



Dear Friend,

You are invited to participate in a project that will set a new world record and set a new standard for combining vehicular performance with environmental responsibility.

Introducing Die Moto, a custom built performance diesel motorcycle capable of running on diesel, biodiesel, or straight vegetable oil (SVO) fuels. Designed and fabricated at The Crucible ([www.thecrucible.org](http://www.thecrucible.org)), an innovative industrial arts education facility in Oakland, Die Moto will compete for the diesel motorcycle land speed world record at the renowned Bonneville Salt Flats in Utah. It will also establish two new classes for competition in biodiesel and SVO fuels.

As fuel efficiency and low emissions become increasingly important, diesel technology has responded with improved mileage and easy adaptation to biodiesel and SVO. While this technology is widely available in Europe, the US has yet to recognize diesel as a viable option. The challenge is to demonstrate the new capabilities of diesel and call attention to the need to integrate environmental responsibility with performance in automotive technology.

At The Crucible a team of environmentally conscious vehicle enthusiasts, engineers, artisans and speed freaks is out to meet the challenge. This group of mavericks constructed Die Moto from a 2003 BMW R1150 RT. The team rebuilt the motorcycle with a custom frame, replacing the motor with a European 2004 BMW 320D Sport, a high performance automotive diesel engine. The motorcycle is covered with a hand-crafted, artistically retro 3/4 fairing.

After only six month's of build time, Die Moto made its debut time-only run at The Southern California Timing Association event at El Mirage in October 2006, setting a top speed of 121 mph. Now the team is back in the shop fine-tuning the engine for our record attempt on the Bonneville Salt Flats in September, 2007. Even without an increase in speed, we will break the current diesel motorcycle record of 105 mph, but our goal is to exceed 160 mph.

We are seeking sponsors for our world land speed record attempt at the International Motorcycle Speed Trials by BUB next year. Our sponsors will see their company's logo on our press releases, t-shirts, website, and the motorcycle's fairing, and all contributions are tax deductible. The unique and beautifully crafted motorcycle is also available for display at your promotional events. Above all we offer you the chance to join The Crucible and the Die Moto team in demonstrating that environmental responsibility and alternative technology have a place in the headlines and history books of high performance vehicles.

You can learn more about Die Moto at [www.thecrucible.org/about/diemoto](http://www.thecrucible.org/about/diemoto), and about The Crucible at [www.thecrucible.org](http://www.thecrucible.org). You can contact me at [michael@thecrucible.org](mailto:michael@thecrucible.org) or by calling 510-409-4400. I look forward to hearing from you.

Sincerely,

Michael Sturtz  
Founder and Executive Director  
The Crucible



**THE CRUCIBLE**

an Educational Collaboration of  
**Arts • Industry • Community**

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## Die Moto Project Proposal

### Project Summary

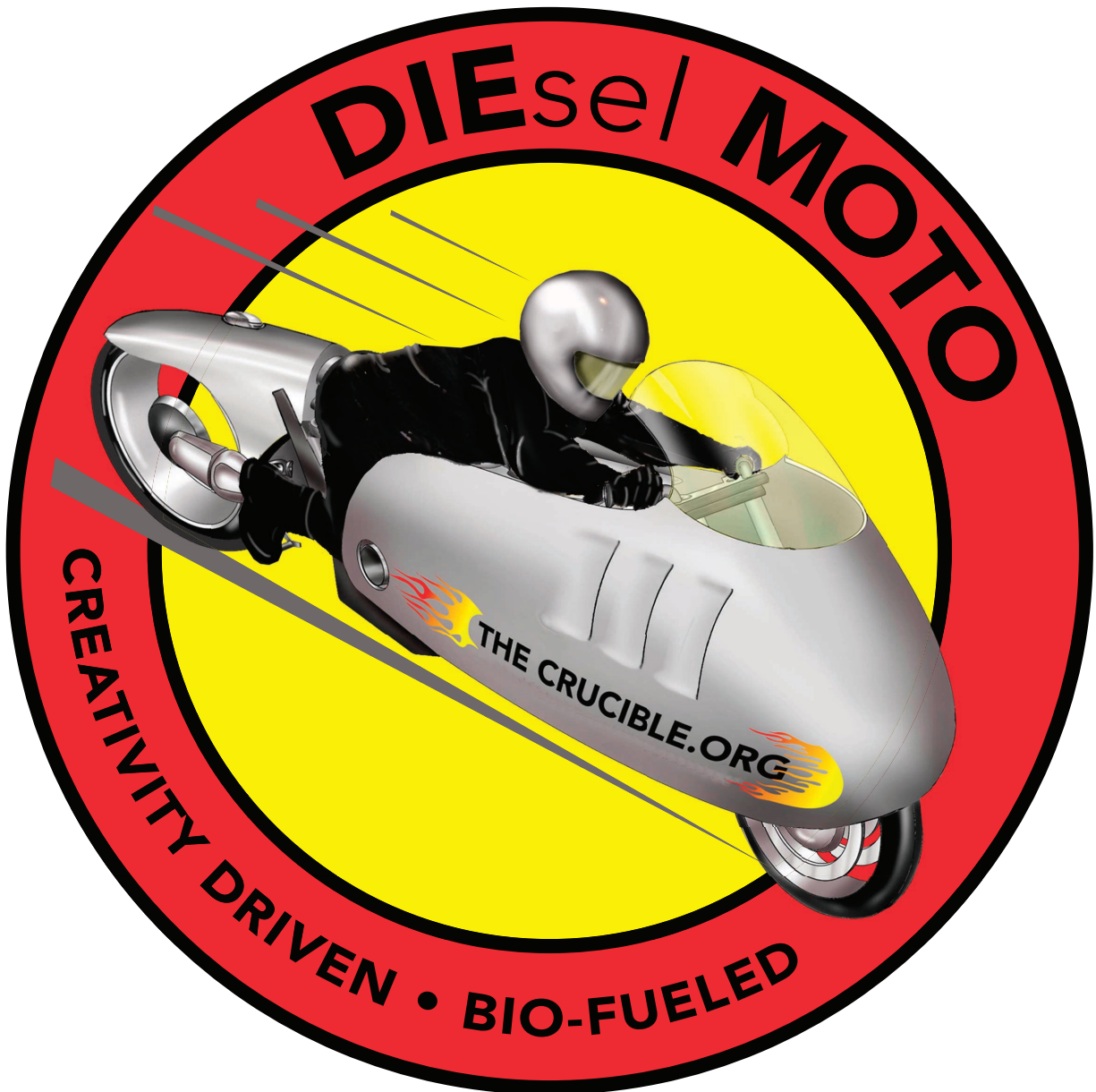
The Die Moto Motorcycle will be the world's first diesel land speed motorcycle capable of running on diesel, biodiesel, and Straight Vegetable Oil (SVO) fuels. A project of The Crucible, a nonprofit industrial arts education facility in West Oakland, Die Moto combines technical creativity, innovative engineering, artistic fabrication, and environmental sensibility.

Die Moto will compete to set a world speed record for diesel motorcycles at the 2007 International Motorcycle Speed Trials by BUB at the Bonneville Salt Flats. It will also be the motorcycle that establishes two new classes for biodiesel and SVO fuels. Created by a team of highly skilled engineers, mechanics, artisans, and fabricators, Die Moto is a motorized work of art—an automotive engine on a motorcycle chassis encased in a hand-crafted 3/4 aluminum fairing. Beyond setting a world speed record, Die Moto is designed to set a new standard for performance and fuel efficiency, proving that style, speed, and environmental responsibility can come together in one vehicle.



## The Build

Die Moto is a 2003 BMW R1150 RT that has been stripped down, the engine replaced by a BMW 2004 320D Sport, a high performance automotive diesel engine. It is wrapped in an aerodynamically designed, hand-crafted 3/4 aluminum fairing. The greatest technical challenges have been the integration of the automotive diesel engine with the motorcycle systems, particularly the transmission and electrical. The team built a custom frame and modified suspension to accommodate the larger, heavier engine. The aluminum skin is reminiscent of the GP racers from the 1950s, paying homage to the early pioneers of motorcycle daring.



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## The Fairing

The hand-crafted aluminum 3/4 fairing is what gives Die Moto its unique, artistic, retro style. It was crafted at The Crucible, giving Die Moto a sleek, aerodynamic exterior. The fairing was built on an English Wheel and treadle hammer using metalworking techniques once used to build cars, motorcycles, and airplanes. These skills are now largely lost in the automated age of vehicle manufacturing, however they remain invaluable to those wishing to build custom vehicles. The Die Moto team built an English Wheel that was used to make the fairing and is now part of The Crucible's sheet metal shop.

These hand-forming skills are so valuable that The Crucible invited a specialist, Evan Wilcox, to assist with the design and construction. Evan has been manufacturing custom hand fabricated motorcycle parts for the past sixteen years. In addition to working with the Die Moto team with the fairing construction, Evan taught a class in English Wheel metal fabrication techniques to The Crucible community.

The custom crafted fairing demonstrates that beauty, craftsmanship, and artistic skill is just as important as ever as we move into the new age of fuel-efficient vehicles.



**Die Moto Design - Working Draft**

## The Crucible

Located in Oakland, California, The Crucible is a non-profit educational collaboration of arts, industry and community. Founded in 1999 by a small group of artists, The Crucible is the Bay Area's only nonprofit sculpture studio, educational foundry and metal fabrication shop offering classes in fine and industrial arts. From cast iron to neon, large-scale public art to the most precise kinetic sculpture, The Crucible is fast becoming the best-equipped public industry & arts education facility on the West Coast. Through training in the fine and industrial arts, The Crucible promotes creative expression, reuse of materials, and innovative design while serving as an accessible arts venue for the general public. It is a place where forges roar, sparks fly, glass bends, molten metals fuse and pour, clay and cement take on form, neon glows, and creativity explodes.

## The Diesel Dozen

The Die Moto team, the Diesel Dozen, brings together twelve highly skilled professionals in the fields of engineering, motorcycle mechanics, design, fabrication, environmental health, and industrial arts. Team leader Michael Sturtz, the Founder and Executive Director of The Crucible, has garnered considerable notoriety throughout the country for his wildly original synthesis of art and functionality in everything from vehicles to fire operas. Each team member brings years of experience in his own field, and all share a commitment to the challenge of building the ultimate diesel performance motorcycle.

Please see the attached biographies for more information on the individual team members.





## The Engine

High performance diesel engines are not currently available in the United States, where sales of consumer diesel vehicles is restricted. However, the Die Moto Team was able to locate a BMW 2004 320D Sport in excellent condition, with only 22,000 miles, in a wrecking yard in Britain. This motor represents the cutting edge in performance diesel technology, which is not yet available in the United States.

This engine offers the following :

- A new radial-piston injection pump that allows high injection pressures of 1350 bar (more than 1700 at the jet itself).
- Four valves per cylinder
- Intercooler
- Reduced friction inside the engine
- Electronically controlled cooling and exhaust gas recirculation (EGR)
- Additional heater for heating up the coolant after a cold start

Engine Specifications:

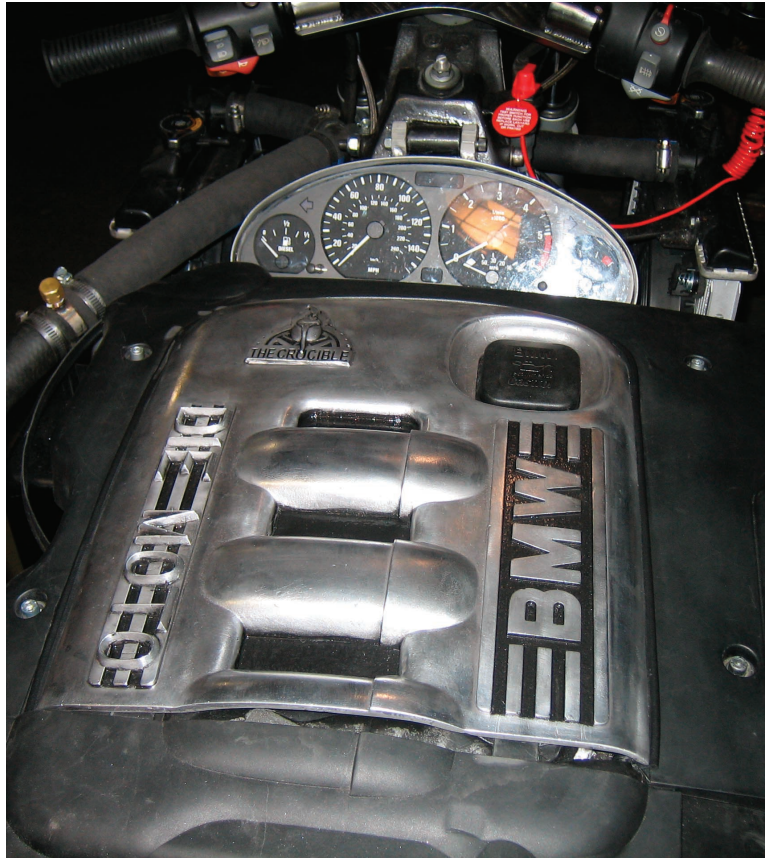
Cylinders/valves 4/4

Capacity cml 1995

Stroke/Bore (mm) 90/84

Max output (kW/hp/rpm) 120/163/4000

Max torque (Nm/rpm) 340/2000



## The Land Speed Trials

The team will be ready to take Die Moto out to the salt flats of Bonneville in September 2007 during the International Speed Trials by BUB. The officials at BUB have approved our entry and invited us to establish classes in biodiesel and SVO. See the attached letter for details on our invitation and learn more about the event at [www.speedtrialsbybub.com](http://www.speedtrialsbybub.com)

The Die Moto team intends to publicize their bid for a world record, capitalizing on the project's creativity and timeliness to garner media attention. The Crucible has an excellent track record for catching the public eye. In 2005 Crucible staff and facilities were at the center of a National Geographic television series, and The Crucible was featured in two front page spreads in the San Francisco Chronicle in the last year. The Crucible will use the Die Moto project as a means to demonstrate the viability of diesel engines to improve fuel efficiency, and to promote its upcoming programs in alternative energy and fuels and green building techniques.

Die Moto's sponsors include: The Crucible, BMW of San Francisco, German Car Dismantelers, Perforce Software, Autologic® Diagnostics, and Greenline Industries.

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## **The Diesel Dozen**

### **Michael Sturtz, Team Leader & Rider**

Michael grew up in an automotive body repair shop, igniting his interest in mechanics and metal work. In high school he fully restored a 1965 Mustang Fastback 289. He earned a MFA in sculpture from the School of the Art Institute of Chicago and continues to apply his artistic, design, and fabrication skills in all manner of projects including some unusual vehicle modifications. In recent memory he transformed a fire truck into a mobile arts education vehicle with a crane and portable welder. For a National Geographic television series he and his team turned another fire truck into a flame-throwing barbeque for the San Francisco Fire Department, and turned a diesel military troop carrier into a monster tailgate vehicle.

Michael is also a motorcycle nut. He has been riding for twenty years, doing everything from working as a motorcycle funeral escort to jumping a bike over a pit of fire before a crowd of thousands. He has ridden and owned the following fine motorcycles: BMW K100RS, BMW K75S, BMW R1000GS, BMW R1150GS, BMW 1100RT, Moto Guzzi Ambassador 750, Moto Guzzi 1100 Sport, and most recently a Ghezzi-Brian 1100 Super Twin and a 2006 BMW R1200 GS Adventure.

Gifted with a unique ability to unite skilled artisans from many different trades, Michael leads his team to success even when mere mortals think the tasks are impossible. As founder and executive director of The Crucible, Michael has proven this ability time and again, making the organization the premier school for industrial arts on the west coast.

Bonneville is the site of Michael's initiation into the world of motorized vehicles. There, at the age of seven, his father first allowed him to satisfy his burgeoning inner speed demon behind the wheel of the family car. Since then Michael has dreamed of returning to Bonneville with a worthier vehicle. While he loves motorcycles and the artistic and practical challenges posed by vehicle modification, what really lights his fire is the opportunity to become a pioneer, ushering in the new age of biofuels with style. He hopes to see The Crucible go down in history as the World's Fastest Art Organization.

### **Steven Bayles**

Steve has been dismantling and rebuilding cars and motorcycles since the age of fourteen. His degree in Mechanical Engineering from California Polytechnic University at San Luis Obispo opened the doors to a 25 year career as a mechanical designer and project engineer for companies including Clorox, Palmolive, and Fleischmann's Yeast. Now the Business & Operations Director at The Crucible, Steve spends all his free time rebuilding and restoring a BSA Thunderbolt and a Norton motorcycle and riding around town on one of his many bikes which include a 1998 R1000 R BMW and a 2004 R1100 S Replica Boxercup BMW.

Steve will keep the team on schedule and under budget while employing his many years of design experience. He is raring to meet the technical challenge of fitting a diesel automotive engine into a motorcycle chassis.

### **Henry Boyle**

Henry is passionate about design. With a BFA in Industrial Design from the Rhode Island School of Design and a degree in Technical Illustration from Santa Barbara City College, Henry has the skills to match the passion. He works for a wide variety of clients, from guitar manufacturers to industrial engineers, enabling them to see their product as a three dimensional object before they build it. He also enjoys working on vehicles—he rebuilt his 1963 Ford Econoline Van and builds his own bicycles.

Henry is thrilled to be able to apply his illustration skills for the benefit of the Die Moto project. He looks forward to working with the diverse team members, helping them visualize the perfect diesel motorcycle.

### **Warren Breslau**

Warren has an impressive resume as a master manufacturer and an expert CNC and manual machinist. Over the last 20 years he has built a diverse range of advanced machines, and parts of machines. His devices for the Space Science Lab at UC Berkeley were used to explore deep space, and his parts for world famous bicycle component manufacturer Chris King won world records. He has created parts for antique tractors and vintage Rolls Royce cars. As owner of Moab Cycle Works he built over 150 bicycle frames out of steel, aluminum and titanium. His BA in biochemistry and molecular biology from the University of California at Santa Barbara gives him a deep understanding of the exotic metals used in high end vehicles.

In addition to his machining skills, Warren will aid in the modeling and planning process with his background in CAD software. He enjoys the collaborative aspect of the project, working in a team of engineers, artists, and craftspeople.

### **Brian Brown**

Brian is a top-shelf mechanic. He only works on the best. From 1982 to 2000 Brian worked on BMWs at Bavarian Professionals, and since then he has been fixing Ferraris at Patrick Otis Company. He has a BA in engineering from Cornell and a degree in automotive technology from Monroe Community College. Brian loves his motorcycles—he owns six Ducatis which he raced professionally for almost fifteen years. He also built his own customed-framed racing motorcycle, a Spondon, from the ground up.

Brian is finally realizing his life-long dream of taking a bike out to Bonneville. He loves the challenge of the Die Moto project, particularly because it brings together this team of diverse and highly qualified professionals.

### **Dann Davis**

Dann can build almost anything, and he has. Ever since childhood he has been building things and he has become very good at it. Dann has designed and fabricated all manner of architectural features, including kinetic and portable architecture, and he has extensive experience with unusual custom vehicle construction and modification. While earning his degree in agricultural engineering at University of California at Davis, Dann began designing and fabricating agricultural equipment, and he prototypes vehicles from scratch for various agricultural and industrial applications. For his own enjoyment he rebuilt and raced an E30 M3 BMW, and he is currently building himself a lightweight expedition camper prototype.



Dann is particularly interested in exploring the capabilities of agriculture-based fuel systems—he has participated in several veggie oil conversion projects. He relished the opportunity to prove the viability of alternative fuels.

### **Danny Dillion**

Danny has been repairing diesel engines on boats since he was twelve, working on everything from 4 cylinder motors to large V8 marine engines. He has a degree in Marine Science from Evergreen State College, and has honed his troubleshooting skills while living and working on boats all over the world. While on land Danny also enjoys fixing cars and he has fabricated a number of unusual metal projects including a giant baseball mitt for San Francisco Pac Bell Park, a prototype for the Chicago Bean sculpture, and the set for the Titanic Theme park in Australia. When in a bind he has been known to build his own tools for the job using whatever bits and pieces that are at hand.

Danny is committed to dispelling the stigma attached to diesel engines and proving the viability of biodiesel as a functional fuel. He also likes the free beer after a hard day of working on the motorcycle.

### **Issa Eismont**

Issa knows BMW motorcycles inside and out. A professional in the motorcycle industry for the last ten years, Issa is a factory certified BMW technician and has worked as the Service Manager at San Francisco BMW for the last six and half years. He started riding two-wheeled motorized vehicles as a teenager, demonstrating his daring by riding a 1963 Vespa 125 from Brooklyn to Philadelphia on I-95. His first motorcycle was a 1971 BMW R75/5 and he still rides daily on his BMW 1150GS Adventure. Issa also brings his artistic sensibilities to the design and aesthetic of Die Moto, as prior to his motorcycle career he went to school for painting and sculpture at the Purchase College State University of New York.

Issa participated in the technical preparation for San Francisco BMW's last land speed motorcycle and he has always been interested in the Bonneville speed trials. He is excited to be part of another land speed team, particularly because of the unique incorporation of a diesel automotive engine into a motorcycle chassis.

### **Jay Kravitz**

Artist Jay Kravitz has been pouring energy into the Bay Area art scene since he first cast wild-eyes upon it in 1991. He has been a central figure at The Crucible since its inception and participated in the design and fabrication of numerous metal sculptures both there and with renowned artist Michael Christian. He has been riding and working on motorcycles since his youth and enjoys fabricating custom parts for his vehicles. In the last year he built new bumpers for his Toyota truck, fabricated custom brackets for his Honda CBR 1100, and fully restored a vintage 1989 GS 500 Suzuki into thing of beauty.

Why does Jay want to be involved in the project? Speed. He can't wait to go out into the middle of the desert and watch things go really, really fast.

### **Ray McLeod**

Ray has motor oil in his blood. His father was a mechanic, his grandfather was a mechanic, and his earliest toys were wrenches and lug nuts. Motorcycles are his specialty and he has been riding and working on them all his life. He is factory certified in Ducati, Triumph and Yamaha and holds

a degree from the American Motorcycle Institute in Daytona Beach. His day job as a mechanic at Munroe Motors, one of the country's top Ducati dealers, affords him time to take his motorcycles out on the tracks; he has accumulated hundreds of hours of track time at all of the Bay Area's race tracks.

Well-immersed in the world of fast motorcycles, Ray believes in the project's goal to introduce alternative fuels to Bonneville. He is also looking forward to working with such a high-caliber team of professionals.

### **Ben Piper**

Ben has Masters degrees in Environmental Management and Public Health from Yale University and currently works as an environmental health consultant. He is also a mechanic and motorcycle enthusiast. While in college he rode a Suzuki 125 Enduro and worked on all of his friend's motorcycles and scooters. Though he no longer rides himself, he still enjoys acting as mechanic for other riders.

Ben is interested in establishing the viability of alternative fuels because of their impact on health and the environment. He is particularly interested if the fuel is inside of really fast motorcycle.

### **Matt Rhea**

Matt is a self-described tinkerer—he has been taking things apart to see how they work since he was old enough to hold a screwdriver. He has a passion for building things that move, from animatronics to kinetic sculpture to engines. Riding since the age of 17, Matt has owned too many bikes to list, though his highlights are a 1997 Moto Guzzi 1100 Sport, a 1984 Kawasaki 750 Turbo, and a 1991 Suzuki Bandit 400. He has a passion for all things two-wheeled, and he has taken on the high-risk challenges of riding in the Minnesota 1000 motorcycle rally and working as a motorcycle courier in San Francisco.

Matt brings to the project an eclectic skill set and an instinct for experimentation. He also brings a love of speed that will doubtless push the team to that world record.



Dear Michael,

Thank you for your inquiry regarding the participation of your motorcycle in the diesel class at our 3<sup>rd</sup> Annual Speed Trials by BUB.

After reviewing the rules for the diesel class I can see no reason why you could not compete with an automotive engine in this particular class. There is a cap on the CC's permitted (3000), however there is no rule stating that it must be a motorcycle engine. We do not wish to limit the innovation that our competitors may come up with!

The run using vegetable oil would technically fall in the fuel class, where as we discussed, it would not be competitive, however you could certainly run it as a change of class for a time only.

Unfortunately for this year the addition of a bio0diesel or vegetable oil (alternative fuel) is not possible. However if you would like top put together a proposal that could be submitted to us, and also reviewed by officials at the AMA it may be something that we could consider for the future. This proposal would need to include all the pertinent details regarding allowable fuel types, and appropriate placement in the rulebook.

As a need for the future we understand that alternative fuels are expanding, however we do need to assess the impact of the addition of a new class thoroughly.

We look forward to seeing you and your crew on the salt, and should you have any more questions please do not hesitate to contact me

Kind Regards

**Delvene Manning**

Event Manager

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