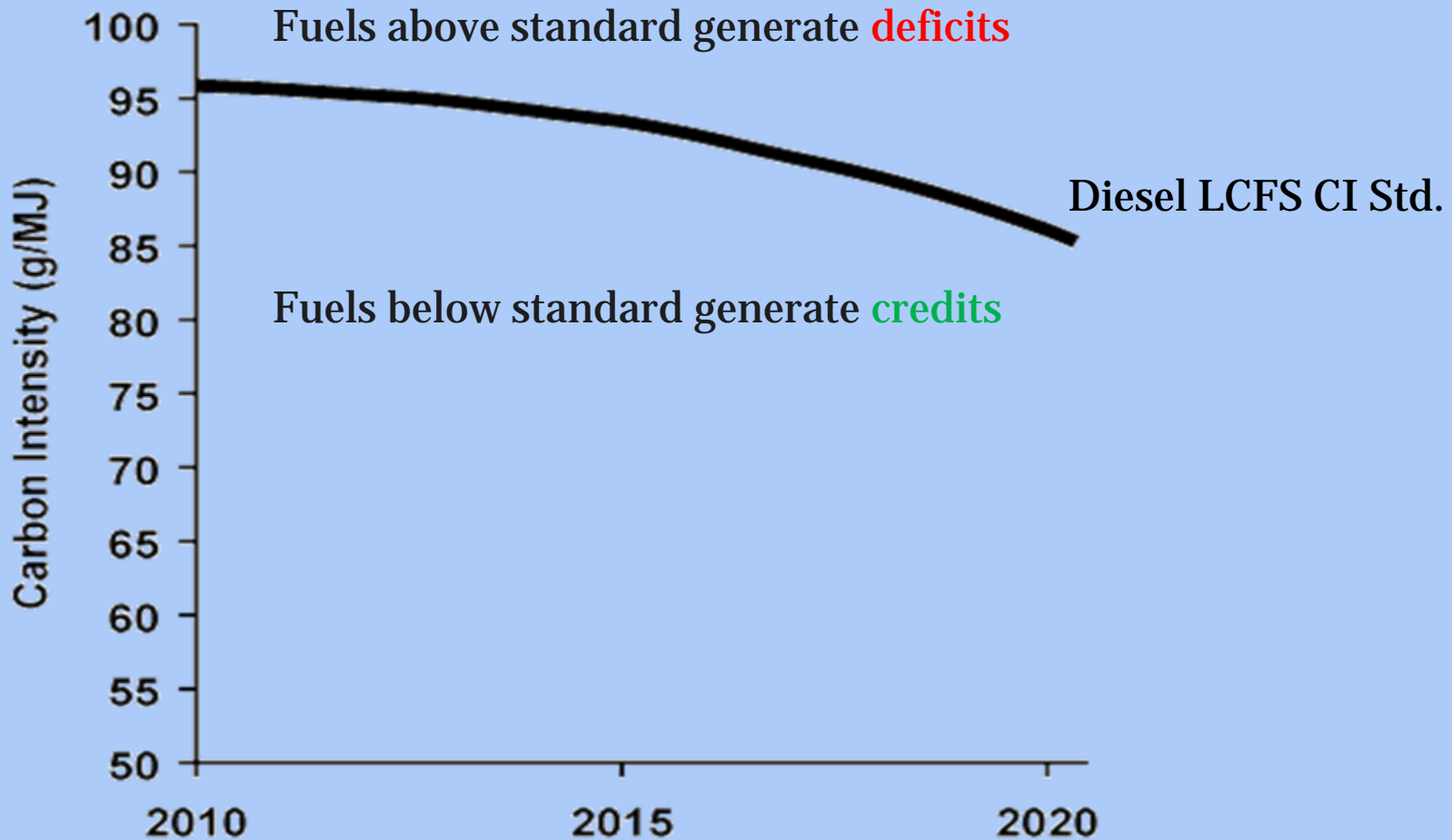


LCFS Applies to Regulated Parties



- California providers of most petroleum and biofuels are “regulated parties” under the LCFS
- Providers of clean fuels that already meet 2020 target are exempt but can “opt in” to program and earn credits
 - Electricity
 - Hydrogen
 - Natural gas & biogas
- Generated credits can be bought and sold by regulated parties

Schedule Provides Time for Fuel Advances



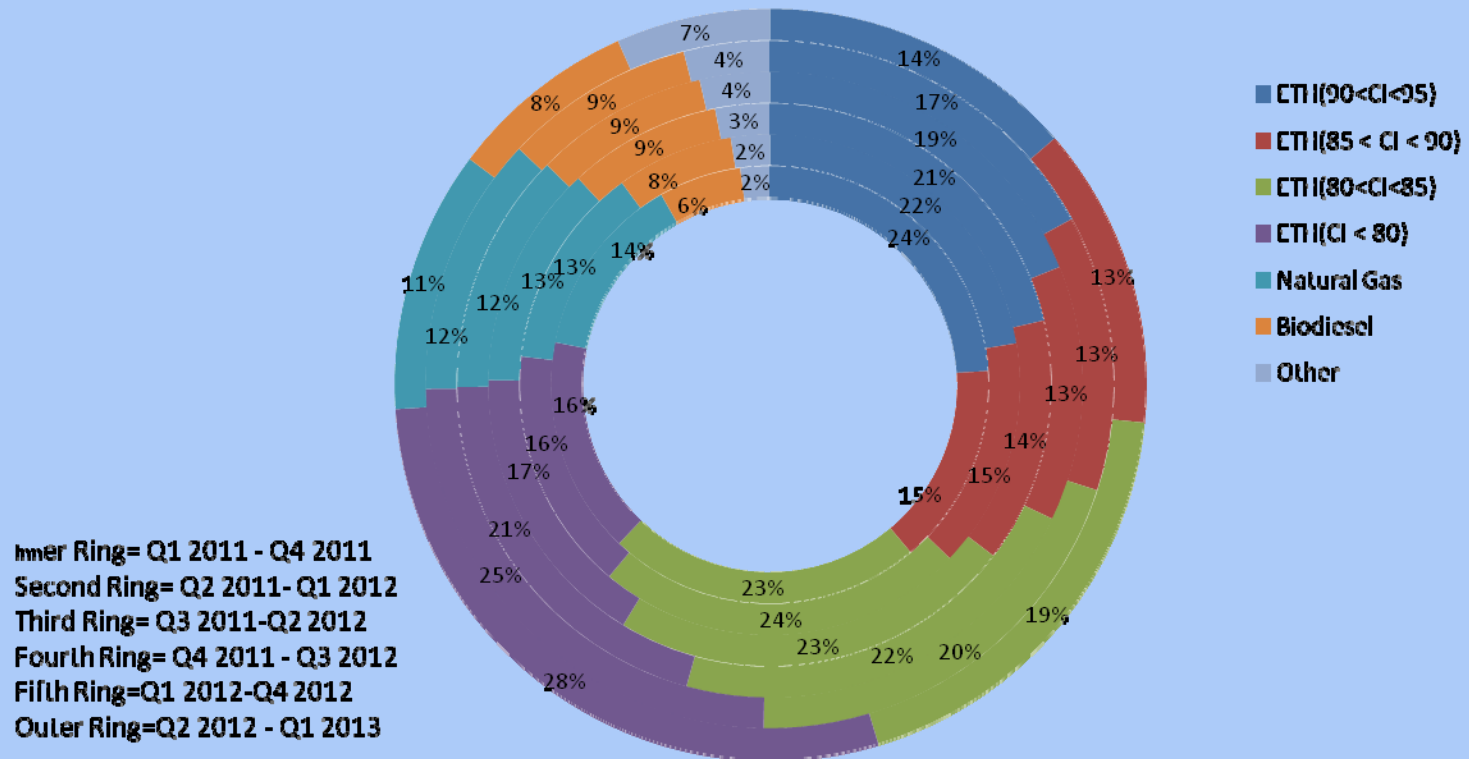
Carbon Intensities of Some Fuels



- Gasoline 99 gCO₂e/MJ
- Diesel 98 gCO₂e/MJ
- Corn Ethanol 76- 121 gCO₂e/MJ
- Sugarcane Ethanol 58 – 84 gCO₂e/MJ
- Biodiesel 4 – 83 gCO₂e/MJ
- CNG -11 – 68 gCO₂e/MJ

Credit Percentage by Fuel

Q1 2011 - Q1 2013





Proposed Alternative Diesel Fuel (ADF) Regulation

Proposed Alternative Diesel Fuels Regulation



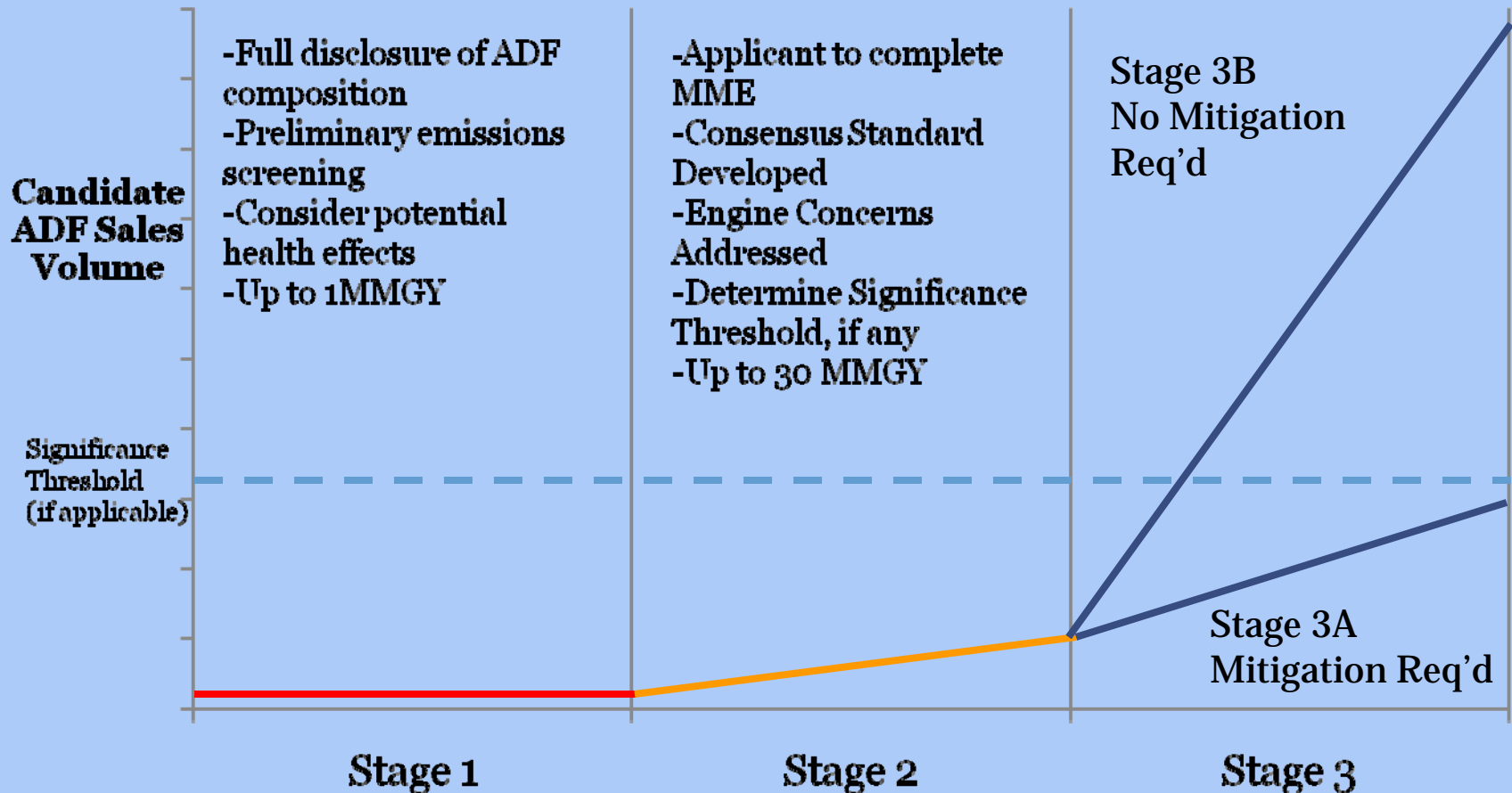
- **CARB diesel regulation not designed for alternative diesel fuels**
- **Provides pathway for commercialization of new alternative diesel fuels**
- **Ensures that new alternative diesel fuels have no significant adverse impacts on air quality**
- **Recognizes biodiesel as first commercial alternative diesel fuel**
- **December 12, 2013 Board Hearing**

Proposed Alternative Diesel Fuel Definition



“ Any non-CARB diesel fuel used in a compression ignition engine that does not consist solely of hydrocarbons, and is not subject to a specification under title 13, CCR, section 2292.”

Phase-in Requirements



Proposed Path Towards Commercialization



- **Stage 1 - Pilot Program**
 - Application
 - Screening Analysis
 - Small fleet use, not to exceed 1 MMGY
 - Memorandum of Understanding

- **Stage 2 - Development of Fuel Specification**
 - Application
 - Limited fleet use, not to exceed 30 MMGY
 - Development of consensus standards
 - Engine OEM approval required for continued ADF use
 - Multimedia evaluation required; identification of any significance thresholds
 - Memorandum of Understanding

Proposed Path Towards Commercialization



- **Stage 3A -
Commercial Sales Subject to Mitigation**
 - ARB to adopt new ADF by regulation
 - Use volume is monitored by enhanced reporting requirements
 - Mitigation measure/s required to stay below significance threshold
 - Biodiesel will be regulated under this Stage

- **Stage 3B -
Commercial Sales Subject to No Mitigation**
 - ARB to adopt new ADF by regulation
 - No mitigation required
 - Reporting requirements same as other commercial fuels

Biodiesel as First Commercial Alternative Diesel Fuel



- **Staff is proposing specifications for biodiesel**
- **Biodiesel under Stage 3A**
- **NO_x “Significance threshold” identified as B10**
- **Mitigation required before significance threshold is reached**



Multimedia Evaluation

Multimedia Evaluation



- **Health and Safety Code Section 43830.8 requires a multimedia evaluation for any ARB regulation that establishes a motor vehicle fuel specification**
- **CARB part of CalEPA workgroup to approve multimedia evaluations**
- **Identification of any significance threshold/s and mitigation measures**
- **External scientific peer review**
- **Must be approved by the California Environmental Policy Council**

Multimedia Evaluation Process



Tier I Work Plan

Work Plan

- Define framework and approach
- Identify information needs and gaps
- Feedback provided



Tier II Risk Assessment Protocol

Risk Assessment Protocol

- Experimental design developed and submitted
- Protocol reviewed, feedback provided for Tier 3



Final Report Risk Assessment

- Final report is used as the basis for recommendations submitted to the Environmental Policy Council
- Final report is peer reviewed

Tier III Final Report Multimedia Risk Assessment

Fuels Currently Under Multimedia Evaluation



- **Dimethyl Ether** – Tier I
- **Biobutanol** – Tier II
- **Biodiesel** – Tier III
- **Renewable Diesel** – Tier III
- **E85** – Tier III

For More Information



- **Proposed Alternative Diesel Fuels Regulation:**
<http://www.arb.ca.gov/fuels/diesel/altdiesel/biodiesel.htm>
- **Low Carbon Fuel Standard:**
<http://www.arb.ca.gov/fuels/lcfs/lcfs.htm>
- **Multimedia Evaluation Alternative Diesel Fuel**
<http://www.arb.ca.gov/fuels/multimedia/multimedia.htm>

Contacts



Low Carbon Fuel Standard

Mike Waugh, Chief

Transportation Fuels Branch

(916) 322-8263

mwaugh@arb.ca.gov

Alternative Diesel Fuels

Jim Aguila, Manager

Substance Evaluation Section

(916) 322-8283

jaguila@arb.ca.gov

Multimedia Evaluation

Aubrey Gonzalez,

Air Resources Engineer

Substance Evaluation Section

(916) 324-3334

agonzale@arb.ca.gov

California Environmental Protection Agency

 **Air Resources Board**



Questions and Answers