SUMMARY OF BOARD ITEM

ITEM # 01-1-2: Public Hearing to Consider Recommendations for Funding Under the Innovative Clean Air Technologies (ICAT) Program.

STAFF RECOMMENDATION: Three proposals for new projects and two augmentation requests for previously approved projects will be recommended for funding.

DISCUSSION: The Board's Innovative Clean Air Technologies (ICAT) program was established in fiscal year 1994-95. Since then, approximately one million dollars has been available annually to foster the development of innovative pollution control and prevention technology. In response to our FY 2000 invitation, ARB staff received 77 preproposals. Based upon an evaluation of the preproposals, ARB staff requested 20 of these proponents to submit complete proposals for review. Ten complete proposals were evaluated regarding their potential for reducing air pollution, for rapid commercialization, and for creating jobs in California.

After evaluation, ARB staff is recommending that three proposals be funded. These three were selected because they address important program needs at the ARB, are technically sound, have the potential to improve air quality, have the potential to succeed in the marketplace, and have the potential to be commercialized within a few years.

The recommended new proposals are titled:

1. "Demonstration of Catalytic NO_X Reduction System Using Trace Hydrogen Injection" by Makel Engineering, Inc.;

2. "Demonstration of a New Emission Control System for Stationary Diesel and Natural Gas Engines" by Sorbent Technologies Corporation; and

3. "An Energy-Efficient Afterburner That Can Eliminate Ninety-nine Percent of Woodsmoke Pollution" by Grahn Industries, LLC.

In addition, the staff is recommending funding augmentation for two previously approved ICAT projects to increase their ability to improve air quality. The augmentation requests recommended for funding are titled:

1. "Optimized Ground Support Equipment Traction Battery Configuration" by Electric Transportation Engineering Corporation; and

2. "Addition of Volatile Organic Compound (VOC) Control to Microwave Cleaned Ceramic Filter Technology Demonstration" by Industrial Ceramic Solutions, LLC.

SUMMARY AND IMPACTS: The objective of the ICAT program is to co-fund the development and demonstration of technologies that will reduce air pollution. The goal of the program is to support technologies that have potential for commercialization and improving air quality in California, while simultaneously helping to stimulate the State's economy.

ICAT projects must increase the efficiency of existing air pollution prevention and control technologies, increase their cost-effectiveness, or offer new alternatives. All types of air pollution prevention and control technologies are eligible for funding.

Matching funds are required for all projects funded under the ICAT program. At least 50 percent of the project cost must be paid by matching funds; ten percent must be committed by the applicant's company. Also, all projects funded under the ICAT program must show high potential for job creation in California.

CALIFORNIA AIR RESOURCES BOARD

NOTICE OF PUBLIC MEETING TO CONSIDER RECOMMENDATIONS FOR CO-FUNDING PROPOSALS RECEIVED UNDER THE INNOVATIVE CLEAN AIR TECHNOLOGIES (ICAT) PROGRAM AND FOR AUGMENTING CO-FUNDING FOR TWO EXISTING ICAT PROJECTS

The Air Resources Board (ARB) will conduct a public meeting at the time and place noted below to consider recommendations for co-funding proposals received under the Innovative Clean Air Technologies (ICAT) Program and for augmenting co-funding for two existing ICAT projects.

DATE: January 25, 2001

TIME: 9:00 a.m.

PLACE: 2020 L Street*
Hearing Room, Lower Level
Sacramento, CA 95814

This item will be considered at a two-day meeting of the Board, which will commence at 9:00 a.m., January 25, 2001, and may continue at 8:30 a.m., January 26, 2001. This item may not be considered until January 26, 2001. Please consult the agenda for the meeting, which will be available at least ten (10) days before January 25, 2001, to determine the day on which this item will be considered.

The facility is accessible to persons with disabilities. If accommodation is needed, please contact ARB's Clerk of the Board at (916) 322-5594, to ensure accommodation. Persons with hearing or speech impairments can contact us by using our Telephone Device for the Deaf (TDD) at (916) 324-9531, or (800) 700-8326 for TDD call from outside the Sacramento area.

The Board's ICAT program co-funds new technologies that have the potential for both improving air quality in California and helping to stimulate the state's economy. ARB staff recommends co-funding three proposals that were received in response to a public solicitation. These were selected because they address important ARB program needs, are technically sound, have the potential to improve air quality, and have the potential to succeed in the marketplace within a few years. The Board will consider proposed resolutions to co-fund these three proposals. In addition, the Board staff will recommend that the Board augment funding to support enhancements to two current ICAT projects. The Board will consider proposed resolutions to supplement support for these existing projects.

Interested members of the public may present comments to the Board orally or in writing on the day of the meeting, and in writing or by e-mail before the meeting. To be considered by the Board, written submissions must be addressed to and received by the Clerk of the Board, P.O. Box 2815, Sacramento, California 95812, no later than 12:00 noon January 24, 2001, or received by the Clerk of the Board at the meeting. To be considered by the Board, e-mail submissions must be addressed to icat01@listserv.arb.ca.gov, and received at the ARB no later than 12:00 noon, December 24, 200.

The Board encourages members of the public to bring to the attention of staff in advance of the meeting any suggestions or comments. The Board requests, but does not require, that 30 copies of any written statement be submitted as early as possible prior to the meeting date, so that ARB staff and Board members have time to fully consider each comment

Inquiries regarding this matter should be directed to Mr. Bart E. Croes, P.E., Chief, Research Division, (916) 445-0753, P.O. Box 2815, Sacramento, California 95812.

CALIFORNIA AIR RESOURCES BOARD

for Michael P. Kenny
Executive Officer

Date: January 3, 2001

State of California

AIR RESOURCES BOARD

Innovative Clean Air Technology (ICAT) Resolutions

Research Division

January 25, 2001

INTRODUCTION

Contained herein for Board review are five resolutions and accompanying summaries from the Innovative Clean Air Technologies (ICAT) Program recommended to the Board by ARB staff and the Executive Office.

Item 1 is a proposal from Makel Engineering, Inc. entitled "Demonstration of Catalytic NOx Reduction System Using Trace Hydrogen Injection." The principal investigator will be Dr. Darby Makel. Resolution No. 01-2

Item 2 is a proposal from Sorbent Technologies Corporation entitled "Demonstration of a New Emission Control System for Stationary Diesel and Natural Gas Engines." The principal investigator will be Mr. Sidney G. Nelson. Resolution No. 01-3

Item 3 is a proposal from Grahn Industries, LLC entitled "An Energy-Efficient Afterburner That Can Eliminate Ninety-nine Percent of Woodsmoke Pollution." The principal investigator will be Dr. Dennis Grahn. Resolution No. 01-4

Item 4 is an augmentation request entitled "Optimized Ground Support Equipment Traction Battery Configuration" from Electric Transportation Engineering Corporation, for a current project entitled "Demonstration of the Use of Fast Charged Electric Ground Support Equipment as a Means of Reducing Airport Emissions while Minimizing Electrical Infrastructure Requirements." The principal investigator is Mr. Donald Karner. Resolution No. 01-5

Item 5 is an augmentation request entitled "Addition of Volatile Organic Compound (VOC) Control to Microwave Cleaned Ceramic Filter Technology Demonstration" from Industrial Ceramic Solutions, LLC for a current project entitled "Commercial Cooking Grease Control, Microwave Cleaned Ceramic Filter Technology Commercialization." The principal investigator is Mr. Richard Nixdorf. Resolution No. 01-6

PROPOSED

State of California
AIR RESOURCES BOARD

Resolution 01-2
January 25, 2001

Agenda Item No.: 01-01-2

WHEREAS, the Air Resources Board has been directed to carry out an effective research program in conjunction with its efforts to combat air pollution, pursuant to Health and Safety Code sections 39700 through 39705;

WHEREAS, a proposal, number 00-01-08, entitled "Demonstration of Catalytic NO_X Reduction System Using Trace Hydrogen Injection," has been submitted by Makel Engineering, in response to the 2000 Innovative Clean Air Technologies (ICAT) Program solicitation;

WHEREAS, the proposal has been independently reviewed for technical and business merit by highly qualified individuals; and

WHEREAS, the Research Division staff, and the Executive Officer and Deputy Executive Officers have reviewed and recommend for funding:

> Proposal Number 00-01-08 entitled "Demonstration of Catalytic NO_X Reduction System Using Trace Hydrogen Injection," submitted by Makel Engineering, for a total amount not to exceed $149,635.

NOW, THEREFORE BE IT RESOLVED, that the Air Resources Board, pursuant to the authority granted by Health and Safety Code section 39703, hereby approves the following:

> Proposal Number 00-01-08 entitled "Demonstration of Catalytic NO_X Reduction System Using Trace Hydrogen Injection," submitted by Makel Engineering, for a total amount not to exceed $149,635.

BE IT FURTHER RESOLVED, that the Executive Officer is hereby authorized to initiate administrative procedures and execute all necessary documents and agreements for the efforts proposed herein, and as described in Attachment A, in an amount not to exceed $149,635.

ATTACHMENT A

INNOVATIVE CLEAN AIR TECHNOLOGIES (ICAT) PROPOSAL

"Demonstration of Catalytic NO_X Reduction System Using Trace Hydrogen Injection"

Background
Conventional catalytic converter technology is relatively low-cost and widely available, but is not effective in reducing NO_X from lean-burning combustion devices such as gas turbines and compression ignition engines. The proposed system contains a hydrogen production source, an injection system, a catalytic converter, sensors and controls. Hydrogen is injected upstream of a catalytic converter to achieve NO_X reduction. Laboratory tests on a natural gas-powered turbine demonstrated that less than 200 parts per million of hydrogen achieved an 80 percent reduction in NO_X emissions.

Objective
The objective of this project is to build an integrated prototype of a low cost NO_X reduction system for lean burn combustion devices, perform design optimization tests, and conduct a field test demonstration on a natural gas-powered turbine.

Expected Results
A low-cost integrated system for NO_X reduction from stationary sources will be built and tested. The demonstration on a natural gas-powered turbine (250 kW class) is expected to show an 80 percent reduction in NO_X emissions.

Significance to the Board
If successful, a new clean air technology will be demonstrated that should have large domestic and international markets, such as large stationary power generators and distributed power generation for industrial and residential buildings. This technology promises to provide NO_X emission reductions at a lower cost than otherwise achievable, and with no toxic by-products. Ultimately, this technology should be adaptable to stationary and mobile diesel applications, in conjunction with new particulate control systems or clean burning fuels that are being developed.

Proponent:
Makel Engineering

Project Period:
12 months

Principal Investigator:
Darby B. Makel, Ph.D

ICAT Funding:
$149,635

Co-Funding:

Makel Engineering	$ 114,439
University Of California, Berkeley	$ 49,600
Lubrizol Corporation	$ 50,400
Total	$ 214,439

Basis for Indirect Cost Rate:
Rates are within the ICAT limits.

Past Experience with this Principal Investigator:
Although staff may not have any prior experience with the PI, the extent of review that each ICAT proposal is subjected to provides a sufficient level of confidence for staff to recommend the proposal for an ICAT award. The ICAT evaluation process includes reviews by five external technical and four external business advisors, as well as internal reviewers from Mobile Source Control and Operations Divisions, Stationary Source Division, Research Division, and the Executive Office.

Prior ICAT Funding to Makel Engineering:

Year	1999	1998	1997
Funding	$0	$0	$0

BUDGET SUMMARY

Makel Engineering

Demonstration of Catalytic NOx Reduction System Using Trace Hydrogen Injection

DIRECT COSTS AND BENEFITS		ICAT	TOTAL
1.	Labor and Employee Fringe Benefits	$ 89,406	$ 149,009
2.	Subcontractors	$ 50,000	$ 75,000
3.	Equipment	$ 0	$ 20,000
4.	Travel and Subsistence	$ 68	$ 68
5.	Electronic Data Processing	$ 0	$ 0
6.	Reproduction/Publication	$ 0	$ 0
7.	Mail and Phone	$ 0	$ 0
8.	Supplies	$ 0	$ 74,900
9.	Analyses	$ 0	$ 10,000
10.	Miscellaneous	$ 0	$ 0
	Total Direct Costs	$ 139,474	$ 328,977
INDIRECT COSTS			
1.	Overhead	$ 0	$ 0
2.	General and Administrative Expenses	$ 10,161	$ 35,097
3.	Other Indirect Costs	$ 0	$ 0
4.	Fee or Profit	$ 0	$ 0
	Total Indirect Costs	$ 10,161	$ 35,097
TOTAL PROJECT COSTS		$ 149,635	$ 364,074

PROPOSED

State of California
AIR RESOURCES BOARD

Resolution 01-3
January 25, 2001

Agenda Item No.: 01-01-2

WHEREAS, the Air Resources Board has been directed to carry out an effective research program in conjunction with its efforts to combat air pollution, pursuant to Health and Safety Code sections 39700 through 39705;

WHEREAS, a research proposal, number 00-01-04, entitled "Demonstration of a New Emission Control System for Stationary Diesel and Natural Gas Engines," has been submitted by Sorbent Technologies Corporation in response to the 2000 Innovative Clean Air Technologies (ICAT) Program solicitation;

WHEREAS, the proposal has been independently reviewed for technical and business merit by highly qualified individuals; and

WHEREAS, the Research Division staff, and the Executive Officer and Deputy Executive Officers have reviewed and recommended for funding:

> Proposal Number 00-01-04 entitled "Demonstration of a New Emission Control System for Stationary Diesel and Natural Gas Engines", submitted by Sorbent Technologies Corporation, for a total amount not to exceed $250,000.

NOW, THEREFORE BE IT RESOLVED, that the Air Resources Board, pursuant to the authority granted by Health and Safety Code section 39703, hereby approves the following:

> Proposal Number 00-01-04 entitled "Demonstration of a New Emission Control System for Stationary Diesel and Natural Gas Engines" submitted by Sorbent Technologies Corporation for a total amount not to exceed $250,000.

BE IT FURTHER RESOLVED, that the Executive Officer is hereby authorized to initiate administrative procedures and execute all necessary documents and agreements for the efforts proposed herein, and as described in Attachment A, in an amount not to exceed $250,000.

ATTACHMENT A

INNOVATIVE CLEAN AIR TECHNOLOGIES (ICAT) PROGRAM PROPOSAL

"Demonstration of a New Emission Control System for Stationary Diesel and Natural Gas Engines"

Background

Despite recent improvements in engine designs to reduce pollution, diesel engines continue to emit large amounts of oxides of nitrogen (NO_x), particulates, and hydrocarbons. These pollutants continue to be a problem with both stationary and mobile diesel engines. No completely satisfactory commercial control technology exists today to treat diesel-engine exhaust gases.

NO_x is also a problem with natural gas-fired internal combustion engines. Although NO_x levels have been improved in recent years, they continue to be a problem with no readily apparent solution.

Sorbent Technologies Corporation (Sorbtech) recently developed a simple regenerable NO_x filter system for use with jet engines that it believes can be successfully adapted to control stationary diesel engine emissions and natural gas engine emissions. The system has already been proven successful in treating aircraft-engine emissions at jet engine test facilities. The system controls NO_x, small particulates, hydrocarbons and carbon monoxide.

Objective

The objectives of this project are to design, construct, install, and test a full-scale prototype of Sorbtech's NO_x control technology and to demonstrate the system in a commercial engine application.

Expected Results

The demonstration of the technology is expected to offer data to support emission reductions of 95 to 100 percent NO_x, 90 to 99 percent diesel particulate, and lesser reductions in hydrocarbons and carbon monoxide.

Significance to the Board

With the successful demonstration of Sorbtech's technology, ARB will be able to encourage the commercialization of a feasible emissions after-treatment device suitable for retrofit applications. In addition, the project will support the State Implementation Plan for reduction of NO_x emissions.

Proponent:
Sorbent Technologies Corporation

Project Period:
22 months

Principal Investigator (PI):
Mr. Sidney G. Nelson

ICAT Funding:
$250,000

Cofunding:

Sorbent Technologies Corporation	$ 50,000
U.S. Environmental Protection Agency	$ 200,000
Total	$ 250,000

Basis for Indirect Cost Rate: Rates are within ICAT limits.

Past Experience with this Principal Investigator:
Although staff may not have any prior experience with the PI, the extent of review that each ICAT proposal is subjected to provides a sufficient level of confidence for staff to recommend the proposal for an ICAT award. The ICAT evaluation process includes reviews by five external technical and four external business advisors, as well as internal reviewers from Mobile Source Control and Operations Divisions, Stationary Source Division, Research Division, and the Executive Office.

Prior ICAT Funding to Sorbent Technologies Corporation:

Year	1999	1998	1997
Funding	$0	$0	$0

BUDGET SUMMARY

Sorbent Technologies Corporation

Demonstration of a New Emission Control System for Stationary Diesel and Natural Gas Engines

DIRECT COSTS AND BENEFITS		ICAT	TOTAL
1.	Labor and Employee Fringe Benefits	$ 104,995	$ 209,990
2.	Subcontractors	$ 9,500	$ 19,000
3.	Equipment	$ 0	$ 0
4.	Travel and Subsistence	$ 7,910	$ 15,820
5.	Electronic Data Processing	$ 250	$ 500
6.	Reproduction/Publication	$ 250	$ 500
7.	Mail and Phone	$ 750	$ 1,500
8.	Supplies	$ 29,630	$ 59,260
9.	Analyses	$ 21,325	$ 42,650
10.	Miscellaneous	$ 3,855	$ 7,710
	Total Direct Costs	$ 178,465	$ 356,930
INDIRECT COSTS			
1.	Overhead	$ 59,885	$ 119,770
2.	General and Administrative Expenses	$ 11,650	$ 23,300
3.	Other Indirect Costs	$ 0	$ 0
4.	Fee or Profit	$ 0	$ 0
	Total Indirect Costs	$ 71,535	$ 143,070
TOTAL PROJECT COSTS		**$ 250,000**	**$ 500,000**

SUBCONTRACTORS' BUDGET SUMMARY

Subcontractors: Dr. A. L. Boehman/Pennsylvania State University
Dr. B. W. Nelson/N. Dakota State University

DIRECT COSTS AND BENEFITS		ICAT	TOTAL
1.	Labor and Employee Fringe Benefits	$9,500	$19,000
2.	Subcontractors	$ 0	$ 0
3.	Equipment	$ 0	$ 0
4.	Travel and Subsistence	$ 0	$ 0
5.	Electronic Data Processing	$ 0	$ 0
6.	Reproduction/Publication	$ 0	$ 0
7.	Mail and Phone	$ 0	$ 0
8.	Supplies	$ 0	$ 0
9.	Analyses	$ 0	$ 0
10.	Miscellaneous	$ 0	$ 0
	Total Direct Costs	$9,500	$19,000
INDIRECT COSTS			
1.	Overhead	$ 0	$ 0
2.	General and Administrative Expenses	$ 0	$ 0
3.	Other Indirect Costs	$ 0	$ 0
4.	Fee or Profit	$ 0	$ 0
	Total Indirect Costs	$ 0	$ 0
TOTAL PROJECT COSTS		**$9,500**	**$19,000**

PROPOSED

State of California
AIR RESOURCES BOARD

Resolution 01-4
January 25, 2001

Agenda Item No.: 01-01-2

WHEREAS, the Air Resources Board has been directed to carry out an effective research program in conjunction with its efforts to combat air pollution, pursuant to Health and Safety Code Sections 39700 through 39705;

WHEREAS, a proposal, number 00-01-03, entitled "An Energy-Efficient Afterburner That Can Eliminate Ninety-nine Percent of Woodsmoke Pollution", has been submitted by Grahn Industries in response to the 2000 Innovative Clean Air Technologies (ICAT) Program solicitation;

WHEREAS, the proposal has been independently reviewed for technical and business merit by highly qualified individuals; and

WHEREAS, the Research Division staff and the Executive Officer and Deputy Executive Officers have reviewed and recommend for funding:

> Proposal Number 00-01-03 entitled "An Energy-Efficient Afterburner That Can Eliminate Ninety-nine Percent of Woodsmoke Pollution", submitted by Grahn Industries, LLC, for a total amount not to exceed $123,300.

NOW, THEREFORE BE IT RESOLVED, that the Air Resources Board, pursuant to the authority granted by Health and Safety Code Section 39703, hereby approves the following:

> Proposal Number 00-01-03, entitled "An Energy-Efficient Afterburner That Can Eliminate Ninety-nine Percent of Woodsmoke Pollution", submitted by Grahn Industries, LLC, for a total amount not to exceed $123,300.

BE IT FURTHER RESOLVED, that the Executive Officer is hereby authorized to initiate administrative procedures and execute all necessary documents and agreements for the efforts proposed herein, and as described in Attachment A, in an amount not to exceed $123,300.

ATTACHMENT A

INNOVATIVE CLEAN AIR TECHNOLOGIES (ICAT) PROGRAM PROPOSAL

"An Energy-Efficient Afterburner That Can Eliminate Ninety-nine Percent of Woodsmoke Pollution"

Background
Smoke from wood-burning stoves and fireplaces is a major part of the particulate matter in the ambient air in the winter. New or relocated wood-burning stoves must meet emission standards set by the U.S. Environmental Protection Agency. However, there are no standards for new fireplaces or for existing stoves or fireplaces, and there is no recognized control hardware for retrofitting stoves or fireplaces.

Objective
The applicant's objectives are to build multiple units of its prototype smoke-destruction device, install them in domestic wood stoves and fireplaces, monitor the installations for effectiveness, durability, and ease of use, and use the observations to optimize the device before its commercial offering.

Expected Results
The project should establish the utility of the first effective and cost-efficient PM control device for retrofit on wood-burning stoves and fireplaces.

Significance to the Board
The device to be tested in the project could enable creating a control measure for an important source of particulate matter.

Proponent:
Grahn Industries, LLC

Project Period:
15 months

Principal Investigator:
Dennis Grahn, Ph.D

ICAT Funding:
$123,300

Cofunding:
Grahn Industries $ 206,300

Basis for Indirect Cost Rate: No ICAT funds are requested for indirect costs.

Past Experience with this Principal Investigator:
Although staff may not have any prior experience with the PI, the extent of review that each ICAT proposal is subjected to provides a sufficient level of confidence for staff to recommend the proposal for an ICAT award. The ICAT evaluation process includes reviews by five external technical and four external business advisors, as well as internal reviewers from Mobile Source Control and Operations Divisions, Stationary Source Division, Research Division, and the Executive Office.

Prior ICAT Funding to Grahn Industries:

Year	1999	1998	1997
Funding	$ 0	$ 0	$ 0

BUDGET SUMMARY

Grahn Industries, LLC

An Energy-Efficient Afterburner That Can Eliminate 99 Percent of Woodsmoke Pollution

DIRECT COSTS AND BENEFITS		ICAT	TOTAL
1.	Labor and Employee Fringe Benefits	$ 65,000	$ 156,000
2.	Subcontractors	$ 24,000	$ 48,000
3.	Equipment	$ 0	$ 16,000
4.	Travel and Subsistence	$ 3,200	$ 6,400
5.	Electronic Data Processing	$ 0	$ 0
6.	Reproduction/Publication	$ 100	$ 200
7.	Mail and Phone	$ 500	$ 1,000
8.	Supplies	$ 7,000	$ 14,000
9.	Analyses	$ 23,500	$ 51,000
10.	Miscellaneous	$ 0	$ 0
	Total Direct Costs	$123,300	$ 292,600
INDIRECT COSTS			
1.	Overhead	$ 0	$ 29,000
2.	General and Administrative Expenses	$ 0	$ 8,000
3.	Other Indirect Costs	$ 0	$ 0
4.	Fee or Profit	$ 0	$ 0
	Total Indirect Costs	$ 0	$ 37,000
TOTAL PROJECT COSTS		**$123,300**	**$329,600**

PROPOSED

State of California
AIR RESOURCES BOARD

Resolution 01-5
January 25, 2001

Agenda Item No.: 01-01-2

WHEREAS, the Air Resources Board has been directed to carry out an effective research program in conjunction with its efforts to combat air pollution, pursuant to Health and Safety Code Sections 39700 through 39705;

WHEREAS, an augmentation request entitled "Optimized Ground Support Equipment Traction Battery Configuration", has been submitted by Electric Transportation Engineering Corporation; and

WHEREAS, the Research Division staff and the Executive Officer and Deputy Executive Officers have reviewed and recommend for funding:

> Augmentation request entitled "Optimized Ground Support Equipment Traction Battery Configuration", submitted by Electric Transportation Engineering Corporation, for a total amount not to exceed $35,000.

NOW, THEREFORE BE IT RESOLVED, that the Air Resources Board, pursuant to the authority granted by Health and Safety Code Section 39703, hereby accepts the recommendation of the Executive Officer and approves the following:

> Augmentation request entitled "Optimized Ground Support Equipment Traction Battery Configuration", submitted by Electric Transportation Engineering Corporation, for a total amount not to exceed $35,000.

BE IT FURTHER RESOLVED, that the Executive Officer is hereby authorized to initiate administrative procedures and execute all necessary documents and agreements for the efforts proposed herein, and as described in Attachment A, in an amount not to exceed $35,000.

ATTACHMENT A

INNOVATIVE CLEAN AIR TECHNOLOGIES (ICAT)
PROPOSAL FOR AUGMENTATION

"Optimized Ground Support Equipment Traction Battery Configuration"

Background
On May 25, 2000, the Air Resources Board approved a $229,693 grant under the Innovative Clean Air Technologies (ICAT) program for the project, "Demonstration of the Use of Fast Charged Electric Ground Support Equipment (GSE) as a Means of Reducing Airport Emissions while Minimizing Electrical Infrastructure Requirements." This project is currently underway at Sacramento International Airport, and includes the replacement of all twelve of Southwest Airlines' diesel-fueled baggage tractors with electric versions. In September, the ARB staff agreed to modify the grant so that the grantee, Electric Transportation Engineering Corporation (ETEC), could procure sealed batteries, considered superior to conventional flooded batteries, for the new baggage tractors. Due to the effort necessary to integrate these new batteries into the combined GSE/fast charging system, successful project completion now requires a grant augmentation. The attached budget shows that the project partners would provide more than five times as much funding as that requested from the ICAT program.

Objective
The main technological objective of the original grant is to demonstrate the feasibility of the ETEC's fast charging system. The objective of this augmentation request is to develop, evaluate, and demonstrate a reduced-cost sealed battery system for the electric baggage tractors.

Expected Results
Under the original grant, a fleet of diesel baggage tractors will be replaced with comparable electric equipment. The proposed augmentation would allow completion of a project with superior sealed batteries in the baggage tractors. Significant development work is necessary to integrate these new batteries into the overall system. Successful project completion would result in a system with no possibility of acid spills on the airport tarmac, faster charging, and lower overall cost.

Significance to the Board
Under the current ICAT grant, ETEC will soon start demonstrating its fast charging technology for airport baggage tractors, a type of ground support equipment, or GSE. GSE is responsible for up to a fifth of the emissions from California's airports.
Incorporation of the new sealed battery should significantly enhance the marketability of the ETEC technology. The accelerated replacement of diesel GSE with zero-emission electric GSE will reduce airport emissions. A successful demonstration could lead to conversion from diesel to electric at other airports.

The ARB is finalizing a Memorandum of Understanding with several airlines that would result in emission reductions from GSE at five California airports. A successful demonstration would support this effort. Electric GSE seems to be recognized by the airline industry as the equipment of choice to meet increasingly stringent emission requirements. This project will provide tangible reasons for airline companies to accept the use of fast charged electric GSE. The availability of an acceptable fast charge system would also eliminate the time and expense of massive electrical infrastructure upgrades to support conventional electric GSE charging.

Proponent:
Electric Transportation Engineering Corporation

Project Period:
12 months

Principal Investigator:
Donald Karner

ICAT Funding:
$35,000

Cofunding:

Arizona Public Service	$ 78,150
Electric Transportation Engineering Corporation	$ 8,650
Sacramento Municipal Utility District (DARPA funds)	$100,000
Southwest Airlines	$ 7,500
Total	$194,300

Basis of Indirect Cost Rate: Rates used are within ICAT program limits.

Past Experience with this Principal Investigator:
Experience with this Principal Investigator since the start of this project in August 2000 has been satisfactory.

Prior ICAT Funding to Electric Transportation Engineering Corporation:

Year	1999	1998	1997
Funding	$229,998	$0	$0

BUDGET SUMMARY

Grant Augmentation Request

Electric Transportation Engineering Corporation

Optimized Ground Support Equipment Traction Battery Configuration

DIRECT COSTS AND BENEFITS		ICAT	TOTAL
1.	Labor and Employee Fringe Benefits	$ 28,000	$ 62,400
2.	Subcontractors	$ 0	$ 109,750
3.	Equipment	$ 0	$ 1,500
4.	Travel and Subsistence	$ 0	$ 4,000
5.	Electronic Data Processing	$ 0	$ 0
6.	Reproduction/Publication	$ 0	$ 0
7.	Mail and Phone	$ 0	$ 0
8.	Supplies	$ 0	$ 27,300
9.	Analyses	$ 0	$ 0
10.	Miscellaneous	$ 0	$ 0
	Total Direct Costs	$ 28,000	$ 204,950
INDIRECT COSTS			
1.	Overhead	$ 7,000	$ 24,350
2.	General and Administrative Expenses	$ 0	$ 0
3.	Other Indirect Costs	$ 0	$ 0
4.	Fee or Profit	$ 0	$ 0
	Total Indirect Costs	$ 7,000	$ 24,350
TOTAL AUGMENTATION COSTS		**$ 35,000**	**$229,300**

BUDGET SUMMARY

Grant Augmentation Request Combined with Previously Approved Budget

Electric Transportation Engineering Corporation

"Optimized Ground Support Equipment Traction Battery Configuration" and "Demonstration of the Use of Fast Charged Electric Ground Support Equipment as a Means of Reducing Airport Emissions while Minimizing Electrical Infrastructure Requirements"

DIRECT COSTS AND BENEFITS	ICAT	TOTAL
1. Labor and Employee Fringe Benefits	$ 168,672	$ 388,703
2. Subcontractors	$ 56,811	$ 144,150
3. Equipment	$ 0	$ 551,100
4. Travel and Subsistence	$ 9,000	$ 35,000
5. Electronic Data Processing	$ 0	$ 0
6. Reproduction/Publication	$ 500	$ 500
7. Mail and Phone	$ 0	$ 0
8. Supplies	$ 0	$ 31,300
9. Analyses	$ 0	$ 0
10. Miscellaneous	$ 0	$ 0
Total Direct Costs	$ 234,983	$1,150,753
INDIRECT COSTS		
1. Overhead	$ 30,015	$ 123,784
2. General and Administrative Expenses	$ 0	$ 0
3. Other Indirect Costs	$ 0	$ 0
4. Fee or Profit	$ 0	$ 0
Total Indirect Costs	$ 30,015	$ 123,784
TOTAL PROJECT COSTS	**$ 264,998**	**$1,274,537**

PROPOSED

State of California
AIR RESOURCES BOARD

Resolution 01-6
January 25, 2001

Agenda Item No.: 00-01-2

WHEREAS, the Air Resources Board has been directed to carry out an effective research program in conjunction with its efforts to combat air pollution, pursuant to Health and Safety Code Sections 39700 through 39705; and

WHEREAS, an augmentation request entitled "Addition of Volatile Organic Compound (VOC) Control to Microwave Cleaned Ceramic Filter Technology Demonstration", has been submitted by Industrial Ceramic Solutions, LLC; and

WHEREAS, the Research Division staff and the Executive Officer and Deputy Executive Officers have reviewed and recommend for funding:

> Augmentation request entitled "Addition of Volatile Organic Compound (VOC) Control to Microwave Cleaned Ceramic Filter Technology Demonstration", submitted by Industrial Ceramic Solutions, LLC, for a total amount not to exceed $58,557.

NOW, THEREFORE BE IT RESOLVED, that the Air Resources Board, pursuant to the authority granted by Health and Safety Code Section 39703, hereby accepts the recommendation of the Executive Officer and approves the following:

> Augmentation request entitled "Addition of Volatile Organic Compound (VOC) Control to Microwave Cleaned Ceramic Filter Technology Demonstration", submitted by Industrial Ceramic Solutions, LLC, for a total amount not to exceed $58,557.

BE IT FURTHER RESOLVED, that the Executive Officer is hereby authorized to initiate administrative procedures and execute all necessary documents and agreements for the efforts proposed herein, and as described in Attachment A, in an amount not to exceed $58,557.

ATTACHMENT A

INNOVATIVE CLEAN AIR TECHNOLOGIES (ICAT) PROPOSAL FOR AUGMENTATION

"Addition of Volatile Organic Compound (VOC) Control to Microwave Cleaned Ceramic Filter Technology Demonstration"

Background

On May 27, 1999, the Air Resources Board approved a $338,007 contract under the Innovative Clean Air Technologies (ICAT) Program for the project entitled "Commercial Cooking Grease Emissions Control, Microwave Cleaned Ceramic Filter Technology Commercialization." This project is currently underway to develop and demonstrate a system for controlling particulate matter (PM) emissions from commercial food preparation facilities. The technology currently uses a PM filter made of silicon carbide fibers to trap and collect the offending PM, and then uses a microwave system to heat the fibers to sufficiently high temperatures to oxidize the grease and PM to water and carbon dioxide, thus efficiently regenerating the filter for reuse. Such PM controls are of special interest in the South Coast Air Basin. However, the South Coast Air Quality Management District (SCAQMD) has subsequently expressed its intent to require controls for volatile organic compound (VOC) emissions from many of these sources as well as PM controls, and has noted that a PM control system without a VOC control capability will probably not meet the goals of any future rule it develops. The applicant requests the augmentation of the ICAT portion of the project funding by $58,557 to allow the development and testing of a VOC control addition to their technology to permit it to be competitive in the regulated environment envisioned by the SCAQMD. The applicant plans to investigate VOC adsorbent, catalyst and ultraviolet destruction technologies to determine which is optimal for incorporation into their microwave regenerated filter technology.

Objective

The objective for this project is to prove that the Microwave Cleaned Ceramic Filter with VOC Control is a viable commercial low-cost control device. Detailed laboratory testing will be conducted to demonstrate compliance with SCAQMD Rule 1138, entitled "Control of Emissions from Restaurant Operations." Afterward, systems will be installed in up to three commercial restaurants, one in the Los Angeles area, for operational testing, further development, and operating cost information collection.

Expected Results

According to the SCAQMD, there are 11.6 tons per day of cooking-related PM and 1.6 tons per day of VOC grease emissions in the South Coast Air Basin. The fully developed Industrial Ceramic Solutions (ICS) microwave-regenerated filter system is expected to operate at 90 percent particulate removal efficiency and up to 80 percent VOC destruction efficiency. Therefore, it could eliminate 10.4 tons of air polluting grease PM emissions per day and up to 1.3 tons of VOC emissions per day, at a

combined capital and operating cost expected to be less than that for existing technologies, such as electrostatic precipitators or thermal incineration.

Significance to the Board
Over 95 percent of California's population live in areas that exceed the state's health-based ambient PM standards. In urban areas especially, commercial cooking facilities like restaurants are significant sources of PM and VOC emissions.

Supporting the development of cost-effective technologies for the control and reduction of such emissions provides the Board with new tools that can support the Board's continuing efforts to protect the public health from the risks of PM and VOC emissions. This project will complete the development and demonstration of one such simple, low cost technology.

Proponent:
Industrial Ceramic Solutions, LLC

Project Period:
30 months (currently underway)

Principal Investigator (PI):
Richard D. Nixdorf

ICAT Funding:
$58,557

Cofunding:

Industrial Ceramic Solutions	$ 39,108
Greenheck Fan Corporation	$ 17,080
Total	$ 56,188

Basis for Indirect Cost Rate: No indirect costs charged to ICAT

Past Experience with this Principal Investigator:
Experience with this Principal Investigator since the start of this project in July 1999 has been satisfactory.

Prior ICAT Funding to Industrial Ceramic Solutions, LLC:

Year	1999	1998	1997
Funding	$ 0	$ 338,007	$ 0

BUDGET SUMMARY

Grant Augmentation Request

Industrial Ceramic Solutions, LLC

Addition of Volatile Organic Compound (VOC) Control to Microwave Cleaned Ceramic Filter Technology Demonstration

DIRECT COSTS AND BENEFITS		ICAT	TOTAL
1.	Labor and Employee Fringe Benefits	$ 30,339	$ 30,339
2.	Subcontractors	$ 0	$ 17,080
3.	Equipment	$ 0	$ 0
4.	Travel and Subsistence	$ 5,623	$ 5,623
5.	Electronic Data Processing	$ 20	$ 20
6.	Reproduction/Publication	$ 95	$ 95
7.	Mail and Phone	$ 480	$ 480
8.	Supplies	$ 20,600	$ 20,600
9.	Analyses	$ 1,300	$ 1,300
10.	Miscellaneous	$ 100	$ 100
	Total Direct Costs	$ 58,557	$ 75,637
INDIRECT COSTS			
1.	Overhead	$ 0	$ 35,011
2.	General and Administrative Expenses	$ 0	$ 4,097
3.	Other Indirect Costs	$ 0	$ 0
4.	Fee or Profit	$ 0	$ 0
	Total Indirect Costs	$ 0	$ 39,108
TOTAL PROJECT COSTS		**$ 58,557**	**$ 114,745**

BUDGET SUMMARY

Grant Augmentation Request Combined With Previously Approved Budget

Industrial Ceramic Solutions, LLC

"Addition of Volatile Organic Compound (VOC) Control to Microwave Cleaned Ceramic Filter Technology Demonstration" and "Commercial Cooking Grease Emissions Control, Microwave Cleaned Ceramic Filter Technology Commercialization"

DIRECT COSTS AND BENEFITS	ICAT	TOTAL
1. Labor and Employee Fringe Benefits	$ 187,116	$ 196,044
2. Subcontractors	$ 119,807	$ 296,086
3. Equipment	$ 0	$ 5,600
4. Travel and Subsistence	$ 28,831	$ 30,091
5. Electronic Data Processing	$ 2,460	$ 2,460
6. Reproduction/Publication	$ 1,215	$ 1,215
7. Mail and Phone	$ 1,970	$ 1,970
8. Supplies	$ 42,400	$ 48,600
9. Analyses	$ 10,900	$ 22,900
10. Miscellaneous	$ 1,865	$ 1,865
Total Direct Costs	$ 396,564	$ 606,831
INDIRECT COSTS		
1. Overhead	$ 0	$ 165,693
2. General and Administrative Expenses	$ 0	$ 23,699
3. Other Indirect Costs	$ 0	$ 0
4. Fee or Profit	$ 0	$ 0
Total Indirect Costs	$ 0	$ 189,392
TOTAL PROJECT COSTS	**$ 396,564**	**$ 796,223**