

September 12, 2006

Dean Leah Jamieson
College of Engineering
Purdue University
West Lafayette, IN 47906

Dear Dean Jamieson,

Following the letter that I wrote to Prof. Ishii on January 13, 2006, [1] I wish to request Purdue University to verify the independence of the Purdue confirmations reported in two papers [2,3] of Dr. Taleyarkhan's sonofusion experiment [4].

I believe that there are enough facts to warrant such action by Purdue based on:

- a) the experiences of our group headed by Dr. Tsoukalas during the unsuccessful confirmatory experiment that we carried out [5] for three years using independent instrumentation to count tritium with the Packard machine at Purdue REM -this is the key measurement because tritium is a product of fusion-,
- b) witnessing rushed publications of the two so-called independent confirmatory papers by another group shortly thereafter.

A list of the most outstanding facts follows:

- 1) On one occasion Dr. Taleyarkhan encouraged us to publish a positive measurement of tritium in our experiment by performing a count of our samples on his tritium counting instrument (i.e., the Beckman machine that he brought from Oak Ridge) and doing an incorrect analysis of the data. An error in the background correction was discovered by Dr. Clikeman. When the analysis was corrected the result became negative.
- 2) On a later occasion Dr. Taleyarkhan encouraged us to publish a positive result by performing another count of our samples on his Beckman machine. However, on that occasion he was not even willing to show us the spreadsheet with the analysis of the counts.
- 3) When Dr. Taleyarkhan realized that we would not publish the "positive" result he advocated, he enlisted Dr. Xu, who had recently started to work for him and was a graduate student, to reproduce his experiment in three months using our experimental facility and Dr. Taleyarkhan's Beckman machine to count tritium. The resulting paper [2] was authored by Dr. Xu and Mr. Butt, a new graduate student, who according to his own statement [6] did not participate in the experiment. In fact Mr. Butt's name was added to the paper one day before the submission of the final galley proof.



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4) A similar conference paper [3] included Dr. Revankar as an additional author. However, when I asked Dr. Revankar about it he said that he only participated in the thermal-mechanical design of the experiment and was not involved with the measurement of tritium. So the problem is the same as the previous situation.

5) The report of the fact-finding committee of the School of Nuclear Engineering [6] established that the two papers [2,3] refer to the same experiment and that Dr. Xu wrote the first draft of the NED paper [2]. When Dr. Xu was asked who the true author was, Dr. Xu refused to disclose the name because "it could jeopardize, in his own words, the confirmatory nature of the experiments."

Furthermore, Dr. Taleyarkhan later represented in the press [7] the published results of the NED paper [2] as work supervised by Dr. Tsoukalas. Another reference in the press [8] declares that "an independent group led by Lefteri Tsoukalas has recreated the experiment." The unexpected publication of the confirmation papers [2,3] and the implied linkage to our work convinced us to publish our negative result [5] though we had originally decided not to.

In addition there are two earlier facts that add valuable information to the picture, even though they are less directly related to the papers in question:

1) The turning point in our thinking came when Dr. Bougaev and Mr. Walter visited Dr. Taleyarkhan's lab at Oak Ridge. Dr. Bougaev, who was a student at the time, was not allowed into the lab but Mr. Walter did go and was asked to participate in an experiment. The experiment consisted of measuring the sonofusion neutrons with a neutron measuring equipment that is different from the tritium counting equipment used in the Purdue experiments. Mr. Walter was asked to write down some data in a lab notebook, but had no control over the experiment and could not take consistent notes nor see the instrument settings. Furthermore, the experimental conditions did not look acceptable in terms of additional bubbles in the chamber that did not collapse. So Mr. Walter was surprised that Dr. Taleyarkhan could measure fusion under those conditions. A few days later Dr. Taleyarkhan proposed a joint publication based on these measurements that included Mr. Walter and Dr. Bougaev as authors even though Dr. Bougaev had been in his hotel room the whole time. Of course both of them refused to do it. This shows Dr. Taleyarkhan's repeated attempts to involve Purdue in a confirmatory publication.

2) A few months later Dr. Taleyarkhan brought his experimental chamber from Oak Ridge to our lab at Purdue together with his neutron detection equipment. He also used deuterated benzene instead of deuterated acetone, because he claimed that it yielded more fusion neutrons per cavitation. He showed us a neutron spectrum on his Multi-channel Analyzer that had a distinct peak which he attributed to fusion. In fact, the growth rate of the peak was visible. However, when we tried to look at the instrumentation settings, Dr. Taleyarkhan would not allow it. Furthermore, this dramatic evidence was never published or described anywhere as far as I know, and I have come to doubt the authenticity of that peak. It is my opinion that this was a further attempt to convince us that his experiment worked and to

encourage us to publish a confirmatory result from our experiment. Other witnesses to this unique event were Dr. Tsoukalas, Dr. Jevremovic, Dr. Bougaev and Mr. Walter.

I consider that these facts are already sufficient for an allegation, even though there are other disturbing facts that came up during our attempt to replicate Dr. Taleyarkhan's experiment. Therefore, following the Purdue Policy on Integrity in Research, I hereby make the allegation that Dr. Taleyarkhan participated in the Purdue confirmations reported in two papers [2,3] of his sonofusion experiment [4]. The Purdue confirmations are not independent because the tritium measurements were performed with his tritium measuring instrument by a student working for him.

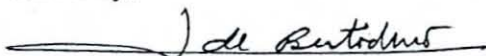
I would like to clarify that I do not make an allegation of fabrication of data by Dr. Taleyarkhan. However, other people outside Purdue have done it [9,10].

When I became involved in this experiment I thought that it was going to be a confirmation of a very exciting discovery. I have been very disappointed by the outcome, specially the divisive effect this has had in the School of Nuclear Engineering. My sole intent in writing this letter is to preserve the reputation of the School of Nuclear Engineering to which I owe so much.

Finally, I would like to acknowledge the strong support that I received from most of the faculty of the School of Nuclear Engineering, Dr. Bougaev and Mr. Walter in this matter.

If you have any questions please feel free to contact me.

Sincerely,



Martín López de Bertodano
Associate Professor

Attachment

c: Dr. Charles O. Rutledge

REFERENCES:

1. M. Lopez de Bertodano, personal communication, January 13, 2006 (attached).
2. Y. Xu, A. Butt, "Confirmatory experiments for nuclear emissions during acoustic cavitation," *Nuclear Engineering and Design*, **235**, pp. 1317-1324, 2005.
3. Y. Xu, A. Butt, S. Revankar, "Bubble Dynamics and Tritium Emission During Bubble Fusion Experiment," 11th International Topical Meeting on Nuclear reactor Thermal-Hydraulics, Avignon, France, October 2-6, 2005.
4. R. P. Taleyarkhan, C. D. West, J. S. Cho, R. T. Lahey, Jr., R. I. Nigmatulin, and R. C. Block, "Evidence for Nuclear Emissions During Acoustic Cavitation," *Science*, **295**, pp. 1868-1873, 2002.
5. L. Tsoukalas, T. Jevremovic, F. Clikeman, M. Bertodano, J. Walter, A. Bougaev, E. Merritt, "Tritium measurements in neutron induced cavitation of deuterated acetone," *Nuclear Technology*, **155**, pp. 248-251, 2006.
6. C. K. Choi, F. M. Clikeman, K. O. Ott, Fact Finding Committee Report, School of Nuclear Engineering, Purdue University, February 23, 2006.
7. E. Guizzo, "Bubble Fusion Research Under Scrutiny," *IEEE Spectrum*, May 2006 (also <http://www.spectrum.ieee.org/may06/3428>).
8. M. Mullins, *New Scientist*, pp. 39-41, January 22, 2005.
9. D. Shapira, M. Saltmarsh, "Nuclear fusion in collapsing bubbles - Is it there? An attempt to repeat the observation of nuclear emissions from sonoluminescence," *Physical Review Letters*, **89**, n 10, 2002.
10. B. Naranjo, "Comment on 'Nuclear Emissions During Self-Nucleated Acoustic Cavitation'," Accepted for publication in *Physical Review Letters* (also http://arxiv.org/PS_cache/physics/pdf/0603/0603060.pdf).