Obtained and made public by the Natural Resources Defense Council, March/April 2002

Energy Secy. Spencer Abraham
1000 Independence Ave. 8th Fl.
Washington, D.C. 20585
June 22, 2001

The Honorable Mr. Andrew D. Lundquist,
Executive Director,
National Energy Policy Development
Office of the Vice President

Sir, I am writing to inform you about a technology that has substantial potential to
accelerate any domestic oil conservation effort, improve air quality and relieve
the overburdened electricity grid.

In my former capacity as Head of the Marine Corps Food Service Program, I had
the privilege of getting to know Mr. Robert S. "Bob" Babington of McLean,
Virginia. Bob Babington (a former Air Force Officer, NASA Engineer, and Atomic
Energy Commission researcher) developed an advanced combustion method
that resulted in the production of the extremely efficient Airtronic Burner. This
burner can run on virtually any liquid fuel such as heating oil, diesel fuel, JP-5,
bio-diesel, and even vegetable oil without any trace of smoke, particle emissions,
or odor.

The Airtronic Burner is the heat source for the Marine Corps' Tray Ration Heating
System. It was field tested in 1993 and has been in use by the Marines since
1995. According to figures published by the Department of Energy, if this burner
were produced for home heating, Americans would save over three billion
gallons of fuel oil per year. If you also consider its ability to utilize bio-diesel, the
potential fuel oil savings easily approaches ten billion gallons per year.

The Airtronic Burner is currently a military unique item, with very limited domestic
production capability. I can think of no better utilization of technology investment
tax dollars than developing domestic production of the Airtronic Burner.

Amazingly, the Airtronic Burner was displayed in the Department of Energy
rotunda as long ago as 1981, as the "future of oil heat." Unfortunately, a lack of
any domestic interest in oil conservation drove Babington into the European
home heating market. His burner now heats more than ten thousand overseas
homes. Brookhaven National Laboratory conducted extensive testing of an early
version of the Airtronic Burner and in a 1988 report described it as "very
exciting...remarkable... and... an important step forward in oil burner design."

Congress once appropriated $5M for the FY 94 Title 3 Program to develop
American Domestic Production Tooling for the Babington Airtronic Burner.
These funds were assigned to Natick Laboratories to develop the domestic
production capability. Natick researchers, believing themselves capable of
developing their own multi-fuel burner, withdrew their sponsorship and the funds
were returned, unexpended. (Eight years later, Babington's technology
continues without peer and Natick researchers have yet to demonstrate any

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similar technology. Without a domestic production capability, Babington satisfied the Marine Corps Tray Ration Heating System contract by obtaining parts from his European suppliers and building nearly 1,000 airtronic burners in his home-based research laboratory.

The Tray Ration Heating System has been very successful. Internal Marine Corps documents cite annual savings of several million dollars in field training and combat service support. Hot meals mean higher morale and the tray ration heater delivers hot meals to Marines on the front lines.

Developing a domestic production capability for the Babington Airtronic Burner is a perfect way for the President and the Congress to quickly gain a return on tax dollar investment while offering a concrete conservation solution. The benefits will be manifold. U.S. oil heat consumers (an estimated ten to thirteen million homes) will save billions of gallons of fuel each year. The environment will benefit from reduced particle, carbon monoxide and NOX emissions. Since the airtronic burner can efficiently burn any oil product, bio-diesel can be used in much greater quantities, reducing America’s reliance on foreign oil even further, while also reducing greenhouse emissions.

These burners are now built in very small quantities. As such, they cost the Marine Corps substantially more than if the burners were a commercial production item, no longer “military unique,” made in America, and not reliant upon foreign manufacturing sources.

The technology has other applications that offer enormous potential in energy conservation. Babington has successfully built prototype cogeneration water heaters, refrigerators and other appliances that dramatically reduce energy consumption. President Bush asked for ideas and solutions. Babington’s technology is the product of homegrown American ingenuity. The United States Marine Corps recognized it and made it the cornerstone of their field-feeding program. Now that the Marine Corps established the beachhead in high efficiency oil combustion, isn’t it time to share it with the rest of America?

I have enclosed a booklet containing additional materials about Babington’s technologies. A McLean-based businessman, he is only minutes from your Washington office. I am not an agent of Babington’s company, but I would be happy to facilitate a meeting. America needs this technology. Semper Fidelis! Similar correspondence has been sent to Vice President Cheney and Secretary Abraham.

William H. Hague
LtCol. USMC Retired

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June 22, 2001

The Honorable Richard B. Cheney
Vice President of the United States
Eisenhower Executive Office Building
Washington, D.C. 20501

Dear Mr. Vice President Cheney,

I am writing to you in your capacity as Chairman of President Bush’s Energy Task Force. I recently retired after completing over 25 years of service as a United States Marine. Based on that experience, I am aware of a technology that has substantial potential to accelerate any domestic oil conservation effort, improve air quality and relieve the overburdened electricity grid.

In my former capacity as Head of the Marine Corps Food Service Program, I had the privilege of getting to know Mr. “Bob” Babington of McLean, Virginia. Bob Babington (a former Air Force Officer, NASA Engineer, and Atomic Energy Commission researcher) developed an advanced atomization and combustion technology that resulted in the production of an extremely efficient liquid fuel burner. This burner can run on any liquid fuel such as heating oil, diesel, JP-8, bio-diesel and even vegetable oil. This burner is so efficient it actually burns these fuels without any trace of smoke, particle emissions, or odor.

The Airtronic Burner is used to heat the Marine Corps' Tray Ration Heating System. It was field tested in 1993 and has been in use by the Marines since 1995. According to figures published by Brookhaven National Laboratory, if this burner were produced for commercial use, Americans would save over three billion gallons of fuel oil per year. If you also consider its ability to utilize bio-diesel, the potential fuel oil savings easily approaches ten billion gallons per year.

Amazingly, the Airtronic Burner was displayed in the Department of Energy rotunda as long ago as 1981, as the “future of oil heat.” Unfortunately, a lack of any domestic interest in oil conservation drove Babington into the European home heating market. Brookhaven National Laboratory conducted extensive testing of an early Airtronic Burner and in a 1988 report described it as “very exciting”...“remarkable”...and...“an important step forward in oil burner design.” Despite that, the Airtronic Burner remains unknown and unavailable to the American public.

Mr. Babington has developed many other cutting edge technologies that have enormous potential to reduce our domestic energy consumption. I have enclosed additional materials summarizing Babington technologies. A McLean-based businessman, his office is only minutes from Washington. I am not an agent of Babington’s company, but I would be happy to facilitate a meeting. America needs this technology. Semper Fidelis!

William H. Hague
Lieutenant Colonel
United States Marine Corps, Retired

cc: Mr. Andrew D. Lundquist
The World's Most Advanced Combustion Technology...

Is Revolutionizing Military Field Feeding, Heating & Hot Water Systems

21297

DOE022-0178
The Tray Ration Heating System

The Tray Ration Heating System (TRHS) is perhaps the most successful field feeding system ever deployed by the United States Marines. Military field feeding needs are tough. Here is a list of the demands, and how the Battaglia TRHS addresses each need.

A field feeding system has to be able to serve lots of hot food, in a short period of time, to military personnel anywhere on the battlefield.

A single TRHS can feed 30,000 personnel a meal in 60 minutes. The Battaglia TRHS utilizes an assortment of high-efficiency burners, each utilizing propylene gas, to cook food in just 15 minutes.

A field feeding system has to be easy to use.

The Battaglia TRHS is easy to use. Personnel have been trained at Battaglia and can be ready to cook within 24 hours. The Battaglia TRHS does not require additional fuel, allowing operations to take place at remote locations.

A field feeding system has to be rugged and reliable in any climate.

The Battaglia TRHS can operate in all climates. From the US Marine's working in the desert to those working in the snow, the Battaglia TRHS can operate in any environment. The Battaglia TRHS is designed to withstand the elements.

A field feeding system has to be safe.

The Battaglia TRHS is a safe system. All personnel have been trained to operate the Battaglia TRHS and are aware of safety procedures. The Battaglia TRHS is designed to minimize any potential hazards.

A field feeding system has to burn clean.

The Battaglia TRHS burns clean. The Battaglia TRHS is designed to minimize any potential hazards. The Battaglia TRHS is designed to minimize any potential hazards.

A field feeding system has to be portable.

The Battaglia TRHS is portable. The Battaglia TRHS can be easily moved from location to location.

A field feeding system has to be easy to maintain.

The Battaglia TRHS is easy to maintain. The Battaglia TRHS requires minimal maintenance, allowing operations to take place at remote locations.

A field feeding system has to be easy to transport.

The Battaglia TRHS is easy to transport. The Battaglia TRHS can be easily moved from location to location.

A field feeding system has to be easy to clean.

The Battaglia TRHS is easy to clean. The Battaglia TRHS is designed to minimize any potential hazards.
The World's Most Versatile Cooking System

The Tray Ration Heating System (TRHS) provides the ultimate platform for total versatility in the field. The very same TRHS, when equipped with optional accessories, fulfills a wide variety of cooking applications. Since each TRHS is a self-contained unit that can prepare any type of food, multiple TRHSs are ideally suited to the mass feeding of hundreds of thousands of troops, refugees, displaced persons, or the victims of natural disasters.

The Tray Ration Heating System Can be Used For...

- Tray Ration Food (T-rations)
- Boiling
- Simmering
- Steaming
- Frying
- Grilling
- Roasting
- Baking
- Deep-Fat Frying

The versatility of the TRHS in preparing fresh food is pictorially shown here. The top four photos show food prepared with the double boiler insert, steamer tray, and the shallow egg pan, all using water as the heat transfer medium.

The bottom four photos show grilling, roasting, baking, and deep fat frying using cooking oil to transfer heat.

21299

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The M-59 Field Range

The M-59 Field Range...Once a hazard, now a field feeding champion.

The M-59 Field Range is well known in military field cooking for its simplicity and versatility. Unfortunately, in the past it has also been known for its lackluster performance. But more importantly, its extremely dangerous M-2 gasoline burner. All branches of the US Military have recognized the need to remove the hazardous M-2 gasoline burner with a safer, efficient burner system. As a result, the M-54 Hydronic burner was born at the Marine Corps Air Ground Combat Center (MCAGCC) at Twentynine Palms, California. The idea was to replace the hazardous M-2 burner with a reliable and safe new fuel. At the same time, the M-59 is being equipped with the new fuel to supply power to the new burner.

Another application for the versatile Airtronic® Burner

The new mounting arrangement of the burner with its protective cover shown at the right is identical to the TRH mounting configuration thus allowing field interchangeability. The slide-out drawer contains a firebox that captures the heat from the burner and evenly distributes it throughout the cabinet. The Hydronic burner is also equipped with a thermostat that can be easily adjusted to achieve any desired temperature without moving the burner from the lower mounting position.

The results have been astonishing

Since the program was initiated in January 1994, approximately 13 million meals have been served. During this period many of the burners have accumulated more than 9,000 hours of operation with early minimal maintenance. During this time there has been no report of any components of the M-59 or thermal equipment including engine, automatic valves, no safety incidents. Credibility has increased that with the M-54 all burners are identical and interchangeable. The new equipment has been tested and has achieved an overall positive experience on the equipment. A further safety feature is the fact that all the burners are air-tight, and the fuel is stored inside the cabinet; no exposure to fuel. A further feature is that the new burner can be removed from the cabinet and new fuel tanks installed outside the building. The new units are easy to install and can be removed in a few hours.

Powered Multi-fuel Burner (PMB)

The Babington PMB is a hydronic-based M-54 burner that uses both a fuel valve and an Airtronic burner. The Babington PMB displays the new burner with the same mounting arrangement used in the TRH and the M-54 burners. The Babington PMB has been field tested and has proven to be a viable alternative with the new burner and a proven safety feature. The Babington PMB allows for the hydronic burner to be removed and new fuel tanks installed outside the building. The Babington PMB is designed to be a multi-fuel burner and can be installed in existing cabinets without the need for any modifications.

21300

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The Airtronic Burner

What if by magic... you could burn safe, economical diesel fuel as reliably and clean as natural gas, without smoke or odor, in any climate?

Now that would be something...

The Airtronic Burner, featuring the Patented Babington Atomization Principle does just that. Not by magic, but by innovative design engineering. A Babington Burner does not use a liquid nozzle like a conventional oil burner. Instead, a low-pressure flow of oil is applied to the exterior of a bullet-shaped atomizer creating a thin flowing film of oil over its surface (See Fig.1). When atomizing air is forced through a laser-cut slot in the tip of the atomizer, it ruptures the thin film of oil creating a fog-like mist. Since high efficiency atomization is fundamental to good combustion, all Babington burners perform with near perfect combustion.

The value of any burner can be measured in terms of combustion performance, versatility, operational simplicity, reliability, maintenance requirements, and total ownership cost.

Consider these operational features of the Airtronic Burner

Reliability Track Record
- TRHS: In military service since 1990 (approximately 60 million meals)
- M-59 Retrofit: In military service since 1995 (approximately 13 million meals)
- Home heating in Europe since 1984
- No unscheduled shutdowns or mission failures on the TRHS or M-59 Retrofit Programs

Combustion Performance:
- Smokeless and odorless performance from startup to shutdown
- High combustion efficiency results in fuel savings
- Reliable performance from -65°F to +130°F
- Instantaneous ignition with low energy spark

Versatility
- Ideally suited to the "one-size-fits-all" concept
- Heat on the move capability
- Variable firing rate with single knob & no parts change
- Compatible with virtually any type of heat exchanger

Operational Simplicity
- Single switch on/off operation
- Thermospectically controlled heat output
- Minimal setup and tear down time
- Automatic fueling
- No special training to operate

Maintenance Considerations
- No nozzle-no clogging
- More than 5,000 hours Mean Time Between Essential Function Failure (MTBEFF)
- Burner can be replaced and a new one installed in seconds
- Modular design allows quick replacement of parts
- High tolerance to fuel contaminants (water, sediment, dirt)
- One size fits all concept makes spare burners readily available

Safety
- Designed to satisfy the highest safety standards established by Underwriter Laboratories, and the European DIN regulations.
- The Airtronic Burner was designed for automatic filling from a remote fuel source. This eliminates the potential for uncontrolled fires and explosions that have plagued the M-2 burner.
- The Babington Airtronic Burner has been used to heat homes in Europe since 1994 and has been in the military inventory since 1996. In all these applications, the Airtronic has enjoyed a perfect safety record. This means no uncontrolled fires, puff-backs, explosions, no personal injuries, and no discomfort or sickness due to exhaust gas emissions.

Total Ownership Cost
- The initial cost of the Airtronic Burner pales by comparison to the savings realized when all factors are considered such as burner life, low maintenance, interchangeability of parts, fuel efficiency, minimal training, and the logistical savings associated with the "one-size-fits-all" concept.

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The Field Sanitation Unit

After Cooking & Feeding...Comes Cleanup...

...and it's a snap with the new Babington Field Sanitation Unit (FSU), fired by the same Airtronic Burner currently available in the military inventory. Its operational features and mounting simplicity also allows for total interchangeability in a matter of seconds. Since the control box on the FSU is identical to that on the TRH, no additional training is required. Simply pull the on/off switch and the single thermostatically controlled burner automatically maintains 42-gallon wash, rinse, and sanitize sinks within prescribed temperatures.

The Future Holds More...

A rugged, lightweight, portable, hot water heater powered by an Airtronic Burner operates smoke and odor-free on any distillate fuel while delivering a continuous flow of hot water at 3.5 GPM.

A Babington Mini-Burner (half the size of the Airtronic*) heats a full sized griddle surface and a tent heater. The griddle operates for 12 hours on a re-chargeable battery, and the tent heater is self powered by thermo-electrics. The Babington Micro-Burner (small enough to hold in the palm of your hand) provides the heat for a convection oven. It also operates on a re-chargeable battery for up to 14 hours. We also have a Babington Sub-Micro Burner (small enough to put in your pocket!). The Sub-Micro Burner is designed to satisfy very low heat requirements. It burns with a blue flame and is easily mistaken for a gas burner.

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Babington Ammonia Cycle Refrigerator

This remarkable refrigerator utilizes a Babington Sub-Micro Burner to provide a clean and odor free combustion source replacing a propane burner most commonly used in these types of refrigerators. This prototype is over 20 sq. ft. in size and burns only 1 gallon of #2 fuel every 15 days. It operates silently, with no moving parts, and consumes less than 20 watts of electricity.
The Babington Mini-Burner

The Babington Mini-Burner is a smaller burner that utilizes a dual spray Babington Atomizer as in the Full sized Airtronic Burner. The Mini-Burner however is a DC powered burner designed for ultra-low power consumption. This burner can operate at full capacity drawing only 7 watts of electricity. In addition, it's 3 independantly controlled motors provide an electronically controlled firing rate feature found in no other burner in the World.
Saving Energy With Military Technology...

A Babington Airtronic Burner (the very same burner in use by the USMC) has proven to reduce heating oil consumption by as much as 50%, and electrical consumption by 150% when installed in a typical home heating system (as pictured above). In addition, home heating oil dealers have become very enthusiastic about the technology due to the fact that it dramatically improves reliability and safety. As well as energy savings, particle and carbon monoxide emissions are virtually eliminated. The home pictured above is over 3,600 sq. ft. and is easily heated with an Airtronic Burner firing at only .4 gallons of heating oil per hour. The conventional burner that was removed from the home was consuming over a gallon of heating oil per hour.
Babington Advanced Portable Tent Heater

This portable tent heater is powered by a Babington Mini Burner and is totally self contained. It incorporates a DC power supply fed by on board batteries, which are recharged by an on-board thermal-electric generator which converts heat into electricity. This system burns very little fuel, vents all exhaust gasses, and is totally safe.
Radiant Heating With The Airtronic Burner

Because the Airtronic Burner can serve as a radiant heat source as well as convective heat source, added performance and size reduction can be achieved in both warm air, and hydronic systems.
Babington Blue Flame Burner

This ultra-low capacity burner produces a clean, blue flame that appears much like propane or natural gas. It is silent in operation, emits no smoke or odor, and has achieved some of the lowest NOX (Nitrogen Oxide) emissions ever recorded from a distillate fuel burner (less than 37 PPM, adjusted to 3% O2).