
From: JT Vaughn <jvaughn@industrialheat.co>
Sent: Monday, September 23, 2013 9:56 AM
To: Tom Darden
Subject: Re: Industrial Heat update 9/24/13

I made some edits, which are in red below--as usual, take or leave any or all. Also, I think might want to add two sections, both of which should be brief at this point but which I think we should include: 1) Commercialization Strategy and 2) Regulatory Compliance. See comments on this in red, below the update. Just thoughts for consideration. If you want to focus exclusively on technology validation, I think that generally works too.

Summary

For the last month, our most important activities have involved producing and testing reactors. Of secondary importance, we have met with potential funders or partners; we have advanced our intellectual property activities and we have finished getting our R&D facility in operation. We believe we have good results, but there is a critical caveat. We are not fully confident in our method for measuring output energy, which is to use a thermal infrared optical camera. These systems need to be calibrated, and they depend on critical adjustment factors such as emissivity of the heated surface, which is not easy to know. Our camera is very expensive and presumably accurate, but we will not be comfortable until we operate with a second one in parallel. We took delivery of a rented camera yesterday but have not used it yet. Until we do, I view the information below as being very tentative and premature.

Production and Testing

Invesco Perpetual, a large U.K. fund, is an investor in a medical products company that I seeded many years ago, and I respect them greatly. They have a small allocation for non-traded securities. When Invesco's chief investment officer heard about our activities, he expressed strong interest because he has been following LENR developments. Unfortunately, Invesco might not be able to invest in IH because of their small allocation to private deals, and because they are currently undergoing a review of their policies associated with non-traded securities. Notwithstanding this, they wanted to come see what we are doing, and they proposed September 12, 2013. We set a goal of having a reactor operating by then.

We needed a shipping container from Italy for the Invesco test, because it contained several reactors and the controls to operate them. It was delayed from the estimated 8/22 arrival date, so we reproduced the reactors and controls in our shop.

In short order we identified suppliers and ordered the necessary components and materials to construct three fully operational reactors. We worked with two machine shops to fabric stainless steel components for the reactors. After receiving the components from various suppliers, we proceeded to build the control equipment, heating elements and reactors, which we fueled. **It was useful to build the devices ourselves, in order to fully understand how to construct the devices and how they operate.** Obviously we are not set up to do this efficiently, so we made only a half-dozen devices, and our total elapsed time was a few days. But we are beginning to think about how this could be done at scale.

We operated the first three reactors on Tuesday, 9/10, and our data (subject to the measurement caveat above) showed that they produced significant excess energy. We stopped them after a half day and waited until Thursday, 9/12 to start them again. They appeared to operate similarly and we believe they produced significant excess energy, though we do not want to report specific multiples until we have reviewed the data thoroughly and conducted tests using at least two thermal cameras to ensure the data is accurate. **After operating for several hours, Dr. Rossi decided to elevate their input energy until something failed, as a test.** The second device shorted out electrically as the temperature increased, shutting itself down. We dissected it and determined that it arced internally due to a void in the ceramic insulation. We can solve this by vibrating the refractory after pouring so it fills all the voids, and by winding the electric coils with machinery instead of by hand. [Consider reminding the reader that we have no intention of doing this by hand in the future...I'm worried they're going to be floored by the concept of 'hand made nuclear reactors'! Obviously this is a big positive of the technology, but we need to ease them into this concept or spell out why the simplicity of the technology is such a big deal and advantage.]

We replaced reactor 2 with one of the remaining three that we built and started operating again on Tuesday, 9/17. We operated for three days, again showing good results based on our (caveated) measurements. The calculated COP ratio was between 5 and 9. [I would wait at least another week to provide hard numbers like this].

We will start up the three reactors on Monday or Tuesday for a long term test, importantly to be monitored by both infrared cameras. If we see similar energy output measurements this week, I will be ready to declare victory [too strong of a statement], although cautiously and still uncertain about how long the reactors will operate on a fuel charge.

The shipping container also had the Bureau Veritas certified six-reactor boiler. We will spend the coming week getting it ready to operate, and we intend to use it for the 365 day test, required by our agreement with Dr. Rossi. This device heats diathermic oil which can be used for process heat or to boil water. Measuring heat transfer into liquid is less complicated than measuring radiated energy, so we hope to be more confident after this device begins to operate.

Investors and Strategic Partners

I went to Beijing on Sunday, 9/15 for meetings with government officials. I had told my Chinese business associates that it is premature to discuss IH until we have more definitive results, but they pressed me to come anyway because my next calendar opening would be several weeks further out. By the way, the son of one of these businessmen works for us in Raleigh, so he is very aware of what we are doing.

The Chinese are acutely interested because of their air pollution crisis. I met with a government-sponsored green investment fund; with a senior official in the agency that oversees electric power production and distribution; with local officials who want to host an R&D facility; and with a wealthy (\$3 billion) nickel mine owner who sees opportunity and who wants to invest in the parent IH company. I told everyone that I might have something to report in two months, at which time we could have a conversation. I returned on Wednesday night.

Intellectual Property

I have given extensive materials to our intellectual property attorneys at Myers Bigel [Redacted - Privileged] [Redacted - Privileged] with a Houston energy patent attorney as well, Todd Patterson. Then before we begin to implement a strategy, we will have it further reviewed by one of the big patent firms. We have no results back from their preliminary review.

We continue to have our weekly IP review meetings, at which those of us in the company discuss new ideas from the last week so Deep River can help us write the claims and pursue patents. Andrea Rossi and Fulvio Fabiani attended the last meeting and seemed to find it useful. This is important because they obviously have many patentable ideas.

Workshop

We have a great testing and production facility near Raleigh-Durham airport in a very incognito location. We are fully functional there for research-oriented production and for testing. Any of you would be welcome if you want to visit. Most of the time, Andrea, Fulvio, T Dameron, JT Vaughn and I are at that location. We also are hiring an electrician this week, and we have contractors available to do anything else we need to do. We have hesitated to staff up more, pending confirmation of success with our tests.

[Consider adding a section to provide your thoughts on Commercialization Strategy broadly--I think investors will be most interested in this. I don't want to shift the focus of the update, but it seems we should provide at least some commentary on our current thinking along these lines. Maybe something along the lines of what I said to Craig in a email yesterday about how we are thinking about a strategy which may entail developing a limited number of core products ourselves while simultancously either 1) partnering with Fortune 500 type companies to jointly develop technologies in various industry verticals (e.g., Texas Instruments or Intel for chips; Google/Apple/Microsoft for server farm power supply; Boeing for defense and aerospace; etc., etc.) or 2) licensing our core technology to Fortune 500 type companies for development (in which case we would not jointly own IP--we would just receive licensing fees and royalty revenue). Of course we are considering a wide array of commercialization strategies, including open source business models, so we don't need to sound definitive--just show them we are beginning to think critically about this.

Also, you may want to discuss Government Relations/Compliance, noting that we are beginning to work on this and we perceive that the disruptive nature of our technology will necessitate significant attention on this front.

another email to follow
(JT: below is the last update, to compare)

Since my last update, we have been working on capital structure, IP, technology transfer, product development and competing technologies. I will discuss each of these below.

We raised approximately \$4.2mm of additional capital, of which we paid \$3.2mm to Dr. Rossi's former partners, a company called Ampenergo ("AEG"). As background, AEG had the right to receive approximately one-third of the proceeds we are paying for Dr. Rossi's intellectual property, based on a prior contract under which AEG provided support for Rossi's work. We modified this contract substantially when we entered into our agreement with Rossi and AEG, in order to reduce the total cost to us. For example, we paid Rossi \$10mm in May after he successfully exceeded our 24 hour challenge requirement of producing six times the energy required to operate his reactor. But instead of having to pay \$5mm to AEG, we agreed they would receive approximately \$500,000 upon success with the test, and we would have the right to convert the remaining \$4.5mm into equity instead of paying them any cash, at our option, within 45 days. When that date came, we asked to change the agreement again, paying them \$1mm and extending the decision point another 60 days for the remaining \$3.5mm, which we increased slightly in exchange for the extra time.

Last week, we paid them \$3.2mm and allowed them to convert \$500,000 into a 1% equity ownership in Industrial Heat, essentially the same as our recent offering. So, we are clear of any obligations to them or Rossi until the machine has operated successfully for 350 days out of the next 400 days. And, we will have about \$1.5mm cash, enough to operate into Q1 2013. This is important generally, but also because our highly-motivated, UK institutional investment fund has a temporary moratorium on closing any new private investments. They still plan to visit us in September, and they seem very interested still, but they will not be coming with funding approved. So, we need to consider initiating a process for significant future capital raising, once we have more test results. If our friends from England come through in the interim, we will stop the process. Meanwhile, we are being courted heavily by the Chinese government, which wants to invest *pari passu* with the Brits for a small percentage of the company in the U.S., but in addition, they would fund \$200mm of capital for a 49% position in a joint venture with Industrial Heat to develop this technology in China, for the domestic market. They are offering "control" to Industrial Heat, which I find surprising and I am not sure would be of any actual benefit to us. But this must be evidence of serious interest. My goal is to move slowly with this process, which is convenient because it seems that deals move very slowly there. I do not see this as being relevant regarding our capital raising process.

After Rossi finished the 24 hour test in May, he began the process of shipping the 1 MW plant to us, with its 105 individual 10 kW reactors inside. This took a long time because the container was non-standard, but it arrived at Norfolk on August 1. We had some disconcerting moments when customs first required an x-ray test to see what was inside the mysterious box, followed next by a special in-person inspection. But this should not have been surprising, since a Google search of the shipper would reveal they are in the business of making some kind of nuclear reactors (at least, "low energy nuclear reactors"). Notwithstanding the drama, our 1 MW unit successfully cleared customs Wednesday and will arrive in Raleigh Friday, 8/16/13. Rossi was extremely worried during this time because the 105 reactors inside are fueled and operational, so an invasive inspection could reveal their internal design and fuel systems. Now that it is over, perhaps we should be glad customs did thorough tests of the reactors, because this is further ratification that they are not radioactive or obviously harmful.

Our next and more important shipment arrives into Charleston on August 22. This container holds all the remaining tools, testing equipment and devices from Ferrara. Importantly, it contains a high temperature plant that we intend to operate for the 350-day test. This small but powerful plant produces much higher temperature steam than the older-technology 1 MW plant we operated for the 24 hour test. Its reactors are in sealed stainless steel tubes. We saw it when we were in Ferrara for our test, but it had not been operated at that time. Since then, Rossi operated the machine, and last week, we received a potentially significant certification from Bureau Veritas: "Conformity Examination Certificate, Machinery Directive 2006/42/EC." The 2006/42/EC rules pertain to industrial machinery, addressing such issues as operator safety, radiation, electrical and mechanical equipment, etc. CE certification would be similar to an Underwriters Laboratory certification, or perhaps to a building code inspection, except it applies to machinery. Products conforming to CE standards are stamped with "CE" written in an odd font—you will see this on the back of any laptop computer or TV, and compliance is required for most products sold in Europe. We probably will never sell this precise product, because no doubt designs will evolve quickly. But we find this significant simply because it means the plant operated for some significant period while Bureau Veritas was making their assessment, and it must be reasonably controllable or else it seems it would not have passed. So, while not specifically very important, we perceive that a third party validation of CE conformity for the high temperature unit is generally quite significant.

Our IP process is beginning to work. Every Friday we meet with Paul Morris, who has a few hundred patents in his name, and who is in charge of capturing new inventions from our team. We now have about 7 new ideas which might evolve into patent disclosures, plus an additional 7 disclosures on which we intend to file, plus our three filed provisionals and Rossi's various non-core provisionals. None of these new inventions disclose Rossi's the core IP, which remains a trade secret for now. They have to do with features or designs that will enhance or benefit the core reaction. Dr. Rossi increasingly agrees that patenting his central invention may be sensible. To implement this, we intend to start with two local firms, Myers Bigel and Patterson Sheridan, which is headquartered in Houston and specializes in energy, but they have an office in Greensboro. No doubt we will bring in larger firms as well later, but we want to start with people we know. And, we will use the local firms for the many ancillary patents we intend to file surrounding the core IP.

One reason Rossi believes we should file patents on his technology is that he wants to build a domestic device which would operate inside or beside a home or apartment to produce heat and hot water. This is fundamentally different than the strategy of making central power plants that could be controlled and secured from theft. We are not convinced we will be ready to put these devices inside homes anytime in the near future, but we do agree this is a useful idea and that the resulting products could have many applications in industrial settings as well as home applications. They will use an entirely new design of reactor, resembling a flat plate, which will be the third reactor version, after the original low temperature boxes and the recent high temperature tubes. Rossi has been told by Bureau Veritas that they would certify this new device for home use under CE standards, assuming it works similar to the high temperature plant. We have prepared design drawings for this new machine, and we expect to build it in our shop once the equipment arrives. We already have built some of the actual reactors for this device.

We are finishing the upfit of our 10,000 square foot machine shop and testing facility, and we will move in soon. It is in a discreet location, intended not to attract attention to our work. We would not expect to be in this facility for very long, but for now it will be very useful. We hope to test the high temperature unit in this facility initially. Later on, ideally, we will find a beta customer in the local area that needs steam, with a secure site. We are impeded in finding this customer now because we are not publicizing our involvement. But if any of you have a suggestion, please let me know. Obviously this needs to be someone who would find this to be interesting or else they will not be willing to spend time seeing if this could work at their facility. Universities or hospitals would make sense, but they probably will not want this new device on site. We would be happy to provide very discounted energy. We should make between 50 kW and 100 kW of steam energy, at a maximum temperature of perhaps 300 degrees centigrade. We could also make hot water if that is preferable to steam.

Our IP team, Paul Morris and Dewey Weaver, went to two important conferences this month: ICCF 18 at University of Missouri, and NI Week at National Instruments in Austin, TX. The former is a LENR conference, attended by most of the known researchers in this field, but never by Rossi. They were well received, because these researchers do not meet very many business people, and because they discussed with some of them the idea of acquiring or investing in their IP, which is something we want to do in the future because some of them are making progress that could benefit us. Paul and Dewey returned feeling that they had met almost all the important industry participants. Among the attendees they met was the highly respected CEO of National Instruments, James Truchard, who is a strong supporter of LENR.

Also there was a team from Defkalion, a Greek company now located in western Canada, which initially had a business relationship with Rossi. He terminated it because Defkalion never showed evidence of having any capital, and he became convinced they wanted to take his technology. In fact, after Rossi backed out, the Greek CEO wrote that he had stolen Rossi's IP. Rossi said this was untrue because he never gave them any information, which would be consistent with how he dealt with us prior to our funding, so I am inclined to believe him. But in any event, they are not viewed as being fully above board. Notwithstanding this, I have always assumed they were one of the serious competitors working in this field. Defkalion held a seemingly credible demonstration of their device at ICCF 18, using National Instruments meters to show they were producing a multiple of the energy they were using. Most in attendance seemed skeptical, but we did not have an opinion.

A week later at National Instruments' new technology conference in Austin, James Truchard approached our IP guys, who he had gotten to know at ICCF 18. He asked directly if they did any work with Defkalion. Hearing they did not, he proceeded to tell them that his team furnished the instruments for the Defkalion test, and that they had discovered a fraudulent modification to the testing equipment which falsified or exaggerated the results shown at ICCF 18. He said he had spent thousands of dollars that week on lawyers writing letters to Defkalion, separating NI from any apparent endorsement of the Defkalion results and informing them that NI knew of the deception. This week, we heard that Defkalion is in discussions with underwriters about a Canadian IPO.

I would not go into this sordid and only marginally relevant detail, except for the fact that this could generate some publicity, which would be very unfortunate for this already marginalized field of research. We wanted you to know about this, for what it is worth. In an ideal world, the offering will not happen and this will die a quiet death. But alternatively, it could be a mess.

Other than working on new IP and finishing the factory space, we will not have much to report before the second container arrives in Raleigh, maybe a week after 8/22. We might have a test operating by mid-to-late-September, at which point I hope you will visit.

Thanks for your support, and please offer input and ideas.

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