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IN REPLY REFER TO:  
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**JUSTIFICATION AND APPROVAL  
FOR USE OF OTHER THAN FULL AND OPEN COMPETITION**

1. Contracting Activity.

Naval Air Warfare Center Weapons Division (NAWC-WD) - China Lake, CA

2. Description of the Action Being Approved.

This justification and approval authorizes on a sole source basis a contract modification to add an 18 month extension to the period of performance under the existing contract N68936-09-C-0125. This will provide research for the additional effort to develop the Advanced Gaseous Electrostatic Energy (AGEE) device called Polywell Wiffleball or Plasma Wiffleball Version 8.0 (WB-8) with Energy Matter Conversion Corporation (EMC2).

3. Description of Supplies/Services.

The current requirement is an effort to research the concept exploration and technology demonstration of the AGEE concept, which consists of research, analysis, development, and testing to validate the basic physics of the AGEE concept as well as provide the Navy with data for potential applications of AGEE. The AGEE concept involves the polywell device, which is a type of fusion reactor that was originated by Dr. Robert Bussard in the early 1980s. Dr. Bussard is a former Chief Executive Officer (CEO) for EMC2. The polywell device traps electrons in a magnetic confinement inside its hollow center. The negatively charged electrons then accelerate positively charged ions for the purpose of achieving inertial electrostatic confinement fusion. The design requires use of circular coils around each main face cusp axis. The device requires use of emitter electron gun arrays and an ion beam drive. The machine is required to be operated in magnetic fields with pulsed currents. Plasma WB-8 was required to be operated at a magnetic field strength of approximately 0.8 Tesla, which represents an increase of eight (8) times the magnetic field strength of previous Plasma WB machines. During the course of the contracted study several anomalies related to how electrons were fed into the device were discovered. These anomalies must be characterized and solutions created if the device is to be made functional. To solve these anomalies, the additional effort will require the incumbent contractor to further their studies by employing independently powered electron gun arrays operating at up to 10 kilovolt (kV) to inject high energy electrons onto the Plasma WB-8 core and control the WB formation process. Additionally, a separate pulsed power system with minimum 100 amperes current rating will be utilized to power the electron gun arrays. It is in the best interest of the Government to acquire this additional effort as it falls directly in scope with and will complete the concept exploration and technology demonstration of the Plasma WB-8. Without this additional effort the Government will not have a complete study on the AGEE concept. The long term goal is to achieve a clean nuclear energy source for the Navy and DoD. The estimated cost to complete this additional effort is approximately \$5,286,405.

See Appendix A for Estimated Dollar Value

4. Statutory Authority Permitting Other Than Full and Open Competition.

10 U.S.C. 2304(c)(1), Only one responsible source and no other supplies or services will satisfy agency requirements.

5. Rationale Justifying Use of Cited Statutory Authority.

This is a new technology and the device has not been previously obtained because the theoretical underpinnings of the Polywell fusion system are unique and revolutionary. Previous research into the science was also conducted by EMC2 under Broad Agency Announcement (BAA) contracts through the Office of Naval Research in Arlington, VA. Further research on the AGEE concept was also performed by EMC2 under Contracts N68936-03-C-0031 and N68936-09-C-0027. The current contract N68936-09-C-0125 was awarded to EMC2 as the only responsible source with the required intellectual property and background in the research area.

A committee of distinguished scientists reviewed the progress of EMC2's work to provide a recommendation to Office of Naval Research (ONR) on the merits of the project. The committee consists of internationally recognized, independent experts in the field of magnetically confined energy producing devices. These committee members are qualified independent scientific and academic experts who were designated by ONR to evaluate and provide impartial opinions on the research done by EMC2. The committee validated the progress made by EMC2. The experimental results to date were consistent with the underlying theoretical framework of the Polywell fusion concept and, in the opinion of the committee, merited continuation and expansion.

EMC2 owns the intellectual property rights to the developmental device and possesses an existing body of experience on the AGEE that makes them uniquely and solely capable of further investigative work on the device. EMC2 also has a unique body of knowledge regarding the operation and performance of the AGEE, which will allow them to continue the basic research to develop an operational AGEE device. Other companies will not have access to EMC2 intellectual property, which is required for these studies. To compete this additional effort as a new contract action would result in duplication of work and cost, because a new company will have a new approach to the technology and would require the Government to start over from the beginning. Based on historical data, the cost and schedule impact of going to a different company would be \$20 million and duration of three to four years. The risk impact of going to a different company is cost duplication and schedule delay. As a result, the Government has determined that in order to avoid delay, significant duplication of costs, and risk, EMC2 is the only source that can provide the service.

6. Description of Efforts Made to Solicit Offers from as Many Offerors as Practicable.

In accordance with FAR 5.201(b)(1), this requirement was synopsisized via the Federal Business Opportunities website on 23 February 2012 with a response closing date of 10 March 2012. No responses or inquiries were received. Any future responses will be evaluated by the Contracting Officer. Market research was conducted in the past mainly through technical journals, conference attendance, discussions with independent experts in similar fields, and studies done by other companies and universities. The

market research shows that no other companies are pursuing the type of magnetically confined device (Plasma WB-8) that EMC2 is investigating.

**7. Determination of Fair and Reasonable Cost.**

In accordance with FAR 15.402, the Contracting Officer shall ensure that all supplies and services provided under this contract are procured at a fair and reasonable price. The Contractor will submit a formal price proposal with certified cost or pricing data and sufficient information to support the accuracy and reliability of the estimate. EMC2's proposal will be reviewed by experienced technical analysts, cost analysts and contract specialists with the aid of necessary Defense Contract Management Agency (DCMA) field pricing support. The Contracting Officer will utilize cost and price analysis as the basis for negotiating a fair and reasonable price.

**8. Actions to Remove Barriers to Future Competition.**

Continuous market research, surveys, and conference attendance to understand potential future competitors are regularly pursued to identify new sources and technology. The anticipated timeframe of this technology going into production is another four or five years from now. If the basic research on this technology is successful it will be competed in the future.

**Appendix A**

**Estimated Dollar Value In Thousands**

	<b>FY12</b>	<b>FY13</b>	<b>FY14</b>	<b>FY15</b>	<b>FY16</b>	<b>FY17</b>	<b>FY18</b>	<b>Total</b>
			(b)(2)High					
				0	0	0	0	\$ 5286 k