SUMMARY OF LECTURE DELIVERED IN TECHNICAL MEETING OF THE JOINT BRANCH ON 5-11-2008

Topic

"CATERPILLAR A.C.E.R.T` PROGRAM TO MEET THE STRINGENT ENVIRONMENTAL STANDARD TODAY AND IN FUTURE"

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Topics Covered:

•Emissions Standards
•Technology used by competitors
•Customer concern & value comparison
•ACERT Benefits

Emission Standards

U.S. EPA Tier 2, 3 & 4
Regulatory Deadlines (By KW/HP)

European EPA Stage II, IIIA, IIIB & IV
Regulatory Deadlines (By KW/HP)

Technology Definitions

- **ACERT Technology**
  - Precise control of the combustion cycle achieved by a systems approach to air management, electronics, and the fuel system
- **External Cooled Exhaust Gas Recirculation (EGR)**
  - Exhaust gases are sent through a complex cooling system before being reintroduced to the combustion chamber through the intake manifold
- **Internal Exhaust Gas Recirculation (EGR)**
  - Exhaust gases are reintroduced to the combustion chamber without cooling
- **Optimized Combustion**
  - Might be code words for Internal EGR
  - Generic term similar to an "in-cylinder technology" solution

ACERT which is revolution through Evolution

- ACERT is not a single, add-on system for reducing emission.
- ACERT is refined combination of technologies.
- ACERT is a revolution through evolution.
- Three major building blocks.

Building Blocks

- Fuel Delivery MEUI Or HEUI
- Electronic Control ADEM A4
- Air Management Series T/C
- Post Treatment D.O.**C**

Key Factors

- Exacting control and monitoring
- Maximized airflow efficiency
- **Multiple, precise fuel injections**
- No exhaust recirculation

Benefits of ACERT

- **Reliability** – Fewer new parts, more uptime, tested/proven systems
- **Durability** – Lower heat rejection, less internal wear, less frequent rebuilds, and higher parts reuse
- **Performance** – Better load response, better high altitude and cold start capability, and system integration.
- **Operating Costs** – Better fuel economy, lower repair costs, lower scheduled maintenance costs, and more uptime

Fact: Reducing peak combustion temperature reduces Oxides of Nitrogen

ACERT™ enhances combustion to reduce peak combustion temperatures