

South Coast Air Quality Management District
Attention: Procurement Section, PON #2009-01
21865 Copley Drive
Diamond Bar, CA 91765

Ohio BioSystems Cooperative (OBSC) www.ohiobiosystems.org

RE: PON#2009-01; E0-E85 Evaporative Offset Analysis: Project I of VI, Late Model Combustion Engine Retrofit

Ohio BioSystems Cooperative is an Ohio 501(c) (3). Ownership: Minority (Hispanic), Women, Disabled Veteran, and Rural Appalachian organization based in Holmes and Ashland Counties in Ohio. Our business model is as a nonprofit think-tank engaged in focused scientific research and development for energy independence through concentrated knowledge, synergistic collaborations, and precise technical knowhow through and to the implementation of for-profit spin-offs across the U.S. In addition, when possible or practical, the aid and assistance of other renewable energy based business models for Research Development and Implementation (RDI).

1. Evaporative measurements analysis is in Addendum "A" of this submission by Ashland University. It is opined by scientific basis (Addendum A) contained therein for evaporative results of E0, E10, E50, E85 and E100. Samples provided and certified by Marathon Oil. In an absolute sense, we find that based on the provided evidence, that evaporative emissions show and are of levels significantly less than that of E0, 97 octane petroleum distillate (gasoline) as provided;
2. As such, the direction of the liquid fuel type implementation, E0 through E85, should be immediately implemented at State and U.S. National levels beginning in California.
3. This is accomplished by a methodological "technology roll" into;
 - a. retrofitting roughly 192 Million EFI (Electronic Fuel Injection) light & medium duty vehicles from 1990 utilizing existing technology at a cost factor ranged from \$300US to \$500US;
 - b. retrofitting light duty fueling stations to allow for "dial-a-blend" at the pump citing the need for ranged fuel types.
4. The first project specific to implementation is opined to be accomplishable in a two or three-year "technology roll" as outlined in the PON pre-proposal as provided in the following pages.

We wish to express our most sincere thanks to the AQMD, the State of California, and Governor Schwarzenegger for entertaining our directional context based in focused fundamental science through to implementation as an award of **\$668,704** for this initial thrust, Phase I, to national cellulosic ethanol implementation (E85) by this program beginning in the State of California. At this time, we would also like the State of California and AQMD to consider Phases II and III as a follow-on to this initial phase as provided and an Ohio-California Partnership in four of the remaining five projects of the NTEP program; Projects ii., iii., iv., and vi. as provided in the following pages.

Sincerely,



Glenn T. Chipner (419-903-0707)
President (Volunteer)
Ohio BioSystems Cooperative, Inc.,
an Ohio Not-For-Profit.
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1. OBSC National Transportation Energy Program (NTEP)

1.1. In response to a confidential conference (California-Ohio) regarding the Nation's current transportation energy status, data is provided on page 6 of 6 as "Addendum "A";

1.1.1. "[...] they didn't consider E85 to be a valid or viable a candidate for this program [national alternative fuels] because they expected E85 would have much higher evaporative emissions in use that would offset any gains that would be seen in exhaust emissions [...]"

1.2. **OBSC et al.:** Ashland University, Ohio State University-OARDC, University of Georgia Research Foundation, and University of Utah have concluded research and study on the national transportation energy issues. We have determined the specific-focused course the U.S. MUST follow as related to current transportation fuel infrastructure, petroleum industry, 192M light duty vehicles (2007) to retrofit and the continued or increased U.S. financial stability.

1.3. Research, Develop, Test, Evaluate, Implement by OBSC NTEP sequenced Project:

Project I - E85 Conversions & Retrofit; \$15M/3-Phase. Cost sharing: OH, CA, and D.O.E. Patents Pending.

Project II - Renewable Cellulosic Biomass Feedstocks – \$30M/five-Phase. Cost sharing: OH, CA, IN, PA, NY, IL, MS, WV, TN, and USDA. Patents Pending.

Project III - C5/6 Pre-digesters and Lignin Kerosene; Cost sharing: \$5M/five-Phase. Cost sharing: OH, CA, IN, PA, NY, IL, MS, WV, TN, and USDA. Patents Pending.

Project IV - Cellulosic Ethanol Production; \$130M/seven-Phase. Cost sharing: OBSI, OH, CA, IN, PA, NY, IL, MS, WV, TN, and USDA. Patents Pending.

Project V - Science & Research Center; Cost sharing: OBSC, OBSI, OH, D.O.E.; \$15M/five-Phase.

Project VI - Ethanol to Hydrogen; Cost sharing: OBSI, OH, CA, D.O.E.; \$28M/seven-Phase. Patents Pending.

Note: Specific OBSC NTEP Projects' criteria & preliminary budgets available for review totaling \$223M +-50%.

Note: Initial NTEP Submission Criteria. All references to documentation contain the criteria caveat to "meet or exceed" and all estimates are at +- (plus or minus) 50%. Research awards shall cause the amounts to +- 20% and the final budget @ approval +- 10% respectively.

2. Project 1 - E85 Conversion and Retrofit and E0-E100 Evaporation Offset & Exhaust Analysis. [2-3 Yrs; \$5M-\$50M]

2.1. Phased, CARB-EPA and ATDS (Ontario, CA) based approach as discussed and in and of our;

2.1.1. **Phase I** – CARB based evaporative emissions testing.

2.1.1.1. Developmental Analytics (ATDS & AU).

2.1.1.1.1. Evaporative E0, E10, E50, E85, and E100 "preliminary" baseline (complete as Appendix 1- Evaporative Emissions Data Baseline; Jeff Weidenhamer, Ph.D., Ashland University).

2.1.1.1.2. Per and Reference CARB and EPA documents.

2.1.1.1.2.1. Durability Data Vehicle (DDV) data collective (Live @ ATDS) [7-9 Mos; \$500K]

2.1.1.1.2.1.1. Gas Chromatography & Evaporative @ 5% intervals; E0 - E100 final baseline (AU).

2.1.1.1.2.2. Juncture, Decision Point:

2.1.1.1.2.2.1. A single California vehicle may prove to expedite testing results for determinative release. However, it should be noted that a non-California vehicle(s) in range may prove to be the worst-case scenario and perhaps should be initiated in phased testing. Both scenarios are desirable. The second, Non-CA L & MDV, against CARB-EPA Emissions standards.

2.1.1.1.2.3. CARB and EPA document criteria germane analytics by ATDS Ontario, CA & CARB-EPA.

2.1.2. **Phase II** – Qualitative Fuel System Material Characteristic(s) Development.

2.1.2.1. Comparative per CARB-EPA & ATDS documents. [Estimated: 9-12 Mos; \$1M]

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2.1.2.2. Tier 1 and 2 Light Duty Vehicle fuel system suppliers;

2.1.2.2.1. Identification, Location and Parts List cross reference database build (UCLA & AU);

2.1.2.2.1.1. Federal access clearance approval for OEM fuel system materials data. Context, [...] contracted by a federal agency, “or any private person or entity acting on behalf of a Federal, State, or local agency in carrying out its functions.” DPPA 18 U.S.C. § 2721 et. seq.

2.1.2.2.1.2. Response Analysis and Certification (UCLA & AU).

2.1.2.2.1.2.1. Public Technology Transfers; data released in “Energy Technology Transfer(s)” to the public. Data is scrubbed per confidentiality agreements and related as; Whether Part Number meets or does not meet E0-E85 CARB and EPA duration analysis Criteria and IF there is a corrective action for that vehicle specifically or its relative class and what it is.

2.1.3. **Phase III** – CARB-EPA and ATDS based OEM device testing to Certification and/or Delineated certification by all OEMs.

2.1.3.1. National E0 to E85 Conversion & Retrofit. **[Estimated: 1 Yr; \$2M-\$8M]**

2.1.3.1.1. Locate and Contact US & Foreign based OEMs.

2.1.3.1.1.1. Request participation.

2.1.3.1.2. Reusable Project Plan segues into a segmented project dependencies array. This insures sustainable methodology for national transformation relative to this technological roll as a retrofit.

2.1.3.1.2.1. Milestone to action levels and cost criteria tracking via MS Project (UCLA, AU, NREL, EPA, DOE and Bill & Melinda Gates Foundation in direction).

2.1.3.2. Development, Certification, and Deployment (implementation).

2.1.3.3. Impact Effect/Affect Derivatives Analysis.

2.1.3.3.1. Report Criteria for Public Release

2.1.3.3.1.1. Tangibles.

2.1.3.3.1.2. Intangibles.

3. **OBSC Research, Development & Implementation (RDI) Team**

3.1. **Ohio BioSystems Cooperative (OBSC), Program/Project Management/Developmental Engineering, Testing/Evaluation and Implementation.**

3.1.1. **Glenn Chipner, President**, Volunteer Principle Researcher, IT Engineer, Program Manager and Developmental Implementation; Multifaceted, team player; over 24 years of combined experience in the Information Technology, Telecommunications, Audio/Video Technologies and U.S. Military Intelligence fields. Demonstrated record of accomplishment analyzing/creating business strategies and developing technology response strategies through creative thinking and strong team leadership. Strong, focused ability to motivate and communicate at all levels of the business landscape, technology, and Intelligence organizations. Experience encompasses the ability to develop business and technological strategic planning, technology/architectural strategy for large-scale executive program and executive level project management planning through various implementation strategies.

3.1.2. **Adina Chipner, Executive Communications and Owner**, responsible for handling the flow of information through the department and that all material is given to the correct individual to ensure completion. Also responsible for representing the official at meeting or events or even presenting prepared information on behalf of OBSC and for processing all correspondence from the department managers as well as opening and prioritizing all incoming information.

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3.1.3. **Tim Sage, BIO & Sciences Directorate**, Bachelor of Science degree Ashland University. Taught and instructed 15-35 student classes in Biologic Sciences for college preparatory classes, Junior High and High School Science Biologist, Health and Physical Education instructor.

3.1.4. **Bud Stanton, Financials and Financials Inventories**, over 20 years of management, planning and organizational leadership. Experienced in developing, implementing, and overseeing projects. Organized and directed personnel to achieve specific goals. Trained in computer systems, time management, and financial analysis & management.

3.2. **Automotive Testing & Developmental Services (ATDS)/Development & Regulatory Compliance.**

3.2.1. **Lin Freeman, VP, and Senior Manager of ATDS** Testing Laboratories in Ontario, California; specialize in automotive exhaust and evaporative emissions, million plus mile vehicle durability programs, federal, state, and local regulatory automotive certifications for new vehicles and components to California and Federal regulations.

3.3. **Ashland University (AU), The Dauch College of Business and Economics/Department of Chemistry, Geology & Physics**

3.3.1. **Dr. Jeff Weidenhamer, Ashland University Chair** of the Department of Chemistry, Geology & Physics; Laboratory Research & Analytical Chemistry. Trustees' Distinguished Professor of Chemistry Chair, Department of Chemistry, Geology & Physics Ashland University. B.S., Chemistry, Ashland University, M.S., Agronomy, Ohio State University, M.S., Analytical Chemistry, Louisiana State University, Ph.D., Biology, University of South Florida, Postdoctoral, Louisiana State University.

3.3.2. **Read Wakefield of Ashland University; Director, The Burton D. Morgan Center for Entrepreneurial Studies**; Grant Management & Implementations advisory council; The Dauch College of Business and Economics, offers state of the art curriculum, facilities, programs and services dedicated to student entrepreneurship across the Ashland University campus as well as support to entrepreneurs in the community at large. Prior to Ashland University, mergers, acquisitions, and strategic planning consulting firm serving manufacturing, distribution and service companies. Industry experience includes marketing and product management positions with ITT Indoor Lighting, a division of International Telephone & Telegraph Corp., and business development, finance, marketing and strategic business units with Ciba Corning Diagnostics Corp., a worldwide leader in medical diagnostics segments and division of Ciba Geigy (now Novartis). B.A. in economics from Denison University and an M.B.A. in marketing and finance from Northwestern University.

3.4. **Ohio State University, Agriculture Research and Development Center (OARDC)**

3.4.1. **Dr. Fred Michel** Frederick C. Michel, Jr., PhD, Associate Professor of Biosystems Engineering; Ph.D. Chemical Engineering, 1991 Michigan State University, E. Lansing, MI, Dissertation: Lignin and Mn Peroxidases of *P. chrysosporium*: Culture Modeling and Application. M.S. Chemical Engineering, 1988 Michigan State University, E. Lansing, MI; B.S. Chemical Engineering, 1986 University of Colorado, Boulder, CO, B.A. Biochemistry, 1986 University of Colorado, Boulder, CO.

4. **Initial Research, Development and Implementation Grant Budget (Cost Sharing)**

Budget Period: September/October 2009 – March/April 2010

Pending AQMD, Ohio, and DOE

Line Items	Cost/P/M	Total
STAFF:	3,334	
Salaries – OBSC	<u>2,000</u>	
Health/Life Insurance – OBSC	5,334	240,030

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Line Items	Cost/P/M	Total
Total Salary and Benefits:		
TRAVEL (7 Trips and 2 OBSC personnel):		
Airfare (\$1,200/person roundtrip)	2,400	16,800
Vehicle Rentals	1,200	8,400
Lodging	3,500	24,500
Meals (\$64/diem)	1,792	<u>12,544</u>
Total Travel Expenses:		62,244
General & Administrative	37,760	37,760
EQUIPMENT:		
Test vehicles (2) late model, California and Non-California	30,000	60,000
IT (hardware, software and miscellaneous)	25,000	25,000
Office	6,000	<u>6,000</u>
Total Equipment:		91,000
OTHER:		
R. L. Polk Proprietary Vehicle Data		20,000
Telecom, Postage, General Office	750	18,000
Automotive Testing – ATDS		<u>125,000</u>
Total Other:		163,000
E0-E100 Analysis – Ashland University:		
Laboratory Supplies (Gas Chromatography etc.)		1,000
Analytical Sciences		26,000
4 Research Students (Chemistry & Physics)		<u>15,827</u>
Total Laboratory Analysis:		42,827
SUB-TOTAL		636,861
Grant Management Fee – Ashland University		31,843
COST SHARING:		
California AQMD	35.0%	\$234,046
D.O.E.	25.0%	167,175
State of Ohio	35.0%	234,046
OBSC	<u>5.0%</u>	<u>33,435</u>
TOTAL PROPOSED BUDGET	100.0%	\$668,704

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5. **Addendum A – Evaporative Emissions Data Baseline; Ashland University Department of Chemistry, Geology & Physics.**

5.1. Ashland University Department of Chemistry and Physics Report, initial analytics on evaporative loss of fuels;

5.1.1. Materials: Marathon Oil Co. provided Gasoline (E0) and ethanol (E100). Fuel samples containing 10% (E10), 50% (E50) and 85% (E85) ethanol by volume were prepared by mixing on a volume basis.

Approximately 20 mL of each fuel was placed in a 40 mL headspace vial, capped and the mass of fuel determined by weighing. Vials were then opened and maintained at 30°C in a water bath for four hours. The water bath was placed in a fume hood with a constant draw, and the position of vials was randomized. The experiment was performed in triplicate. After four hours, vials were capped and reweighed to determine the mass of fuel lost.

5.1.2. Results:

5.1.2.1. “Gasoline E0 and E10 showed the greatest evaporative loss under these conditions. Gasoline mass loss was approximately three times the mass loss of the E85 blend, and more than five times the mass loss of ethanol. Standard deviations ranged from 0.34% (E50) to 0.69% (E100) for the averaged trials.”

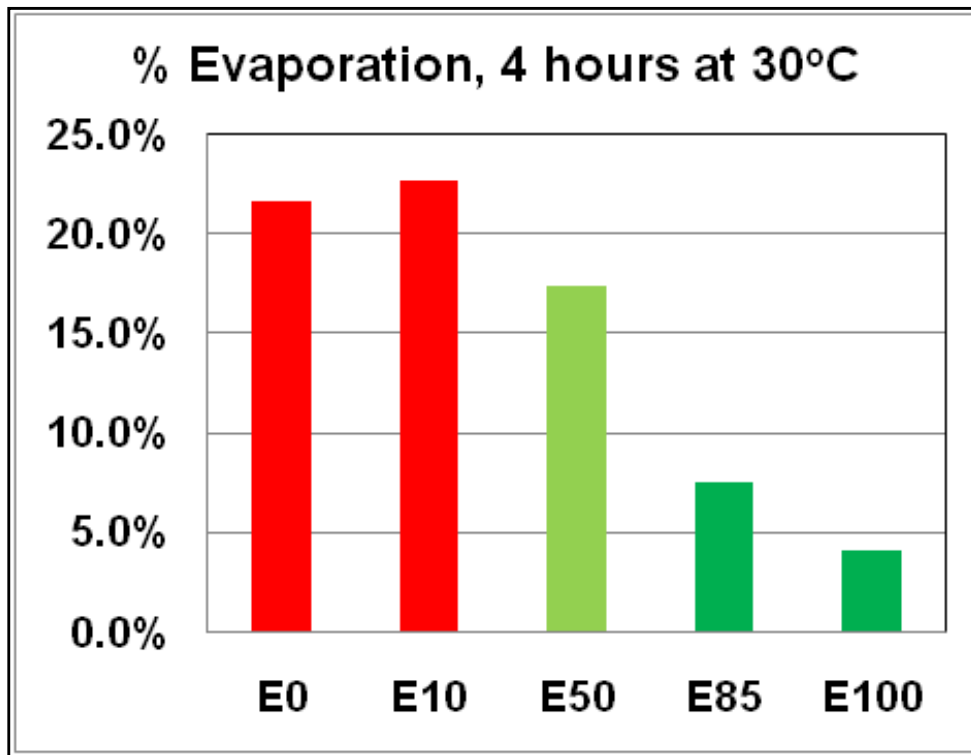


Figure 1. Average evaporative loss from each of five fuel blends over four-hour period at 30°C.

Source: Jeff Weidenhamer, Ph.D. Professor of Chemistry and Chair, Department of Chemistry, Geology & Physics, Ashland University.

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