# Analysis of Evidence related to False Confirmation of Xu et al.

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## Summary

The report presents a re-analysis of evidence already available to Purdue University which strongly points to a false confirmation in the published work of Xu et al[1] and to falsification in the work of Taleyarkhan et al.[2] The publications appear to be orchestrated and the work of Xu et al[1] is falsely claimed by Taleyarkhan to be an "independent confirmation" of Taleyarkhan's bubble fusion claims.

The report focuses on a mistake in the precision of the Xu's published work. Precision here is measured by the statistical concept of "standard deviation." The analysis of evidence reveals that the reported precision is simply impossible and that it was likely claimed in order to achieve a false confirmatory positive result.

It is shown that the independent confirmation of Xu and Butt is neither. It is not independent because it was Taleyarkhan who chose the researchers to perform it. It is false because he knowingly chose researchers who were inexperienced in nuclear measurements, incapable of identifying all sources of error and who applied the wrong method to calculate the standard deviation and therefore claim a positive result which is simply wrong.

It is asserted here that falsification occurred when Taleyarkhan in the PRL publication[2]claimed Xu's results to be independent confirmation of his earlier claims.

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[1] Y. Xu, A. Butt, "Confirmatory experiments for nuclear emissions during acoustic cavitation," Nuclear Engineering and Design, **235**, pp. 1317-1324, 2005. (For convenience all references will be placed in footnotes; e.g., Ref.1 will point to reference in Footnote 1.)

[2] Taleyarkhan et al, PRL, January 2006.

**Concerns with Published Results of Tritium Measurements by Xu et al[1]**

This section consists of the comparison of two almost identical experiments, that of Xu and Butt[1] and an independent experiment performed by Nuclear Engineering. The comparison is even more pertinent because for the two experiments the counts presented herein were performed by Xu using the same instrument and the same procedure. The conclusion is that the standard deviation reported by Xu and Butt is approximately half of the correct value. This implies that Xu did not confirm Taleyarkhan's bubble fusion claims.

The standard deviation reported by Xu and Butt, the 0.8 DPM/gm value (DPM means disintegrations per minute; gm refers to grams) reported in the first row of the table shown in Fig. 1, is approximately half that obtained from the first four values in the 7th column of Table 1, labeled "DPM/GM Gaussian". Table 1 is based on independent experiments performed by Nuclear Engineering but counted by Xu and Taleyarkhan with the same Beckman instrument owned by Taleyarkhan and the same counting and calculation procedures (i.e., 10 cycles x 10 min/cycle counts of four samples shown in Fig 2 and in spreadsheets developed by Clikeman, see Appendix 1) as the values reported by Xu and Butt. The procedure used to perform the measurements shown in Table 1 is described in more detail in a memo[3] in Appendix 2. Table 2 shows that the aggregate "Gaussian" standard deviation of the first four counts of Table 1 is 1.6 DPM/gm. This should be compared with 0.8 DPM/gm, which is the value reported by Xu and Butt. These values should be approximately equal.

The "Gaussian" standard deviation in Tables 1 and 2 refers to the standard deviation derived from the distribution of disintegrations obtained by the instrument, as opposed to the theoretical value, based on the random nature of radioactive decay which is proportional to the square root of the total disintegrations and which is shown in the 6th column and labeled "Poisson." The difference is significant. For example, in Table 2, the aggregate "Gaussian" standard deviation is 1.6 DPM/gm and the "Poisson" is 0.8 DPM/gm. It is important to notice that the aggregate standard deviation reported by Xu and Butt is the same as the "Poisson" value in Table 2.

The first four counts of Table 1 were selected in Table 2 to compare between the counts of the independent Nuclear Engineering experiment and Xu and Butt's experiment, because the result published by Xu and Butt consists of only four counts.

The Tritium activity of the Nuclear Engineering D-Acetone samples ranged between 150 DPM/gm and 210 DPM/gm. The Tritium activity of the D-Acetone in the samples used by Xu and Butt (NED) is believed to be similar, if not the same, i.e., approximately 190 DPM/gm. This assumption is based on a measurement made by Clikeman of a sample provided by Xu for a run he made on 2/4/04 (i.e., table titled "D-Acetone 7 hr run 2/4/04, Analysis of 4/16/04" in Appendix 1). It is documented[4] that on 2/4/04 Xu conducted an

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[3] S. Revankar, Internal memo to Taleyarkhan, 2/20/04 (see Appendix 2)

irradiation test[4] so it is assumed that it is the same samples Xu gave to Clikeman. Also, Tables 1 and 2 were produced at the same time at which Xu was performing his NED experiment.

**Therefore, if the two sets of counts (i.e. those in Table 1 vs. those reported by Xu et al) were performed by the same person, at the same time, with the same instrument, the same procedure, the same counting time and similar tritium content, then the standard deviations should be approximately the same**. However, they differ significantly. This difference makes the published result of Xu and Butt "positive" (in the sense that the overall signal to noise ratio exceeds three standard deviations).

A possible explanation for this discrepancy is that Xu and Butt used the "Poisson" standard deviation. This would be as highly surprising as it is wrong. Clikeman, the experimental nuclear physicist of Nuclear Engineering, repeatedly stated that Poisson statistics should not be used when dealing with DPM values, which are determined from the CPM measurements and the efficiencies of the counting systems. This was emphasized at several meetings with Xu, Taleyarkhan and Revankar. This is standard undergraduate material taught to Nuclear Engineering students. Quoting the classical radiation measurements textbook[5] used in Purdue's NUCL 205/305 Nuclear Engineering Undergraduate Laboratory I and II: **"One *cannot* associate the standard deviation σ with the square root of any quantity that is not a directly measured number of counts. For example, the association does *not* apply to... any *derived* quantity."** DPMs are clearly derived quantities (as our Juniors in Nuclear Engineering learn).

In addition, in the memo[3] the reported standard deviations obtained by Xu are "Gaussian". It is also stated[3] that the data of Xu and Butt were "processed similar to the methods employed in the previous data check during Feb 2004" (i.e., those described in the memo[3]) which leads one to believe that "Gaussian" statistics were also employed in the publication by Xu and Butt. On the other hand the "Poisson" statistics approach was advocated by Taleyarkhan in an exchange with Clikeman and may have been arbitrarily adopted for the "independent confirmation" to pan out.

A lower Tritium content in the D-Acetone used by Xu and Butt is difficult to support because the sample Xu gave Clikeman for a run performed on 2/4/04 had ~190 DPM/gm activity. The possible origins of the D-Acetone could be:

1. NUCL material with tritium activity ~ 150 DPM/gm – 210 DPM/gm (> 50 CPM/ml)
2. Material used by Taleyarkhan at Oak Ridge (Science, 2002) which has an activity > 50 CPM/ml, which is similar to the NUCL material.

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[4] Chronology of Events Doc (DOC-4) in Allegations of Research Misconduct against T. Jevremovic, M. Lopez de Bertodano and L. H. Tsoukalas (see Appendix 4).

[5] G. F. Knoll, "Radiation Detection and Measurement," Third Edition, John Wiley & Sons, Inc., 2000.

3. Sigma-Aldrich low Tritium content D-acetone ~ 100 DPM/gm (manufactured by Isotec to order as a unique request). This is highly unlikely but the lowest possible tritium content that could be purchased. Even so, the standard deviation of Xu and Butt would look small even compared to this.

Xu and Taleyarkhan did not provide Tables 1 and 2 at the time of the independent Nuclear Engineering experiment, even though such information was strongly requested. Tables 1 and 2 were obtained last summer as part of documentation for an allegation of research misconduct filed by Revankar against Clikeman, Bertodano, Jevremovic and Tsoukalas[6]

It is important to mention that Clikeman identified another error in the counting measurements of Xu and Butt. In particular he showed that the deficient correction of the Beckman instrument for quenching and the related calibration with toluene instead of Ultima-Gold standards, make null results look positive. This error occurred because the researchers were inexperienced in nuclear measurements.

The results shown in Figure 1 have also been presented at the NURETH-11 Meeting[7]. It has been stated in Ref. 4 (p. 14) that Revankar checked Xu's calculations published in the NURETH-11 paper, so it is hard to support that a random mistake was made, unless the mistake was to adopt "Poisson" statistics (references point to footnotes, e.g., Ref. 4 points to Footnote 4). Unfortunately such assertion cannot be confirmed because tables equivalent to summary Tables 1 and 2 could not be obtained for the results published by Xu and Butt. The calculation tables and counter printouts are also unavailable. In the case that such a mistake was made, it cannot be construed as a "difference of opinion" and it is unacceptable in the only independent confirmation of an exceptional claim that is published in a journal. It is remarkable that no mention can be found in the documentation or papers of any consideration of Clikeman's criticism, not even an error propagation analysis, as any independent scientist would have done. Also this mistake is impossible to identify from the paper because of the absence of supporting tables to verify the data.

Such a mistake could only be made by people not qualified for the job, in an atmosphere of secrecy. Furthermore , the mistake occurred because Xu was not independent from Taleyarkhan, who encouraged a positive outcome all along and who advocated anything possible that appeared to deliver a positive outcome, including "Poisson" statistics, while the expert opinion of Clikeman was ignored.

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[6] Support Documents for DOC-4 (DOC-5) in Allegations of Research Misconduct against T. Jevremovic, M. Lopez de Bertodano and L. H. Tsoukalas

[7] Y Xu, A. Butt and S. T. Revankar, Bubble dynamics and tritium emission during bubble fusion experiments, The 11th International Topical Meeting on Nuclear Thermal-Hydraulics (NURETH-11), Paper No. 548, Avignon, France, October 2-6, 2005

The independent confirmation of Xu and Butt is neither. It is false because Taleyarkhan knowingly chose researchers who were inexperienced in nuclear measurements, incapable of identifying all sources of error and who applied the wrong method to calculate the standard deviation and therefore wrongly obtain a positive result that is wrong. It is not independent because the researchers who Taleyarkhan chose for the "confirmation" were novices who were in no position to perform the "confirmation" on their own.

The group that was originally intended to perform the confirmation, with the agreement and assistance of Taleyarkhan, was the independent group from Nuclear Engineering that included Clikeman. Once Taleyarkhan realized that this group would not be manipulated[8] to deliver his expected outcome he selected another group (Xu, Butt and Revankar). For example, in early 2004, Bertodano overheard Taleyarkhan telling Revankar that the "farce should stop" (i.e., the activities of the other group) and asked him to publish separately an "independent confirmation" with the Beckman results shown in Figs. 1 and 2. Obviously, this did not happen because Revankar could not use the Nuclear Engineering experiments to publish an "independent confirmation" on his own without telling anybody. Instead, Taleyarkhan enlisted Xu to do the work. Butt was included in the end to add one more author.[9] This is nothing more than a desperate attempt to obtain the appearance of a confirmation.

Finally the "independent confirmation" appears to be legitimized by Revankar (Ref. 4, p. 14) who has no experience in nuclear measurements and questionable involvement with the published work. Revankar's problematic judgment is apparent in his absurd allegation against Prof. Clikeman and three other professors of Nuclear Engineering where he claims that the independent Nuclear Engineering team falsified their null result because Table 1 shows it was positive. This was strongly demonstrated not to be the case. The main reason why the independent Nuclear Engineering result is null is because it corrects the effect of quenching correctly, using a different instrument, and because the appropriate standard deviation is used.

[8] Email from Taleyarkhan requesting replacement of Clikeman (see Appendix 3)

[9] Affidavit of Butt (see Appendix 5).

**Table 1**: Table of Xu and Taleyarkhan, all counts (Ref. 6, p. 134)

| D-Acetone | CPM/GM Raw Data | | | DPM/GM | | | Cavitation | Background |
|---|---|---|---|---|---|---|---|---|
| | Mean | Poisson | Gaussian | Mean | Poisson | Gaussian | bursts/sec | CMP/DPM |
| | | | | | | | | |
| 9.19.03 | 2.2 | 1.0 | 1.0 | 4.6 | 1.5 | 2.5 | 15.0 | 15.2/32.5 |
| 9.19.03 2nd Batch | 1.4 | 1.0 | 1.2 | 5.6 | 2.0 | 4.8 | 13.0 | 13.8/28.8 |
| 9.24.03 | 1.0 | 0.9 | 0.9 | 3.6 | 1.5 | 2.2 | 13.0 | 14.9/31.8 |
| 9.26.03 | 1.9 | 1.0 | 1.0 | 2.2 | 1.5 | 2.6 | 13.0 | 15.5/33.0 |
| 10.3.03 | 3.2 | 1.0 | 1.0 | 6.3 | 1.5 | 2.5 | 34.0 | 15.7/33.5 |
| 10.8.03 | 1.3 | 0.9 | 0.9 | 3.7 | 1.5 | 2.3 | 22.0 | 15.3/32.8 |
| 10.27.03 | 0.5 | 0.9 | 0.9 | 1.0 | 1.5 | 2.4 | 32.0 | 15.5/33.0 |
| 10.31.03 | -1.1 | 1.1 | 0.8 | -1.2 | 1.7 | 2.0 | 25.0 | 15.1/32.3 |
| 11.03.03 | 2.4 | 1.1 | 0.9 | 2.5 | 1.8 | 2.2 | 23.0 | 14.8/31.6 |
| 11.07.03 | 0.8 | 1.1 | 1.3 | 2.6 | 1.7 | 3.3 | 34.0 | 15.8/33.8 |
| 11.14.03 | 0.3 | 1.1 | 1.0 | -1.0 | 1.7 | 2.6 | 22.0 | 15.0/32.2 |
| | | | | | | | | |
| Average | 1.3 | 0.3 | 0.3 | 2.7 | 0.5 | 0.8 | | |

**Table 2**: Table of Xu and Taleyarkhan, first four counts (Ref. 6, p. 132)

| D-Acetone ( 1 Ci Source) | CPM/GM Raw Data | | | DPM/GM | | | Cavitation | Background |
|---|---|---|---|---|---|---|---|---|
| | Mean | Poisson Error (1 SD) | Gaussian Error (1 SD) | CMP/DPM | Poisson Error (1 SD) | Gaussian Error (1 SD) | burst/sec | CMP/DPM |
| | | | | | | | | |
| 9.19.03 | 2.2 | 1.0 | 1.0 | 4.6 | 1.5 | 2.5 | 15.0 | 15.2/32.5 |
| 9.19.03 2nd Try | 1.4 | 1.0 | 1.2 | 5.6 | 2.0 | 4.8 | 13.0 | 13.8/28.8 |
| 9.24.03 | 1.0 | 0.9 | 0.9 | 3.6 | 1.5 | 2.2 | 13.0 | 14.9/31.8 |
| 9.26.03 | 1.9 | 1.0 | 1.0 | 2.2 | 1.5 | 2.6 | 13.0 | 15.5/33.0 |
| | | | | | | | | |
| Aggregate | 1.6 | 0.5 | 0.5 | 4.0 | 0.8 | 1.6 | | |

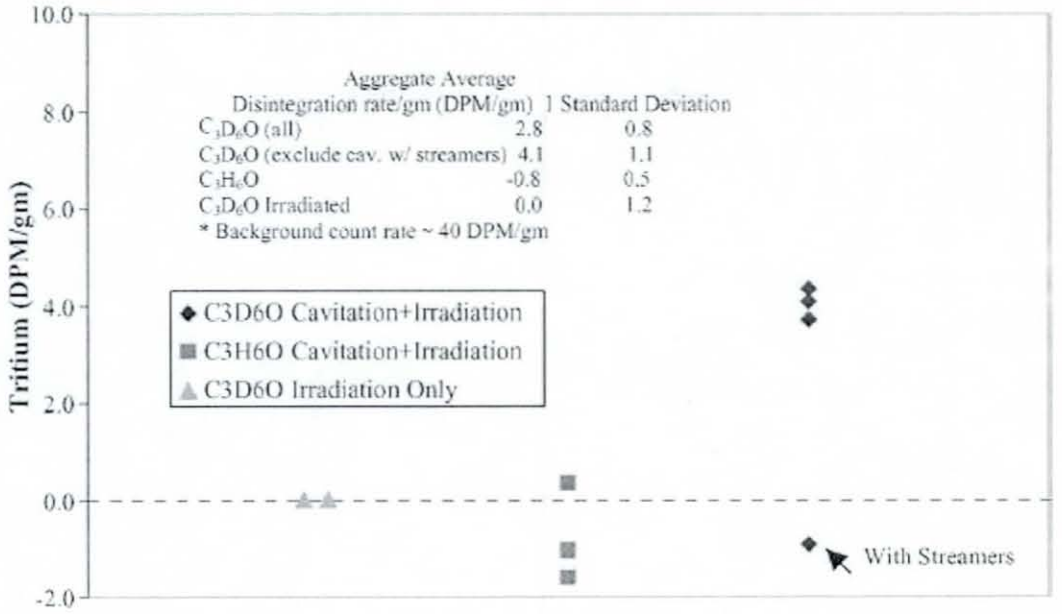


**Figure 1:** Tritium results published by Xu and Butt (Ref. 1, Fig. 2 and Ref. 7, Fig. 9)

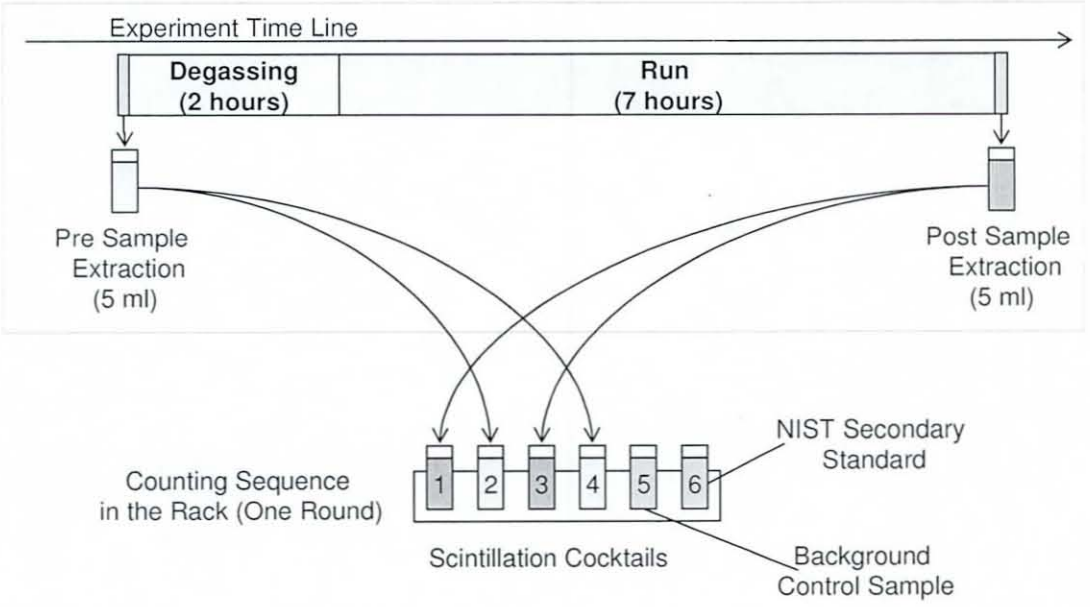


**Figure 2:** Schematic of counting procedure

## Appendix 1

## Counting of Xu's D-Acetone as Performed by Clikeman

D-Acetone 7 hr run 2/4/04 — Analysis of 4/16/04

Time per count: 10 Minutes — Coef = ######## ######## ######## ########

Number of cycles: 10

| Sample | Composition | Init. Wt. | Final Wt. | Net Wt. | | Pass -1 | | | Pass -2 | | | Pass -3 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | Date | 4/15/04 | | 4/15/04 | | | 4/15/04 | | |
| | | | | | Time | 16:41 | | 17:49 | | | 18:57 | | |
| | | | | | CPM | tSIE | DPM | CPM | tSIE | DPM | CPM | tSIE | DPM |
| 2-4-04-1 | 15 ml UG + 1 ml postporcessed D-A | 33.1565 | 34.0237 | 0.8672 | 72.85 | 442 | 194.47 | 70.06 | 441 | 187.37 | 73.10 | 440 | 195.87 |
| 2-4-04-2 | 15 ml UG + 1 ml preporcessed D-A | 33.1851 | 34.0591 | 0.8740 | 75.95 | 443 | 202.37 | 71.44 | 442 | 190.70 | 75.80 | 443 | 201.97 |
| 2-4-04-3 | 15 ml UG + 1 ml postporcessed D-A | 33.4022 | 34.2719 | 0.8697 | 72.99 | 442 | 194.84 | 68.78 | 443 | 183.26 | 72.03 | 446 | 190.66 |
| 2-4-04-4 | 15 ml UG + 1 ml preporcessed D-A | 33.1830 | 34.0570 | 0.8740 | 71.56 | 446 | 189.62 | 76.22 | 445 | 202.34 | 75.26 | 448 | 198.69 |
| 8-18-13-1 | 16 ml UG (Background) | | | | 13.10 | 569 | 28.94 | 12.79 | 568 | 28.29 | 11.19 | 568 | 24.75 |
| 10-15-02-5 | Standard | | | | 98568.0 | 516 | 233196.8 | 98892.9 | 518 | 233303.6 | 98979.0 | 517 | 233837.1 |

| | | Pass -4 | | | Pass -5 | | | Pass -6 | | | Pass -7 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Date | 4/15/04 | | | 4/15/04 | | | 4/15/04 | | | 4/15/04 | | |
| | Time | 20:06 | | | 21:14 | | | 22:23 | | | 23:31 | | |
| | | CPM | tSIE | DPM | CPM | tSIE | DPM | CPM | tSIE | DPM | CPM | tSIE | DPM |
| 2-4-04-1 | 15 ml UG + 1 ml postporcessed D-A | 73.59 | 442 | 196.44 | 72.42 | 442 | 193.32 | 72.00 | 443 | 191.84 | 71.81 | 444 | 190.98 |
| 2-4-04-2 | 15 ml UG + 1 ml preporcessed D-A | 75.40 | 444 | 200.53 | 69.07 | 445 | 183.36 | 75.83 | 445 | 201.30 | 78.05 | 445 | 207.19 |
| 2-4-04-3 | 15 ml UG + 1 ml postporcessed D-A | 69.73 | 443 | 185.79 | 71.97 | 442 | 192.12 | 69.86 | 447 | 184.77 | 74.72 | 445 | 198.35 |
| 2-4-04-4 | 15 ml UG + 1 ml preporcessed D-A | 74.35 | 447 | 196.65 | 76.12 | 447 | 201.33 | 71.35 | 448 | 188.37 | 74.64 | 448 | 197.06 |
| 8-18-03-1 | 16 ml UG (Background) | 12.15 | 569 | 26.84 | 8.75 | 569 | 19.33 | 13.73 | 571 | 30.26 | 10.22 | 572 | 22.50 |
| 10-15-02-5 | Standard | 98987.6 | 518 | 233527.0 | 98875.8 | 516 | 233925.0 | 98927.4 | 519 | 233056.4 | 98919.8 | 515 | 234362.6 |

| | | Pass -8 | | | Pass -9 | | | Pass -10 | | | Pass -11 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Date | 4/16/04 | | | 4/16/04 | | | 4/16/04 | | | |
| | Time | 0:40 | | | 1:48 | | | 2:57 | | | |
| | | CPM | tSIE | DPM | CPM | tSIE | DPM | CPM | tSIE | DPM | |
| 2-4-04-1 | 15 ml UG + 1 ml postporcessed D-A | 74.58 | 443 | 198.72 | 70.90 | 442 | 189.26 | 72.59 | 443 | 193.41 | |
| 2-4-04-2 | 15 ml UG + 1 ml preporcessed D-A | 70.37 | 446 | 186.46 | 71.98 | 444 | 191.43 | 70.21 | 444 | 186.73 | |
| 2-4-04-3 | 15 ml UG + 1 ml postporcessed D-A | 71.45 | 444 | 190.02 | 73.15 | 447 | 193.48 | 73.98 | 444 | 196.75 | |
| 2-4-04-4 | 15 ml UG + 1 ml preporcessed D-A | 73.68 | 449 | 194.17 | 75.99 | 449 | 200.26 | 69.57 | 447 | 184.01 | |
| 8-18-03-1 | 16 ml UG (Background) | 11.15 | 568 | 24.66 | 13.70 | 571 | 30.20 | 10.76 | 570 | 23.74 | |
| 10-15-02-5 | Standard | 98940.7 | 520 | 232760.8 | 98985.2 | 519 | 233194.9 | 99221.3 | 518 | 234078.3 | |

| | | Ave DPM | ± σ | Bkg corr Act/gm | ± σ |
|---|---|---|---|---|---|
| 2-4-04-1 | 15 ml UG + 1 ml postporcessed D-A | 193.17 | 1.09 | 192.82 | 1.81 |
| 2-4-04-2 | 15 ml UG + 1 ml preporcessed D-A | 195.20 | 2.64 | 193.55 | 3.29 |
| 2-4-04-3 | 15 ml UG + 1 ml postporcessed D-A | 191.03 | 1.62 | 189.81 | 2.27 |
| 2-4-04-4 | 15 ml UG + 1 ml preporcessed D-A | 195.25 | 1.93 | 193.70 | 2.56 |
| 8-18-03-1 | 16 ml UG (Background) | 25.95 | 1.13 | | |

| | Act/gm | ± σ |
|---|---|---|
| Ave. Post-processed | 191.32 | 1.45 |
| Ave. Pre-processed | 193.68 | 2.09 |
| Net Activity | -2.36 | 2.54 |

## Appendix 2

## Memo from Revankar to Taleyarkhan (February 20, 2004)

**Internal Memo**
**School of Nuclear Engineering**
**Purdue University**

**Date:** February 20, 2004
**From :** Shripad Revankar
**To:** Professor Rusi Taleyarkhan
Subject: Report on the data verification and analysis of the counting data from Beckman liquid scintillation counter.

## 1. Introduction

The following is the report based on study of the data from Beckman liquid scintillation counter. The data set includes counting results and the analysis carried out on these data.

I had two meetings with (Dr.) Yiban Xu on February 13, and February 14 for this particular task.

The following information/data was available for this task.

The data tables considered for this report include the followings:
(1) The counting results from the Beckman liquid scintillation counter for the experiments listed below with Sample ID.

Table 1. Irridiation/cavitation Tests

Total 4 vial samples; Two for Post and Two Pre irradiation/cavitation tests

| Sample ID | Source |
|---|---|
| D-Acetone 7 hr run 9/19/03 | 1Ci Pu-Be |
| D-Acetone 7 hr run 9/24/03 | 1Ci Pu-Be |
| D-Acetone 7 hr run 9/26/03 | 1Ci Pu-Be |
| D-Acetone 7 hr run 10/3/03 | 1Ci Pu-Be |
| D-Acetone 7 hr Run 10/8/03 | 1Ci Pu-Be |
| D-Acetone 7 hr run 10/27/03 | 10 Ci Am-Be |
| D-Acetone 7 hr run 10/31/03 | 10 Ci Am-Be |
| D-Acetone 7 hr run 11/3/03 | 10 Ci Am-Be |
| D-Acetone 7 hr run 11/7/03 | 10 Ci Am-Be |
| D-Acetone 7 hr Run 11/14/03 | 10 Ci Am-Be |
| | |
| N-Acetone 7 hr run 9/18/03 | 1Ci Pu-Be |
| N-Acetone 7 hr run 10/15/03 | 1Ci Pu-Be |
| N-Acetone 7 hr run 10/18/03 | 1Ci Pu-Be |

*The Basic Data:*
The tables present counting data for each set of vials a total of 10 set of counts in CPM each with 10 minutes counting time. The tables include the ultra-gold cocktail counts as well. The table includes the H# for each count both for ultra-gold sample as well as for

the four samples of D-Acetone/N-acetone. The table also includes the masses of the vials plus cocktail and vial plus cocktail plus acetone.

*Analyzed/Calculated Data*

The calculated data include DPM, Poisson and Gaussian standard deviation, average values of CPM and DPM, Poisson and Gaussian standard deviation, mass of the acetone, background subtracted CPM and DPM per unit gm (background corrected CPM and DPM with equation : Mean CPM- 0.8* Mean CPM for cocktail) and their Poisson and Gaussian standard deviations, averaged CPM, DPM per unit gm and Poisson and Gaussian standard deviation.

(**2**) The calculation equations for the mean, Poisson and Gaussian standard deviations, CPM/gm.

(**3**) Table and Graph of the H# vs counter efficiency (%).

(**4**) Data table on D-Acetone mass variation and CPM for the following set of measurements

Table 2. Mass Effects on Counting Tests

| Sample ID | D-Acetone Volume |
|---|---|
| 2-07-04-1 | 0.9 mL |
| 2-07-04-2 | 1.0 mL |
| 2-07-04-3 | 1.1 mL |
| 2-07-04-4 | 1.2 mL |

This table consists of the basic data on CPM for ten sets of counts, H#, Ultagold CPM and mass data on vial plus cocktail, and vial plus cocktail plus acetone. Processed data include DPM, Poisson and Gaussian standard deviations, averaged CPM and DPM and their Poisson and Gaussian standard deviations, mass of the acetone, background corrected CPM and DPM with equation ( Mean CPM- 0.8* Mean CPM for cocktail)

(**5**) Summary table of the Pu-Be irradiation test with D-acetone, all the tests shown in Table 1 and aggregate result of all D-Acetone irradiation/cavitations tests for D-Acetone

## 2. Procedures

*Data Check:*

Each of the above stated data/information was cross checked with the raw data. The copies of the raw data, the print outs from the Beckmann machine, were compared with the tabular data on the excel files. Each data point was verified with Yiban Xu. Some tables were repeat checked for the redundancy and accuracy.

*Calculations Check:*

The basic equations used in the calculation equations of the mean, Poisson and Gaussian standard deviations, mass, CPM and DPM per gm, background subtraction method were checked.

The excel files were checked for the correctness of these equations and were cross checked with a calculator for some calculations results with the excel file results.

**3. Assessment**

The following assessment is arrived having followed the above listed procedure and examination of the data.

(1) The plot of the H# vs the efficiency percent agrees with the data of the calibration of the Beckmann machine. This is used in DPM value calculations.

(2) The data of the tests in Table 1 were all checked and few entry errors were identified. These were corrected by Yiban Xu. Thus the raw data for the tests on Table 1 have been verified and have the numbers corresponding to original machine output raw data.

(3) The calculated/processed data of the CPM, in terms of DPM through H# vs efficiency calibration are correct.

(4) The averaged CPM and DPM per gm values are correct as per calculation method used.

(5) The Poisson and Gaussian standard deviations calculated values are correct as per calculation method used.

(6) The procedure for background subtraction for the CPM and DPM based the following equation ( Mean CPM/DPM- 0.8* Mean CPM/DPM for cocktail) was used and why a factor 0.8 was used was not clear. However as a procedure to calculate based on these equations were correct.

(7) The raw data for the tests in Table 2 were all checked and were verified and have numbers corresponding to the machine output data.

(8) The calculations of the CPM and DPM, Poisson and Gaussian standard deviations for test of Table 2 were verified and are correct as per calculation method used.

(9) The plots of the CPM/gm vs D-acetone mass, (CPM-.8*Bkground)/gm vs D-acetone mass, DPM/gm vs D-acetone mass, and (DPM-.8*Bkground)/gm vs D-acetone mass were verified.

(10) The consolidated table of the Pu-Be irradiation test with D-acetone, all the tests shown in Table 1 and aggregate result of all D-Acetone irradiation/cavitations tests for D-Acetone was checked and some minor entry corrections were identified and the corrected table was examined. The processed data is verified.

(Rusi , I have mailed you my corrections, in file BeckmanPurdue(Final)-Rusi-Rev1.exl to this table, though they are minor, which are shown in red color on the excel files)

**4. Conclusions**

(1) Based on the examination of the data, verification of the data, calculation method and processed data, the data are verified to be correct and agree with the original Beckman machine output.

(2) The controlled D-acetone irradiation alone test results show a net negative CPM and DPM changes with large Poisson and Gaussian errors.

(3) The three controlled N-acetone with irradiation and cavitation show one positive (0.2 CPM, 1.025 DPM) change with large Poisson ( 0.78) and Gaussian ( 1.49) errors, and two negative CPM and DPM changes. The average results for the control N-acetone irradiation and cavitation tests show a net negative change in counts.

(4) All the five D-Acetone irradiation and cavitation tests with 1 Ci source show a net positive change in CPM and DPM. The CPM changes are 3.8 SD and DPM changes are 4.5 SD.

(5) In the D-Acetone irradiation and cavitation tests with 10 Ci source, three out of 5 tests show a net positive DPM changes and four out of 5 net positive CPM changes.

(6) The aggregate results of all D-Acetone irradiation and cavitation tests show that 8 out of 10 test show a net positive DPM change. The CPM change is 2.83 SD and the DPM change is 3.4 SD Gaussian.

(7) *The overall conclusion is that the tests results of D-Acetone irradiation and cavitation give a convincing evidence of net positive DPM change with about 4 SD Gaussian, whereas the N-Acetone irradiation and cavitation tests give a negative DPM change.*

**Appendix 3**

**Email from Taleyarkhan to Tsoukalas (February 12, 2004)**

**Suggesting Removal of Clikeman from the Nuclear Engineering Confirmation Effort**

**Subject:** Update on Beckman Tests(rpt->lefteri,2/12/04)
**From:** "Rusi P. Taleyarkhan" <rusi@ecn.purdue.edu>
**Date:** Thu, 12 Feb 2004 18:02:16 -0500
**To:** tsoukala@ecn.purdue.edu

Dear Lefteri:

Couldn't find you today to talk but thought I would jot some thoughts down.

As agreed upon last week, for attaining final closure to the effort you generously initiated more than a year ago, the testing I promised you on the state-of-the-art Beckman counter is proceeding but is not yet completed.

Upon review of all that has gone around so far, It is now my deep conviction that rather than rely on a retired faculty member- Frank Clikeman to pronounce positions and perform what are never-ending re-analyses, we should rather comprehensively recruit and involve one of our own active and capable professors for independent verification of these new data I have promised to get to the School from my counter. This will create the feeling of ownership and participation among our active faculty, as I/we strive to build a much larger and comprehensive effort in this area.

Along with my ongoing R&D work on sonofusion, per my promise to you I've directed Yiban to deviate time and again to systematically complete the comprehensive testing of samples prepared by Clikeman. I am taking pains to ensure absence of obvious errors prior to dissemination. A lot has been done in terms of calibrations, checks for effects of background,etc.

Shripad has volunteered to in-depth independently review /check each number/formula entry made by Yiban in spreadsheets (with and without background subtraction) for each of the 13 test cases (10 DAcetone, 3 NAcetone). This should be complete early next week after which we'll ensure everyone in the group can critique the raw data tables and results.

Hope we can see you tomorrow before you leave; in any case have a safe and most enjoyable trip to Berlin.

Best, Rusi

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## Appendix 4

Chronology of Events Compiled by Revankar

Made Available in Summer 2007 as Part of Revankar's Allegation of Research Misconduct Against Clikeman, Bertodano, Jevremovic and Tsoukalas

## CHRONOLOGY OF EVENTS Document (DOC-4)

The information in this document outlines key dates and actions related to sonofusion research and STR's participation in the sonofusion research . The information is based entirely on e-mail communications addressed or copied to SFR, memory and related documents and notes.

List of Abbreviations

*For names of person:*

| | | | |
|---|---|---|---|
| AA | Alvin Solomon | JW | Josh Walter |
| AB | Anton Bougaev | KO | Karl Ott |
| ADB | Adam Butt | KV | Karen Vierow |
| CC | Chan Choi | LHT | Lefteri H. Tsoukalas |
| DEM | Dean Edgar Martinez | MB | Martin Bertodano |
| DLJ | Dean Leah Jamieson | MI | Mamoru Ishii |
| DLK | Dean Linda Katehi | RT | Rusi Taleyarkhan |
| EM | Ed Merritt | SD | Sean McDeavitt |
| EV | Emil Venere | STR | Shripad T. Revankar |
| FM | Frank Clikeman | TJ | Tatjana Jevremovic |
| JC | Jim Cavera | XS | Xiadong Sun |
| JN | Jeanne Norberg | YX | Yiban Xu |

*Other Abbreviations*

| | | | |
|---|---|---|---|
| BCM | Beckman Coulter counting machine | ORNL | Oak Ridge National Laboratory |
| INOK | A location away from NAVCO drive where new laboratory was located | PCM | Packard counting machine |
| | | PNG | Pulsed neutron generator |
| NAVCO | A location in NAVCO drive away from Purdue campus | RPI | Rensselaer Polytechnic Institute |
| | | SFR | Sono Fusion Research |
| NE | Nuclear Engineering | SNE | School of Nuclear Engineering |
| NYT | New York Times | | |

| Date, Time | Events Related to SFR | Comments |
|---|---|---|
| April last week 2002 | A meeting was called by LHT to discus possibility of conducting sonofusion experiment. SFR attended this meeting where each was asked to contribute to the conduct of the experiment. CC, ED, FM, JC, JW, LHT, MI, MB, STR, TJ, XS attended this meeting | MB's e-mail of 03 Jun 2002, 09:03:40 in DOC-5 confirms this meeting |
| 03 Jun 2002 09:03:40 | MB sent e-mail to CC, ED, FM, JC, JW, LHT, MI, MB, STR, TJ, XS. The e-mail contains one attachment copy of the design of the chamber from RPI and MB notes | MB was collecting information from RPI as well as from RT. The email of 03 Jun 2002 09:03:40 and attachment are in DOC-5 |
| Week of 06 Jun 2002 | Two meetings were held one with RT to get information and other on SFR planning. I attended the second meeting. In the meeting it is said that MI is in support of this SFR planning and has agreed to lend his high speed camera. JW and AB are defined as "graduate students" to work on experiments with MB as their key supervisor. SFR role in this SFR was to help AB to design cooling system for the chamber. | JW was then officially my Ph.D student. LHT said he will support JW with School budget for which I agreed. |
| 13 Jun 2002 16:02:20 | JC sent e-mail with attachment on the minutes of meeting in previous week and the questioner/answer with RT | The e-mail of 13 Jun 2002 16:02:20 and attachments are in DOC-5 |
| 01 Jul 2002 09:49:38 | EM sent e-mail to SFR asking to review the attached procedures on radioactive material handling. The experiments initially were started in the EE room B-84 and were then moved to basement of Pharmacy building | SFR role was from beginning was either to check existing document/file or help others. The e-mail and attachments are in DOC-5 |
| July 2002-January 2003 | AB and JW were working on experiment primarily supervised by MB. The experiments were unsuccessful, no or sustained cavitation was observed, and chamber breakages occurred . MB was directly contacting RT for help on the experiments. | E-mails by AB and JW on 19 Sep 2002 11:38:27, by MB on 29 Jan 2003 13:48:17 and by RT 29 Jan 2003 15:01:56 in DOC-5 show this. By this time CC was not active in this effort. |
| Feb – May 2003 | Due to unsuccessful experimentation LHT took help of RT and planned for AB and JW visit to ORNL to learn directly from RT lab at ORNL. LHT group planned to receive readymade working chambers form RT/ORNL | Email was forwarded to SFR on 29 May 2003 14:18:55 by LHT. This was courtesy e-mail probably because JW is SFR's student. This email is in DOC-5 |
| June middle 2003 | AB and JW visit the ORNL RT's lab for few days. They return and start experiments. | MB's e-mail of 06 Jun 2003 09:26:49 indicate there are problems with chamber assembly. This email is in DOC-5 |
| September 18, 2003 | AB and JW get successful cavitation experiments with Normal acetone (N-acetone) | |
| September 19, 2003 | AB and JW get successful cavitation experiments with Deuteriated acetone (D-acetone) | |
| September 2003 | One N- acetone test and three D-acetone tests are done in September. FM starts collecting samples for analysis. | SFR does not believe FM attended actual experiments conducted by AB and JW. |
| 29 Sep 2003 | FM sent analysis of 9/26/03 tests and said he is experimenting with data analysis; | FM e-mail of 29 Sep 2003 15:54:47 and the |

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| 15:54:47 | according to FM:<br>Attached is the preliminary analysis of the data from the run of 9/26/03. Because of the large difference in the weights of the one post-processed samples, I am changing the method of averaging the data to use a statistical weighted average. The results are not much different if I had used my previous methode, but I am happier with this method. I want to check my method to make sure I remembered how to do it. There is one other correction that I may also want to make that might have a very small effect. I should have the final results tomorrow."<br>His analysis shows 1.52 net counts with deviations of Gaussian 0.33 and Poisson 0.35. | attachment are in DOC-5. Now at this time everybody is excited that the analysis shows positive count. Some times during August – October 2003 ~~STR~~ signed on the wall of the lab room along with others indicating the sonofusion experiments success. |
| 30 Sep 2003 12:04:54 | MB sent e-mail to LHT indicating the communication between MB and RT and says that : " We ran a third test last Friday. The result was1.5 +- 0.35 cpm. We are getting consistent results. Now we need to increase the cpm a little bit." | MB e-mail of 30 Sep 2003 12:04:54 is in DOC-5 |
| 30 Sep 2003 14:28:05 | FM sent e-mail with data of 9/19/03 and 9/24/03 test with D-acetone. His analysis show net count of 1.12+-0.49 and 0.32+-0.48 for these tests respectively. | FM e-mail of 30 Sep 2003 14:28:05 and attachment are in DOC-5 |
| 06 Oct 2003 11:39:58 | FM sent e-mail with data of 10/3/03 test with D-acetone His analysis show net count of 1.09+-0.40. | FM e-mail of 06 Oct 2003 11:39:58 and attachment are in DOC-5 |
| 09 Oct 2003 09:34:47 | FM sent e-mail with data of 10/8/03 test with D-acetone. His analysis show net count of -0.26+-0.87 | |
| 10 October 2003 | MB said to ~~STR~~ and other that they see some streamers in the test chamber which fail the tests | MB's e-mail to RT of 10 Oct 2003 16:03:14 relate the streamer to impurities. |
| 12 Oct 2003 10:57:12 | MB sent e-mail with attachment on apparatus and procedure. The e-mail is sent to MB, RT, TJ, STR, JCW FM, AB. | MB's e-mail of 12 Oct 2003 10:57:12 is in DOC-5 |
| 12 Oct 2003 17:08:54 | Streamer problems still persist in tests | MB's e-mail to AB and JW of 12 Oct 2003 17:08:54 about streamer and impurities. This email is in DOC-5. |
| 13 Oct 2003 13:57:44 | FM sent e-mail with data of 10/8/03 test with D-acetone. Now his analysis show net count of 0.32+-0.43.The analysis now showed different result than the one sent on 09 Oct 2003 09:34:47 | FM e-mail of 13 Oct 2003 13:57:44 and attachment are in DOC-5. |
| 14 Oct 2003 08:03:54 | LHT sent e-mail to FM and copied to AB, MB, EM, JW, STR, TJ, saying that "Thanks very much. This looks a lot like the second 7-hour run with the 1Ci source (minus the detector drift?) Great work!" | LHT e-mail of 14 Oct 2003 08:03:54 is in DOC-5. |
| 16 Oct 2003 12:48:17 | FM sent e-mail with data of 10/15/03 with analysis for N-acetone test. FM analysis show net count of 0.93+-0.82 | FM e-mail of 16 Oct 2003 12:48:17 and attachment are in DOC-5. |
| 17 Oct 2003 10:11:59 | FM sent e-mail with data of 10/15/03 with analysis for N-acetone test. This time analysis show net count of 0.58+-0.42 for this test. He adds comment: "Attached is the final analysis of the data taken on the run of 10/15/03 with N-acetone. The results for the post-processed acetone is suspect because of the wide variations in the counting | FM e-mail of 17 Oct 2003 10:11:59 and attachment are in DOC-5. |

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| | rate. Chi-squared tests should be made with a miniumum of 10 measurements. In this case we are using 8, but the conventional wisdom would say that the measurement should be repeated." | |
| 17 Oct 2003 10:13:58 | TJ sent e-mail to FM and copied to MB, AB, EM, JW, STR, TJ, LHT and wrote : "from the10Ci n-acetone data and prof clikeman comments, i would suggest that n-actone exp should be run one more time. what is today plan? next week plan, having in mind prof clikeman schedule??" | TJ email of 17 Oct 2003 10:13:58 is in DOC-5. By this time LHT had assigned TJ to manage the test runs with AB and JW. During this period JW said to ~~STR~~ that AB and JW were asked to run tests back to back as dictated by TJ. By this time ~~STR~~ has little to do with the experiments and does not attend sonofusion meetings. |
| 18 Oct 2003 13:54:04 | FM sent e-mail with analysis of data of 10/15/03 with N-acetone test one more time. This time analysis showed net count of 0.27+-0.30. FM added comments: "Attached are the final final results for the n-acetone run of 10/15/03. I counted the samples three more times. As you can see, the net counts are getting closer to zero, and is within one standard deviation (gaussian) of zero. The chi-square tests are a bit better, but due to the first count of the post-processed n-acetone, the spread in data points is still too large to be reallly acceptable" | FM email of 18 Oct 2003 13:54:04 and attachment are in DOC-5 |
| 18 Oct 2003 14:12:12 | LHT sent e-mail to FM and copied to MB, AB, EM, JW, STR, TJ, saying that "Thanks so very much. There are still fairly wide variations in the counting rate largely due to the first count of the post processed sample.This is great work." | LHT e-mail of 18 Oct 2003 14:12:12 is in DOC-5 |
| 20 Oct 2003 14:26:14 | FM sent e-mail with analysis of 10/18/03 N-acetone test. His analysis shows net count of 0.27+-0.29. He adds comments : "Attached are the results of the run the men did on Sat. 10/18/03. The results are again positive, but again within one standard error of zero. This time the Chi-square test looks good. There was a power failure during the count, so I did not get as many cycles as I wanted, but I do not think that it is worth adding more counting runs." | FM e-mail of 20 Oct 2003 14:26:14 and attachment are in DOC-5. |
| 22 Oct 2003 14:52:58 | EM sent e-mail with analysis of data of 10/21/03 D-acetone test. FM analysis showed net count of 0.44+-0.61 for Tritium cts and 0.37+-0.31 for C-14 cts. He adds comments "These D-acetone vials had no processing only the measurement procedure was followed as closely as possible. i.e. new gloves, 4-new (clean unused, massed) vials of Ultima Gold @15-ml ea, 1-new (clean unused) syringe for vial 1,3 and 1-new (clean unused) syringe for vial 2,4 prepared in sequence as normal (1-ml sample), i.e. 1,3, then 2,4, vials shaken in respective order 1,3,2,4, massed as usual, counted with protocol number 19 (Dr. Clikeman's tower), counting order 1,2,3,4. Note: Both tritium and C-14 data were entered into the existing spread sheet (Dr. Clikeman's). As an aside the tSIE varied from 442 to 451 (is this 2.04%?). i.e. run-1: 442, 448, 448, 444; run-2 446, 450, 450, 446; run-3 448, 451, 450, 447; but the tSIE | Now EM had carried out the analysis in place of FM. EM e-mail of 22 Oct 2003 14:52:58 and attachments are in DOC-5 |

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| | for the BG vial was 573, 577, & 578 (0.873%?); for the 'standard' vial it was 526, 526, & 525 (0.190%). The tSIE is related to 'quenching' or possibly gas (oxygen) in the sample vials. 'Quenching' is reduced ability for the system to count the cocktail. As I understand it the computer counting system does not use tSIE during the calculation of cpm. But it may tell us why the cpm is changing. | |
| 28 Oct 2003 17:00:13 | JW sent e-mail and data analysis of 10/27/03 D-acetone test addressed to LHT, TJ, STR, EM, MB. JW analysis shows net Tritium counts of 1.65+-0.97 | Now JW has carried out the analysis. FM was not sent copy of this e-mail. JW e-mail of 28 Oct 2003 17:00:13 and attachment are in DOC-5 |
| 29 Oct 2003 08:38:59 | EM sent e-mail for data analysis of 10/27/03 D-acetone test. This time EM analysis shows net Tritium counts of 0.74+-0.80 | EM e-mail of 29 Oct 2003 08:38:59 is in DOC-5 |
| 31 Oct 2003 13:51:21 | EM sent e-mail about data analysis of 10/27/03 D-acetone test with more counting done on 10/28/03 and 10/29/03. This time EM analysis shows net Tritium counts of -0.17+-0.67 | EM e-mail of 31 Oct 2003 13:51:21 is in DOC-5 |
| 31 Oct 2003 14:12:53 | MB sent e-mail with a figure attached indicating that the count rates are decreasing for the same test. MB adds comment: "The attached figure shows how the counts changed from day to day. It doesn't look very random." | MB e-mail of 31 Oct 2003 14:12:53 and attachment are in DOC-5 |
| 03 Nov 2003 14:04:28 | FM sent e-mail and data analysis of test 10/31/03 D-acetone test. FM analysis showed net counts of -0.63+-0.48. FM adds comment: "There may still be one more count to add to the data, but it should not affect the results very much. As you can see, the results are negative, but just outside one Std. Dev." | FM e-mail of 03 Nov 2003 14:04:28 and attachment are in DOC-5 |
| 04 Nov 2003 10:57:41 | FM sent e-mail and data analysis of test 11/3/03 D-acetone test. FM analysis shows net counts of 2.58+-0.31. | FM e-mail of 04 Nov 2003 10:57:41 and attachment are in DOC-5 |
| 05 Nov 2003 13:32:57 | FM sent e-mail and data analysis of test 11/3/03 D-acetone test second time. FM analysis this time showed net counts of 2.90+-0.45. | FM e-mail of 05 Nov 2003 13:32:57 and attachment are in DOC-5 |
| 06 Nov 2003 12:42:59 | FM sent e-mail and data analysis of test 11/3/03 D-acetone test for third time. FM analysis this time showed net counts of 2.65+-0.47. | FM e-mail of 06 Nov 2003 12:42:59 and attachment are in DOC-5 |
| 10 Nov 2003 14:07:56 | FM sent e-mail of run 11/7/03. According to FM this run used mixed D-acetone from runs the runs of 10/31/03 and 11/3/03. FM data analysis of this mixed sample shows net counts of 0.50+-0.54. FM commented: "The run used the mixed D-acetone from the runs of 10/31 and 11/3. As you can see, the results are positive, but the chi-squared test of the post-processed counting indicates that the data are bad. There was too much drift in the counting system during the run. The results for the preprocessed data are ok, but also leans toward too much drift. A chi-square test of the standard indicates that the results are ok but very marginal." | FM e-mail of 10 Nov 2003 14:07:56 and attachment are in DOC-5 |
| 17 Nov 2003 14:31:30 | FM sent e-mail and data analysis of test 11/14/03 D-acetone test. FM analysis showed net counts of 1.11+-0.50. | FM e-mail of 17 Nov 2003 14:31:30 and attachment are in DOC-5 |
| 21 Nov 2003 | FM sent e-mail and data analysis of test 10/27/03 D-acetone test. This time FM | FM e-mail of 21 Nov 2003 14:52:11 and |

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| 14:52:11 | analysis showed net counts of -0.39+-0.65. | attachment are in DOC-5. |
| 5 Dec 2003 00:02:13 | YX sent e-mail to RT and copied MB and STR about the NAVCO facility where RT will have space for experiments | By this time YX has joined as post-doctoral researcher And in fall 2003 RT has joined as faculty. ~~STR~~ was asked by LHT to help MB who was helping RT with YX to set up his lab. A NAVCO facility was considered new lab space for RT. YX mail of 5 Dec 2003 00:02:13 and attachment are in DOC-5 |
| 5 Dec 2003 19:27:28 | JW sent e-mail to MB about mass spectrometer analysis of the acetone. | There were problems with sealant used in test chamber contaminating the test fluid. JW e-mail of 5 Dec 2003 19:27:28 is in DOC-5 |
| 09 Dec 2003 11:54:57 | MB sent e-mail to YX copied to STR, RT, LHT about permission request to REM to use radiation source at NAVCO location. | YX was working on preparing permission request to move and use radiation sources at new location. ~~STR~~ checked YX written procedures as ~~STR~~ was asked by LHT to help. FM was not sent this e-mail. MB e-mail of 09 Dec 2003 11:54:57 is in DOC-5 |
| 09 Dec 2003 18:53:17 | MB sent e-mail to RT and copied to STR, YX, LHT, JW, AB about the arrival of PNG. | PNG was shipped from ORNL Again FM was not sent this e-mail. FM was not happy that he was not consulted in this activity which FM once expressed to ~~STR~~ during the second week of December 2003. MB e-mail of 09 Dec 2003 11:54:57 is in DOC-5 |
| 10 Dec 2003 16:49:37 | RT sent e-mail to JW, AB, YX, MB, STR and copied to LHT and said that plans to move BC counter are underway. | RT e-mail of 10 Dec 2003 16:49:37 is in DOC-5 |
| 10 Dec 2003 17:10:10 | MB sent e-mail to RT and copied to JW, AB, YX, STR, LHT about coordinating receiving BC counter | MB e-mail of 10 Dec 2003 17:10:1 is in DOC-5 |
| 17 Dec 2003 17:08:14 | MB sent e-mail to STR, RT, YX, TJ, JW, Ab, FM about his presentation of FM analyzed data | During this week FM was very unhappy with RT for reason not known to ~~STR~~ and expressed it in one meeting attended by ~~STR~~. MB e-mail of 17 Dec 2003 17:08:14 is in DOC-5. |
| 19 Dec 2003 12:02:53 | FM sent e-mail to AB, EM, FM, JW, MB, RT, STR, TJ, LHT about FM analysis on CPM and DPM. FM commented: "I will stand by my original comparison of cpm vs. dpm results. Attached is the spreadsheet. When Rusi tried to redo the calculations, he did not factor in the fact that by adding D-acetone to the cocktails, I also was adding tritium that was in the acetone which increaseed the counts and the DPM. Because the | There seemed a dispute between FM and RT. FM disagreed with RT on the method of data analysis in the previous few weeks. ~~STR~~ did not know this at that time until this e-mail. The attachment file shows incorrect |

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| | DPM data that I used also had background in it, I had to subtract 15 DPM per sample to correct the total DPM." | dates for the tests Dates shown are for 2002 year. FM e-mail of 19 Dec 2003 12:02:53 and attachment is in DOC-5 |
| 19 Dec 2003 14:29:45 | FM sent e-mail follow up e-mail where FM acknowledges mistakes in data sheet. He adds comment; " Mistake!! I realized that I should have subtracted the tritium from the D-A samples rather than add it. The corrected data sheet is attached and the ratio of the DPM data looks very good." | FM e-mail of 19 Dec 2003 14:29:45 is in DOC-5. STR could not find the attachment for records. |
| 14 Jan 2004 14:01:10 | TJ sent e-mail with an attachment on the sonofusion paper. In e-mail TJ said: " here is the sonofusion paper that need a lot of work still. please start filling in as suggested and email me back not later than January 18th. after that we will have some more iterations i am sure. we would like to speed up and be able to submit the paper sometime in february." The order of authorship on the draft is AB, JW, TJ, MB, FM, EM, STR, LHT. | The paper claimed: "The results point to statistically observable tritium increases in post-cavitation deuterated acetone samples, suggesting the possibility of D-D fusion taking place. Samples of normal acetone and deuterated acetone not subjected to cavitation do not show statistically observable changes in tritium". TJ e-mail of 14 Jan 2004 14:01:10 and attachment are in DOC-5 |
| 15 Jan 2004 15:51:20 | RT sent e-mail to LHT, STR, TJ, MB FM about RT's analysis of the raw data files taken from FM. RT e-mail said: " I took the raw cpm data files that Frank Clikeman had prepared and re-analyzed the numbers neglecting the additional cocktail vial based background subtraction of the averaged counts (which amounted to double counting and an increase of the error estimates). The attached Excel file shows the summary of the data for each of the various cases.<br>Neglecting the first run data taken on 8/27/03 (which was taken with a different chamber) the results are as follows:<br>Average CPM/g increase = 0.96<br>Std. Deviation (Poisson) = ~0.13<br>Std. Deviation (Gaussian) = ~0.13<br>The results indicate a ~7.6 Sigma change(increase) with cavitation on." | RT e-mail of 15 Jan 2004 15:51:20 and attachments are in DOC-5 |
| 16 Jan 2004 13:02:33 and 13:09:13 | JW sent two e-mails on the CPM data sheet for no run Isotek D-acetone test of 12/19/2003 to TJ and copied to LHT, AB, MB, STR, FM, EM. The net counts for these no run D-acetone test is -1.20+-0.42 | Here JW is directly reporting to TJ. JW e-mails of 16 Jan 2004 and attachments are in DOC-5. |
| 16 Jan 2004 14:15:30 | MB sent e-mail copied to FM, TJ, LHT, JW, AB, STR and attached three excel spreadsheets on data summery of counting done in ORNL and Purdue. (1) ORNL counted analysis showed dpm aggregate counts for 7 sets of D-acetone test w/o background subtraction 1.7+-0.44, with background subtraction 1.32+-0.44. The N-acetone dpm counts showed 1.04+0.38. (2) The Purdue PM counted analysis showed dpm aggregate for ten sets of D-acetone tests w/o background subtraction 1.59+-0.39, | By this time there is debate on if one should substrate background count from raw data. By this ~~STR~~ is not participating in the project much. During this period there is another analysis and another set of results. MB e-mail of 16 Jan 2004 14:15:30 and |

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| | with background subtraction 1.04+-0.38. The N-acetone dpm counts showed 1.04+0.38. (3) for a run 10/08/03 D-acetone test counted at Purdue PM showed dpm of 1.18+-1.51 | attachments are in DOC-5 |
| 29 Jan 2004 15:44:48 | RT send e-mail to LHT, TJ, JW, STR, MB, FM, YX about the counting done on BCM by YX using samples given to RT by FM. The counting and analysis showed difference in post and -pre process dpm (1) 9/19/03 D-acetone test = 4.60. (2) 9/26/03 D-acetone test = 2.30, (3) 10/27/03 D-acetone test = 0.97, (4) 9/18/03 N-acetone test =0.19. | RT e-mail of 29 Jan 2004 15:44:48 and attachments are in DOC-5 |
| 06 Feb 2004 14:45:49 | FM sent e-mail to EM, MB, AB, JW, RT, STR, TJ, LHT on summary of counting by PCM. FM summary showed net dpm for 11 runs with 10 sets of tests D-acetone test = 0.85+-0.36. The dpm for three sets of N-acetone tests = 0.71+-0.36. No run N-acetone and D-acetone respectively showed cpm of -0.05+0.4 and -1.2+-0.42 | During this week LHT talked to STR about the problems that two different results from PCM and BCM. LHT said LHT trusted BCM data rather than PCM data. LHT told STR to check YX data analysis and talk to RT about data checking with YX. During this period FM makes it very clear that he does not agree with Beckman data. FM e-mail of 06 Feb 2004 14:45:49 and attachments are in DOC-5 |
| 13 Feb 2004 and 14 Feb 2004 | STR had two meetings with YX and checked his BCM data in excel file and printouts from the BCM | The details of these meetings and data examination process are given in DATA EXAMINATION document DOC-6 |
| 19 Feb 2004 17:03:55 | FM sent e-mail to STR and MB. Here two files were attached. One giving comparison between cpm counts from PCM and cpm counts from BCM. FM's data comparison showed average net cpm of 0.60+-0.14 for PCM data and 1.11+-0.36 for BCM | FM e-mail of 19 Feb 2004 17:03:55 and attachments are in DOC-5 |
| 21 Feb 2004 | STR met RT and talked about the checking BCM data with YX and said STR has prepared a report on the meetings with YX on 13 and 14 Feb 2004. | This meeting is referred in e-mail by STR to RT on 2/21/2003 09:58 PM which is in DOC-5 |
| 21 Feb 2004 09:58 PM | STR sent e-mail to RT summarizing BCM data examination with YX measurement in an internal memo and minor data entry correction in two excel files. The internal memo described the basic raw data used, analyzed/calculated data, assessment and conclusions. | During this week the printed copy of the report was given to LHT. Following week LHT asks STR to meet with FM and discuss BCM data. STR e-mail of 21 Feb 2004 09:58 PM and attachments are in DOC-5 |
| 28 Feb 2004 | STR had meeting with YX and checked additional BCM data. | The details of these meetings and data examination process are given in DATA EXAMINATION document DOC-6 |
| 01 Mar 2004 20:00:09 | RT sent e-mail to LHT, TJ, STR, FM, JW, YX. In this e-mail YX report to RT was attached. RT commented on the YX report: "Main conclusions are: 1) Negative/null results with irradiation alone of D-Acetone (both 7h and 63h tests showed negative | The e-mail from RT did not include MB. In this e-mail RT mentioned about impending STR meeting with FM. During this week |

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| | results). 2) Negative/null results with irradiation-induced cavitation of N-Acetone (3 or 4 showed negative results; the one showing an increase is well within 1 SD). 3) About 4 to 5 SD positive/increase for irradiation-induced cavitation of D-Acetone. The tests with 1Ci source are all positive; those with 10Ci are mixed in performance." | FM asked STR about the efficiency vs H# data for BCM. The RT email and attachments are in DOC-5. RT email 01 of Mar 2004 20:00:09 and attachments are in DOC-5 |
| 04 Mar 2004 10:02:04 | MB sent e-mail to FM, TJ, STR, JW, YX about the news in New York Times about a paper by RT associates from RPI and ORNL | Clearly by this time there was dispute to agree with YX data from BCM. MB talked privately to STR that MB role being diminished in the data assessment. MB said that to STR that he would trust NY Times news than the FM analysis or YX data on Beckman. MB e-mail of 04 Mar 2004 10:02:04 is in DOC-5 |
| 6 Mar 2004 14:16:11 | RT sent e-mail to STR giving information to the BCM calibration curve. This was in response to STR e-mail to RT on 5 Mar 2004 requesting details on the how a BCM calibration curve was obtained. | During this week LHT had asked STR to talk to FM and convince FM to compromise between two measurement results one from PCM data analyzed mainly by FM and by EM and JW. By this time MB, TJ, EM, FM, JW, AB were supportive of FM's decision. There was also talk about RT not liked by MI. FM said that RT would have hard time working at Purdue if RT opposes FM view. RT e-mail of 6 Mar 2004 14:16:11 is in DOC-5 |
| 9 Mar 2004 | STR had meting with FM. STR showed all the BCM data given by YX and the checking process. | FM agreed on the checking process and did not dispute the raw data. FM mentioned that the FM does not agree with the BCM calibration and not deducting background count. FM did not agree with BCM data in general. |
| 12 Mar 2004 | A meeting was held attended by FM, STR and MB. In the meeting FM said that he does not like BCM data. MB was supporting FM point of view in this meeting. | This was indication of some serious disagreement between two camps on one side FM, MB, TJ, JW, EM, AB, and another side RT and BCM data. LHT at this point seemed neutral as was STR. |
| 16 Mar 2004 14:29:25 | LHT sent e-mail to STR after hearing from STR that there was problem in the meeting with FM, and MB that no compromise solution expected by LHT was accomplished. | During this week STR gave LHT a copy of report: Analysis of Tritium Measurement with Beckman LS6500 Machine. Copy of |

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| | | the report and LHT e-mail of 16 Mar 2004 14:29:25 are attached in DOC-5 |
| 5 May 2004 18:25:47 | FM sent email to MB, AB, STR, TJ, LHT, JW with summary of PCM recounted data and BCM data attachment Now FM showed the average of dpm net count from (1) BCM 1.3+-0.8 for D-acetone tests and -1.0+-1.0 for N-acetone tests. (2)PCM -1.42+-0.78 for D-acetone tests and -.30+-0.75for N-acetone tests. | By this time test samples were in the lab for last 6-8 months. STR expressed his concern to LHT that FM, MB, TJ, JW, EM, AB have dismissed BCM data. LHT talked seriously to STR that BCM data would be used in the sonofusion paper and STR should help in finding way to break the deadlock between two camps. FM email of 5 May 2004 18:25:47 is in DOC-5 |
| 18 May 2004 17:30:40 | RT sent e-mail to STR for meeting and referred to communication between LHT and RT where STR name was mentioned by LHT, where LHT email quoted: " I have had extensive discussions with Shripad (please talk with him when you have a chance). We are all on the same side and I am confident that Frank will be on our side as well.<br>I agree with the suggestions. Please talk with Frank about the suggested course of action and all will go very well. (In essence, we are now going to the point where the initial Packard measurements have to be ignored as coming from an inferior instrument - a position that was anathema to Frank until the ultima gold calibrations in the Beckman a week ago or so.)<br>Not an expert in the machines, but I know about measurements, and just by looking at uncertainties and signs, had a lot more confidence at the Beckman machine than the Packard from the beginning. Also, it appears that the Beckman machine is better calibrated at the low cpm measurement end.<br>Prof VanValkenburg, my late advisor at Illinois, and a pioneer in systems theory used to say something to the effect that "only half the job [of a Professor] is to educate his students; the other half is to educate his colleagues."" | LHT had meeting with STR and LHT said to STR that PCM data would be ignored and LHT would not trust PCM data. STR said STR would not differentiate between both measurement and expressed view that both PCM and BCM data should be presented to outside reviewers. RT email of 16 Jun 2004 21:55:49 is in DOC-5 |
| 16 Jun 2004 21:55:49 | FM sent email to MB, AB, STR, TJ, LHT, JW with summary of PCM recounted data and BCM data attachment. Now FM showed the average of dpm net count from (1) BCM 1.33+-0.8 for D-acetone tests and -1.03+-1.0 for N-acetone tests. (2)PCM 0.40+-0.47 for D-acetone tests and 0.07+1.30 for N-acetone tests. | The PCM data analysis again changed from previous measurements. STR noted that the e-mail was sent at 11:55PM. FM email of 16 Jun 2004 21:55:49 is in DOC-5 |
| 01 Jul 2004 14:37:11 | MB sent e-mail to YX, LHT, FM, TJ, STR, AB, EM. MB indicated in the email that LHT had asked MB to submit abstract to NURETH-11 and attached conference abstract.. the abstract said: "Samples from pre-cavitation and post-cavitation deuterated acetone were measured for tritium content with a Packard and a Beckman scintillation detectors. The experiments were performed using isotropic neutron sources for initiating cavitation in properly degassed deuterated acetone. The results with the Beckman detector point to statistically observable tritium increases in post- | The abstract had author list in order: AB, JW, YX, TJ, MB, FM, EM, STR, LHT. STR was surprised that with still dispute on BCM data, the abstract indicated emphasis on BCM data. MB email of 01 Jul 2004 14:37:11 and the abstract attachment are in DOC-5 |

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| | cavitation deuterated acetone samples, suggesting the possibility of D-D fusion taking place. Samples of normal acetone and deuterated acetone not subjected to cavitation do not show statistically observable changes in tritium" | |
| 02 Jul 2004 09:41:35 | MB sent e-mail to YX, LHT, FM, TJ, STR, AB, EM indicating there would be a meeting that afternoon. | Until now MB was quite, after the abstract planning MB was suddenly interested. MB email of 02 Jul 2004 09:41:35 and the abstract attachment are in DOC-5 |
| 02 Jul 2004 10:54:29 | MB sent e-mail to YX and copied to LHT, FM, TJ, JW, STR, AB, EM. Revised abstract for the NURETH-11 conference was attached. This was response to YX e-mail sent to MB. YX wrote to MB: "Thanks for including my name in your abstract. I have a question regarding the Packard and Beckman machines. We may need to address why we just conclude only the Beckman gives the observable results. People may ask how about the Packard's results and whether the results of normal acetone and d-acetone without cavitation also come from the Beckman." To this MB replied: "At present we do not know why the Beckman gives a positive result (hopefully!) and the Packard gives a negative result. We are just reporting the results, though I agree that somebody should investigate why there is a difference. I have corrected the abstract to clarify that the results of normal acetone and d-acetone without cavitation come from both the Beckman and the Packard." | Now it seemed YX BCM data was indispensable where as FM data were attached with little value by the same group who had previously agreed with only FM PCM data. The revised abstract and the MB e-mail of 02 Jul 2004 10:54:29 are in DOC-5 |
| 2 Jul 2004 14:52:11 | FM sent e-mail to YX, LHT, TJ, JW, STR, AB, EM with revision on the abstract. and wrote " My version of the abstract" The abstract said "While some of the preliminary results with the Beckman system indicate a statistically **observable** tritium increase in the post-cavitation deuterated acetone samples, suggesting the possibility of D-D fusion taking place other results show the increase to be within one standard deviation of zero. The measurements of samples of both normal acetone and deuterated acetone not subjected to cavitation do not show any statistically **observable** changes in the tritium content of the samples." | The revised abstract and the FM e-mail of 02 Jul 2004 14:52:11 are in DOC-5 |
| 03 Jul 2004 15:29:59 | MB sent e-mail with next revised abstract for NURETH-11 conference to YX, LHT, FM, TJ, JW, STR, AB, EM. | The abstract was essential same as previous FM modified version. MB email of 03 Jul 2004 15:29:59 and the abstract attachment are in DOC-5 |
| 03 Jul 2004 15:58:24 | LHT sent e-mail to YX, FM, TJ, JW, STR, AB, EM saying the abstract should be sent to NURETH-11 | LHT e-mail of 03 Jul 2004 15:58:24 is in DOC-5 |
| 22 Oct 2004 14:16:56 | MB sent e-mail to LHT and copied to TJ, FM, AB, JW, STR YX. In the mail MB said TJ, AB and FM attended a meeting and FM made objections to new data. | STR did not know what the new data were and the purpose of the new data. When STR asked about this to MB, MB told STR that there were serious opinion difference between RT and the group (MB, FM, TJ, |

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| | | AB, JW, MB, LHT). Apparently LHT by now was supporting FM's view. I also heard LHT and RT not in good terms. ~~STR~~ was no where in this conflict. MB e-mail of 22 Oct 2004 14:16:56 is in DOC-5. |
| 6 Dec 2004 18:19:54 | JW sent email to LHT and copied to TJ, FM, AB, JW, STR, YX, MB. JW attached draft paper for NURETH-11. There was no mention of BCM data in the paper. The author order in paper : LHT, JW, AB, TJ, MB, FM, STR, EM, YX. The abstract in the paper then read: "Measurements of tritium produced in controlled experiments to investigate nuclear reactions during acoustic cavitation of deuterated acetone have been reported by Taleyarkhan, et. al., in Science, March 2002. Experiments to reproduce some of the results reported by Taleyarkhan have been performed at Purdue University. The experiments were made using isotopic neutron sources for initiating cavitation in degassed deuterated and normal acetone. Samples from pre-cavitation and post-cavitation acetone were measured for tritium content with a Perkin Elmer/Packard 1900 Tri-Carb Liquid Scintillation Counter. Results show changes of tritium content to be within one standard deviation of zero. Measurements of samples of normal acetone and deuterated acetone not subjected to cavitation do not show statistically observable changes in tritium. It was observed that slight variations of acetone mass in scintillation cocktails can lead to significant deviations in tritium counts." | The paper was surprise to ~~STR~~ as the abstract had changed and did not contain any of BCM processed data. Apparently MB, FM, TJ, EM, AB, JW, MB, LHT had worked as a group and planned the paper content. By this time STR was very busy with other newly funded research projects. By July JW had started to work directly with STR on fuel cell research. STR had made policy that even though JW was STR student he did not ask JW's involvement in sonofusion. JW email of 6 Dec 2004 18:19:54 and draft paper attchemnt are in DOC-5 |
| 18 Dec 2004 11:17:57 | MB sent e-mail to YX, LHT, FM, TJ, STR, AB, EM saying that MB, FM and JW were meeting on 20 Dec 2004 to discuss about paper and others can join. | STR asked MB about sudden plan change on data. MB said "we have a plan." STR could not understand what MB meant. MB email of 18 Dec 2004 11:17:57 is in DOC-5 |
| 20 Dec 2004 11:45 AM | STR sent e-mail to LHT and wrote: "I have seen the draft paper. Apparently the data analysis from the BeckmanLS6500 machine is not presented in this paper. Just to recall that I had spent week or two on checking the Beckman data with Dr. Yiban and the I had meeting with Professor Clikeman. Dr. Clikeman had gone through the data with me. I have attached the pertaining data and my report on this work. **His main objection was that the background count should be accounted in the Beckman data analysis.** So there was disagreement on this issue. Now the paper does not give this data at all. I feel concerned about this and I think this data should be included in this paper and let the reviewers make the judgement in the validity of the data analysis and conclusions made thereafter. I will be attending todays meeting and will bring this matter. However should the majority decide not to include the Beckman data in this paper I like to talk to you further on this." | STR email of 20 Dec 2004 11:45 AM and the report prepared Feb 22 2004 are in DOC-5 |
| 20 Dec 2004 1:30 PM | ~~STR~~ attended the meeting. Discussion is one sided with FM criticizing BCM processed data and FM threatens that he would not allow the paper for publication if BCM data is included. A vote is taken. STR voted for inclusion of BCM data along with PCM | ~~STR~~ felt too naive in this meeting. Apparently it was planned to have vote and other than STR had made their plans. |

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| | data. Rest in the meeting voted immediately against the proposal. | |
| 22 Dec 2004 14:03:22 | TJ sent e-mail with another revised version of the draft paper for NURETH-11. This time YX name was missing from the paper. The abstract was changed in tone and three sentences were added in the draft about BCM data . | The TJ email and copy of revised draft paper for NURETH-11 are in DOC-5 |
| 22 Dec 2004 18:33:38 | MB sent email to STR. The email was copied to LHT and TJ only. This was in response to STR email to LHT. STR wrote to LHT: This follows my previous e-mail about my concern on non-reporting Beckman data for the paper. In the last Monday meeting all the members except me agreed that Beckman data analysis should not be included. For this project I primarily worked on verifying and checking the Beckman data analysis. My real contribution is almost null to the current paper. In light of this I like take out my name from the paper's author list. If there is an opportunity to present the Beckman data I will be glad to contribute. MB replied to STR: "As far as I know the Beckman data is in the latest draft of the paper. Right now there are three votes against it: Josh, Bougaev and Clikeman and three votes in favor: yours, mine and Jevremovic's. Dr. Tsoukalas has the deciding vote." | ~~Apparently MB and others were playing game on STR innocence. The latest draft STR has not seen yet and STR did not believe MB~~. TJ had sent email with a draft at 14:03:22 on same day. The e-mail was sent to STR, LHT and TJ. Now MB claims TJ and MB voted for inclusion in the meeting which is a straight untruth! Now STR was worried that MB lies and could be dangerous to work with. MB e-mail of 22 Dec 2004 18:33:38 is in DOC-5 |
| 23 Dec 2004 10:03:05 | LHT sent e-mail to MB and copied to TJ and STR. LHT wrote to MB : "The more information the better. Let's have the Beckman data in (with the right qualification/description)." | This indicated that MB and LHT are together in this planning. LHT email of 23 Dec 2004 10:03:05 is in DOC-5 |
| 23 Dec 2004 11:31:18 | LHT sent e-mail to STR and copied to TJ. LHT wrote: "The Beckman data will be included (with appropriate explanation)." | LHT email of 23 Dec 2004 11:31:18 is in DOC-5 |
| 23 December 2004 | ~~STR asked MB about the revised version of the paper~~. MB gave copy of the printed colored draft copy. This version is slight different than the one sent by TJ at 22 Dec 2004 14:03:22 . MB said the BCM data would be included. | The copy of the colored draft paper is in DOC-5 |
| 14 Jan 2005 11:00:36 | MB sent e-mail copied to LHT, FM, TJ, JW, STR, AB, EM. Part of the e-mail is addressed to NURETH-11 Technical Chair. MB wrote : "As decided at the meeting, we will not submit the paper to NURETH-11. Please review the following statement to the meeting Program Chair.<br>Dear Dr. Lemonnier,<br>We have decided not to submit the paper # 455. We would also like to withdraw the abstract that we already submitted from the web-page, if possible." | ~~Another surprise to STR~~. When STR asked MB, MB did not tell anything to STR. But warned STR that he should not work with RT. Now it made sense to STR. During one meeting in May 2004 with MI, MI had basically said same thing to STR. MI had said STR should work only with PUMA project and with MI, And it would be good for STR otherwise there would be problem with STR promotion. |
| Week of 17 Jan 2005 | YX contacted STR saying that YX would like to submit an abstract on sonofusion to NURETH-11 and if STR is interested in submitting the paper at NURETH-11. YX said that ADB and YX are working on hydrodynamics of bubble cavitation. YX said the paper would contain these data and sonofusion test data which are different from the one related to runs carried by LHT group. Since YX and ADB have visa problem both | |

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| | may not be able to travel to France. STR was cautious and does not agree immediately to the proposal. Moreover the deadline for submission of abstract for NURETH-11 was in July 2004. | |
| Week of 24 Jan 2005 | YX called back STR on the planning to submit abstract. STR offered that STR can present paper for YX. However, YX suggested that it would good if STR presented the paper as a co-author at NURETH-11. STR agreeed with condition that STR would examine and check the sonofusion data and if not satisfied would not participate. YX agreed to discuss the new sonofusion data set with STR. STR set the date of meeting with YX for data evaluation on 28 Jan 2005. | In an unrelated e-mail communication between RT and STR, STR's meeting with YX on Jan 28 2005 is mentioned in the email of RT to STR on 28 Jan 2005 10:56:10. The copy of this e-mail is in DOC-5 |
| 28 Jan 2005 | STR and YX met at INOK building. STR checks data sheet with YX. The data were made sure that these were new data taken by YX different from the test samples run by JW and AB for LHT group | |
| 30 Jan 2005 | STR and YX meet second time at INOK building to check data. STR completed cheking the data with YX and STR agreed that the raw data were processed similar to the methods employed in the previous data check during Feb 2004. STR and YX sign a summary sheet of the data checked. The summary sheet contained data of tests conducted on 3/10/2004, 3/08/2004, 3/07/2004, 2/26/2004 for D-acetones and 2/10/2004, 2/05/2004, 1/25/2004 for N-Acetone tests and irradiations tests data of 2/12/04 and 10/7/2004. | Copy of the signed data sheet is in DOC-6 |
| Week of 7 Feb 2005 | YX asked STR to help contact NURETH-11 Technical Chair as the deadline was already passed. STR personally knew NURETH TECH Chair HL. STR had submitted two other papers and was organizing and chairing a session at NURETH-11. | |
| 14 Feb 2005 | STR sent e-mail to NURETH-11 TECH Chair HL. STR wrote : " We have some interesting results on sonofusion and its hydrodynamic experiment. The work was carried out by Dr. Yiban Xu who is post-doc fellow with Prof. Taleyarkhan. I have done data verification with this paper with Dr. Xu. Dr. Xu intend to submit this paper for NURETH11. Since Dr. Xu can not come to France due to Visa issues he has asked me to present paper in case it is accepted for presentation. I was wondering if it is late now to submit the paper. Please let me or Dr. Xu know about this. Dr. Xu e-mail is yiban@ecn.purdue.edu. To this HL replied : "Thank you for your mail of February 14, We do need papers on sonfusion. Before I can do anything, please apply for an abstract normally (http:\\nureth11.com\Abstract.htm) : write an abstract on the dedicated template and fill in the information file with three suggested referees. Then send the full-length paper to me asap. I am looking forward to reading all this." | HL email e-mail of 14 Feb 2005 18:08:07 in DOC-5 |
| 15 Feb 2005 18:36:20 | YX sent e-mail to STR with a draft of paper written by YX and ADB. and wrote: "Please check out the draft paper for NURETH11.Please let me know if you have any comments and suggestions. I already submitted the abstract and abstract information to NURETH11 by email today. Please send them to Dr. Lemonnier if you think of that is | YX e-mail copy and attachment copy of paper is in DOC-5 |

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| | appropriate." | |
| 17 Feb 2005 17:06:31 | STR received e-mail from NURETH-11 Tech chair HL informing of YX abstract acceptance. | HL email of 17 Feb 2005 17:06:31 is in DOC-5 |
| 21 Feb 2005 13:42:37 | YX sent email to STR to check if the draft paper was received. | YX email of 21 Feb 2005 13:42:37 is in DOC-5 |
| 21 Feb 2005 2:21 PM | STR replied to YX indicating he was on travel and would check the paper later. STR meets with YX during next months and gives input to the draft paper. YX handled paper review and final paper submission with ADBs help. | STR email of 21 Feb 2005 2:21 PM is in DOC-5 |
| 3rd week Feb 2005 | MB asked STR if STR had submitted another abstract to NURETH-11. STR replied that YX has submitted one and some of the data for the paper were checked by STR in Jan 2004. MB seemed very unhappy about STR participating in NURETH-11. | |
| 10 Mar 2005 11:26:44 | HL sent e-mail to STR asking about LHT paper. HL wrote Dear Shripad, Could you help me contacting Dr. Tsoukalas I did not succeed in reaching by e-mail or phone. I am wondering wether he still intend to submit a paper on sonofusion as promised. I received your joint paper with Yiban Xu who confirmed me this was a different paper than that promised by Dr. Tsoukalas. I thank you very for your help." STR did not send reply to HL. HL called STR from France the following week. STR told HL LHT email and phone number. | HL e-mail of 10 Mar 2005 11:26:44 is in DOC-5 |
| 14 Jun 2005 09:45:07 | YX sent e-mail to STR with final accepted copy of the paper for NURETH-11 | YX e-mail of 14 Jun 2005 09:45:07 and attachment are in DOC-5 |
| June –July 2005 | MI met STR and said to STR that head of the School meaning LHT has lot of power. If STR has anything to do with sonofusion research he (STR) would be highly penalized. | |
| July –August 2005 | During the end of July LHT met STR in STR office. During this meeting LHT spent 40 minutes criticizing RT sonofusion work and said there may be fraud in RT work. | |
| August –Sept 2005 | During this period STR learned that LHT, MI and CC were unhappy about STR participation in another sonofusion paper. This was concern for STR as STR was said to be considered for promotion. | |
| 7 Sep 2005 12:45:22 | EV sent e-mail to STR and asked about paper presentation at France and takes interest in STR and AA wrote paper on composite fuel to produce news article. EV met STR on 13 Sep 2005. When asked about sonofusion paper STR told EV to contact YX and ADB as YX and ADB were the right people. The news article on compiste fuel was featured in several news media. Later after Sept 20 EV called STR and told there was problem in sending the sonofusion paper as news. EV mentioned that LHT was opposing the publication. Given these circumstances STR said he could not help EV more on this and STR would not like to talk to media or news about that sonofusion paper. | EV email of 7 Sep 2005 12:45:22 is in DOC-5<br>EV mail of 29 Sep 2005 is in DOC-5 |
| 29 Sep 2005 | YX sent email to STR with power point presentation material about the NURETH-11 | YX e-mail of 29 Sep 2005 12:07:05 and |

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| 12:07:05 | paper to STR. STR gav some suggestion on slides to YX over phone. STR asked for detailed information on slides, helpful notes and a meeting with YX to discuss the content of presentation and clarify the doubts. | copy of the attachment are in DOC-5 |
| 30 Sep 2005 14:59:25 | YX sent email with three attachments on presentation notes, additional slides and revised ppt file. | YX e-mail of 30 Sep 2005 14:59:25 and copy of the attachment are in DOC-5 |
| 30 Sep 2005 3:30pm | STR met with YX in STR office. The presentation material was reviewed | |
| 30 Sep 2005 19:38:13 | YX sent email to STR and attached a figure file which STR had asked to modify in the ppt file. | YX e-mail of 30 Sep 2005 19:38:13 and copy of the attachment are in DOC-5 |
| 1 Oct 2005 – 8 Oct 2005 | STR attends NURETH-11 conference in Avignon France. Three papers were presented by STR including the sonofusion paper. STR also chaired a session in the NURETH-11. The sonofusion paper was in panel session and was well received by the attendees. | |
| 7 Oct 2005 15:20:22 | JN sent e-mail to STR requesting help on the news articles produced by EV on sonofusion paper. As STR was on travel he did not reply. However on return from France STR learnt from EV that the issue was settled not to publish the article. | This e-mail is in the e-mail communication between DM and STR on 11 Oct 2005 13:22:02 and also in the EV email of 8 Oct 2005 14:17:13. Both emails are in DOC-5 |
| 11 Oct 2005 08:30:49 | DM sent e-mail to STR and wrote: "Please give me a copy of your NURETH-11 paper on sonofusion. Also, could you tell me how you responded to the attached e-mail from Jeanne Norberg? ". STR immediately sent DM NURETH-11 sonofusion paper and wrote : "Here is the NURETH11 paper. I have not replied to the e-mail from Jeanne Norberg." | The e-mail was copied to LHT. ~~STR learnt from DM it was LHT asking for this information. Later STR learnt that LHT knew that the news on sonofusion would not be published, but he wanted my reply on record –for some purpose.~~ The content of e-mail is in email of 11 Oct 2005 13:22:02 and is in DOC-5 |
| 11 Oct 2005 13:22:02 | DM sent reply to STR thanking for immediately reply. | DM e-mail of 11 Oct 2005 13:22:02 is in DOC-5 |
| 17 and 18 Oct 2005 | LHT sent email on 17 Oct 2005 03:25 PM to STR and wrote: You probably have already done so, it is good professional courtesy and good form to respond to Jeanne's email." STR replied to LHT : "This e-mail was sent to me when I was in France attending NURETH11 meeting. Before I could reply Emil informed me that the subject has been settled by the Jay Gore's office and I need not worry. So that is reason I did't have to reply. You can probably find more details on this issue from Jay." Again on 18 Oct 2005 13:21:50 LHT wrote to STR:<br><br>"I understand there will not be a press release on your sonofusion paper, but Jeanne Nordberg's email (sent 10 days ago) deservers a reply. It is simple professional courtesy particularly as it pertains to an individual who has done much to showcase the work of our faculty.". Now STR felt harassed by LHT for no good reason. STR called | ~~STR felt what purpose this kind of email from Head of a school serve.~~ LHT email of 18 Oct 2005 13:21:50 is in DOC-5 |