



20130126\_Cherokee\_LENRR Rev. No: 2

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## MEMORANDUM

DATE: 15-Apr-13  
VIA: Email  
TO: Tom Darden, John Mazzarino, JT Vaughn c/o Industrial Heat  
FROM: Dewey Weaver, Paul Morris  
RE: DRV Comments on "Test Protocol for Plant Made for Cherokee"  
CC: Lee Feldman

At the request of Industrial Heat (IH), Deep River Ventures (DRV) has reviewed the "Test Protocol of Plant Made for Cherokee" for the test currently scheduled to start on 4/30/2013. At DRV's request, Lee Feldman has also reviewed the test protocol and provided DRV with input. Below we provide our opinion based on our understanding of the goals of the test. We have also included comments on the Leonardo Corporation Test Document which is included for your review. Additionally, we make a number of suggestions in two categories a) Important and b) Optional. Finally we identify additional information that would allow us to perform a more thorough analysis of the test protocol and results once they become available. If the additional information is provided, we will do a second analysis of the test protocol for IH.

### Goal and Assumptions:

DRV understands that the goal of the test is verify that the plant produces more energy than it consumes as specified in the contract and within the time durations specified in the contract as an appendix to the test protocol. As such, we have not focused whether the test provides an explanation of how the device generates excess heat (e.g. is it a fusion reactor, a fuel cell, a battery, etc.). We have focused on whether the test reveals that it does generate excess heat as specified in the contract.

### Opinion:

We believe, based on our collective review and discussion, that the test is sufficient to demonstrate whether the tested device meets the contractual specifications. However, there are important additional test criteria not included in the contract that you may wish to review at some point.

### Suggestions:

#### **Important:**

1. The test protocol states that the same instrumentations as used in the previous third party independent test will be used. Identify, in the test protocol document, what equipment is being used?

**2**26 January 2013  
Client: Cherokee Fund; LENR Project

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2. Provide, in the test protocol document, a definition for the Coefficient of Performance that will be used in the tests. For example, the COP can be defined as Delta T divided by the power consumed by the plant. In addition to providing an average of the COP, provide the variance.

***Optional:***

1. A thermal diagram of the system with identification and description of the measurement points by location on/in the system and by time taken during the testing. This will provide an understanding of the dissipated heating with respect to the energy input components to provide a truer test of "system wide thermodynamic loads.
2. Measurements of thermal line loss, absent input power to the plant. Again, this will aid in understanding the thermodynamics of the system.
3. Measure pressure changes in the input and output fluid lines. This will provide information regarding any pressure-related heating/cooling that may take place during operation of the system. Identification of the fluid use and its volumetric thermal capacity would be helpful to include in this information. Changes in variance in the heat capacity of the fluid over the range of input and output temperatures can be used to make corrections in the final Delta T measurements. The reason for this suggestion - superheating caused by pressure can easily raise the temperature of a fluid (e.g., water) by many-fold. In superheated water systems, a 5-fold increase in temperature is possible just from an increase in pressure.
4. Measure the COP for both the operating system and the system while it is presumably not operating. This will provide data on the thermal heat sink capacity of the system.
5. Create and provide a detailed digest or log (i.e. an experimental digest) of activities during test setup, testing, and post-test. This will allow for additional post-test analysis and measurement over time.

**Additional data that would be helpful in reviewing the test protocol:**

- a. Provide a description of the design/construction/materials of the specific device tested to the extent possible allowing trade secrets to remain protected. This should include a description of the electrical system used to start the reaction (e.g., thermal induction, simple heating elements, etc.)
- b. Indicate whether thermal line loss, absent any input power, will be measured. If so, what measurements will be made and how?

We hope that this input adds value to the IH test plan for the E-Cat device and are ready to assist in any way needed moving forward. As always, thank you for the opportunity to work with Industrial Heat.

Sincerely,

Dewey Weaver

Paul Morris

Deep River Ventures LLC