# DOCUMENTATION OF LENR INVESTIGATIONS BY DENNIS LETTS

## *A PROJECT OF THE LENR RESEARCH DOCUMENTATION INITIATIVE*

## DRAFT REPORT
## VOLUME 1. TEXT AND INTERVIEW TRANSCRIPTS

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## Contents

# 1 Introduction

Cold fusion (CF) was announced on March 23, 1989, by Dr. Martin Fleischman and Dr. Stanley Pons. The immense potential energy benefits of CF (also referred to as Low Energy Nuclear Reactions, LENR) were immediately recognized. Humankind's need for a source of cheap, clean, inexhaustible, and safe energy seemed to be realized. However, LENR was rejected by mainstream science within a year or so, and it remains highly marginalized to this day. On the other hand, the phenomenon has continued to be rigorously pursued by many investigators in several countries. The mounting evidence for the reality of LENR shows that its potential benefits may yet be realized.

Because it is a "pariah" science, LENR has attracted relatively few new investigators to the field. Many of the researchers became active in the early months and years after the 1989 announcement. Now 30 years later many of these investigators are leaving the field. The results of their many years of LENR investigation are at risk of being lost, which would be extremely unfortunate not only for the field, but also potentially for humanity.

The LENR Research Documentation Initiative (LRDI) is underway to mitigate the risk of loss of research records of long-standing LENR investigators. Its objectives are to collect, organize, document, and archive these records. It is being performed at LENRGY, LLC[1], Austin, Texas. The LRDI is set up to assist researchers in making sure that their efforts are preserved and to keep the records available for additional analysis and interpretation. It is described in a recent article in Infinite Energy[2] as well as on a dedicated website[3].

Dennis Letts became interested in LENR not long after the 1989 announcement. Although he was involved in gold mining in Bolivia at the time, he familiarized himself with the field by studying relevant technical papers while still living in mining camps. He began LENR experiments in his home lab in 1992 with focus on radio frequency (RF) radiation as a trigger of

[1] LENRGY: LENR Energy – Pursuing the Benefits of Cold Fusion Realization. www.lenrgyllc.com.

[2] Grimshaw, T., 2020. Documenting Cold Fusion Research: Preserving a Vital Asset for Humankind. Infinite Energy, Issue 150, March/April 2020, p. 9-13.

[3] LENR Research Documentation Initiative: Collection, Organization, Description, Archiving of LENR Research Records. www.lenr-documentation.org.

the phenomenon. He has continued experiments nearly continuously since then, working with many other researchers and entities, including John Bockris, Peter Hagelstein, Dennis Cravens, and National Instruments (James Truchard). Letts has named his LENR research organization “LettsLab”. It is located in Austin, Texas. A photo of Mr. Letts is in Figure 1-1.

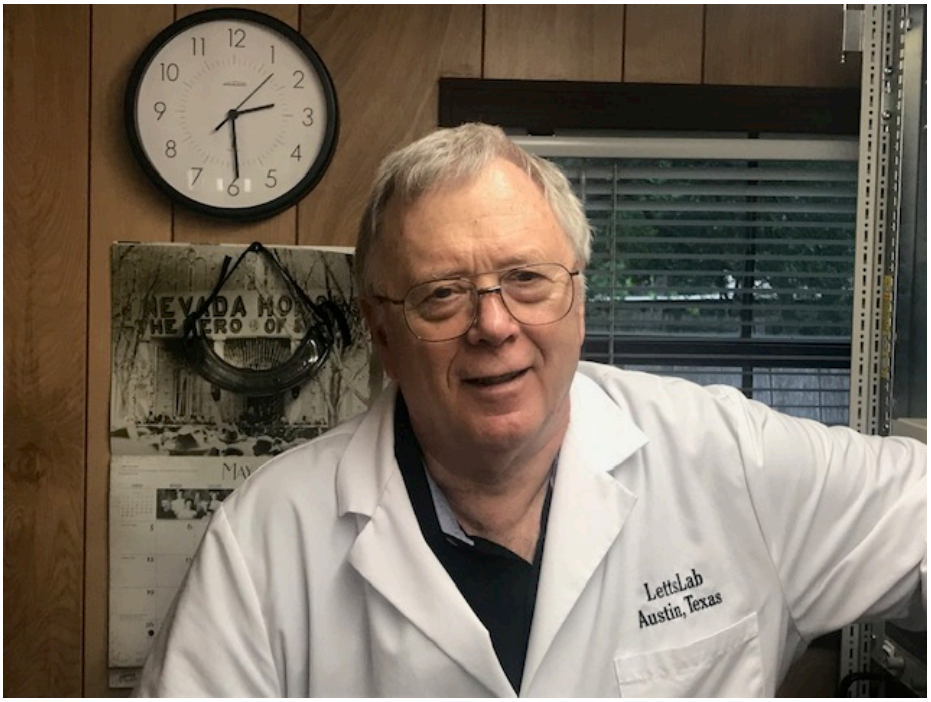



*Figure 1-1.*
*Dennis Letts in his LENR Research Lab (LettsLab), Austin, Texas*
*Photo Taken July 2019*

A project has been initiated under the umbrella of the LRDI to document Mr. Letts’ research in the LENR field. The Letts LENR Research Documentation Project (LLRDP) is based on the information collected and on interviews of Letts. This Volume 1 contains the text of the draft LLRDP report and appendices with the transcripts of the two sets of inteviews. Sections 2, 3, and 4 characterize his research record, and his lab is described in Section 5. The interviews are described in Section 6. Mr. Letts’ LENR research phases are outlined in Section 7, and future possibilities for the LLRDP are set forth in Section 8. The methods used in the Project are described in Section 9. Volume 2 of this report contains copies of Mr. Letts’ publicly-available LENR reports and related materials.

# 2 Publicly-Available Documents

Letts has presented and published over 30 papers, mostly as a co-author with other LENR researchers he has collaborated with. His first publication, which was with John Bockris as lead author, came in 1993, not long after he began LENR experiments in 1992. He has had strong collaborations in particular with Dennis Cravens and Peter Hagelstein and has jointly published many papers with both. Letts' papers have been obtained from his own collection and from Jed Rothwell's LENR-CANR.org website[4,5]. The list of publications from both sources[6] is in Table 2-1. Copies of the reports are in Volume 2 of this report.

[4] LLRDP: Documentation of Publicly Available Works (Provided by Letts). Memo to Dennis Letts from Tom Grimshaw. February 28, 2019.

[5] Documentation of Publicly Available Works: Documents Listed on LENR-CANR.org. Memo to Dennis Letts from Tom Grimshaw. March 1, 2019.

[6] Publicly Available LENR Papers, Presentations, Etc. for the LLRDP. Memo to Dennis Letts from Tom Grimshaw. May 15, 2019.

*Table 2-1*
*Dennis Letts' Publicly-Available LENR Publications and Related Works*


1 Bockris, J., et al., 1993, Triggering of Heat and Sub-Surface Changes in Pd-D Systems. Fourth International Conference on Cold Fusion (ICCF-4). Proceedings.

2 Letts, D., and D. Cravens, 2003. Laser Stimulation of Deuterated Palladium: Past and Present. Tenth International Conference on Cold Fusion (ICCF-10). Proceedings.

3 Letts, D., and D. Cravens, 2003. Laser Stimulation of Deuterated Palladium: Past and Present. Tenth International Conference on Cold Fusion (ICCF-10). PowerPoint Slides.

4 Cravens, D., and D. Letts, 2003. Practical Techniques in CF Research – Triggering Methods. Tenth International Conference on Cold Fusion (ICCF-10). Proceedings.

5 Cravens, D., and D. Letts, 2003. Practical Techniques in CF Research – Triggering Methods. Tenth International Conference on Cold Fusion (ICCF-10). PowerPoint Slides.

6 Kowalski, L. et al., 2004. Charged Particles from Ti and Pd Foils. Eleventh International Conference on Condensed Matter Nuclear Science (ICCF-11). Proceedings.

7 Letts, D. and D. Cravens, 2004. Cathode Fabrication Methods to Reproduce the Letts-Cravens Effect. Fifth Asti Workshop on Anomalies in Hydrogen/Deuterium Loaded Metals. Proceedings.

8 Letts, D. and D. Cravens, 2004. Cathode Fabrication Methods to Reproduce the Letts-Cravens Effect. Fifth Asti Workshop on Anomalies in Hydrogen/Deuterium Loaded Metals. PowerPoint Slides.

9 Letts, D., D. Cravens, and P. Hagelstein, 2008. Thermal Changes in Palladium Deuteride Induced by Laser Beat Frequencies. American Chemical Society, Low-Energy Nuclear Reactions Sourebook, Chapter 15, pp. 337-352.

10 Letts, D., 2008. Stimulation of Optical Phonons in Deuterated Palladium. Draft Manuscript for Fourteenth International Conference on Condensed Matter Nuclear Science (ICCF-14).

11 Letts, D., and P. Hagelstein, 2008. Stimulation of Optical Phonons in Deuterated Palladium. Fourteenth International Conference on Condensed Matter Nuclear Science (ICCF-14). Proceedings.

12 Cravens, D., and D. Letts, 2008. The Enabling Criteria of Electrochemical Heat: beyond Reasonable Doubt. Fourteenth International Conference on Condensed Matter Nuclear Science (ICCF-14). Proceedings.

13 Letts, D., D. Cravens, and P. Hagelstein, 2009. Dual Laser Stimulation of Optical Phonons in Palladium Deuteride. American Chemical Society, Low-Energy Nuclear Reactions and New Energy Technologies Sourcebook, Volume 2, Chapter 5, pp. 81–93.

14 Letts, D., 2009, Listening to CMNS Experiments. Infinite Energy Magazine. Issue 86 (July/August).

15 Letts, D., 2009. A Scalable Research Reactor for CMNS Experiments. Infinite Energy Magazine, Issue 87 (September/October).

16 Letts, D., D. Cravens, and P. Hagelstein, 2009. Progress on Dual Laser Experiments. Fifteenth International Conference on Cold Fusion (ICCF-15). PowerPoint Slides.

17 Hagelstein P., D. Letts, and D. Cravens, 2010. Terahertz Different Frequency Response of PdD in Two-Laser Experiments. Journal of Condensed Matter Nuclear Science. Vol. 3, pp. 59-76.

18 Hagelstein P., and D. Letts, 2010. Analysis of Some Experimental Data from the Two-Laser Experiment. Journal of Condensed Matter Nuclear Science, Vol. 3, pp. 77-92.

19 Chubb, S., and D. Letts, 2011. Magnetic Field Triggering of Excess Power in Deuterated Palladium. Infinite Energy. Issue 95 (January/February).

20 Letts, D., 2011. Codeposition Methods: A Search for Enabling Factors. Journal of Condensed Matter

Nuclear Science. Vol. 4, pp. 81-92.

21 Letts, D., and P. Hagelstein, 2012. Empirical Models for Excess Power in Dual Laser Experiments. Seventeenth International Conference on Cold Fusion (ICCF-17). Abstracts. p. 87.

22 Letts, D., 2012. Gibbs Function Applied to a Cold Fusion Experiment. Unpublished Manuscript. January.

*23* Hagelstein, A., and D. Letts, 2014. Temperature Dependence of Excess Power into-Laser Experiments. Journal of Condensed Matter Nuclear Science, Vol 13, pp. 165–176.

24 Letts, D., and P. Hagelstein, 2012. Modified Szpak Protocol for Excess Heat. Journal of Condensed Matter Nuclear Science, Vol. 6, pp. 44-54.

25 Letts, D., 2013. A Method to Calculate Excess Power. Infinite Energy, Issue 112 (November/December).

26 Letts, D., 2015. Highly Reproducible LENR Experiments Using Dual Laser Stimulation. Current Science, Vol. 108, No. 4, pp. 559-561.

27 Hagelstein, P., and D. Letts, 2014. Temperature Dependence of Excess Power in Two-Laser Experiments. Journal of Condensed Matter Nuclear Science, Vol. 13, pp. 165-176.

28 Letts, D., 2014. Quantum Mechanics of LENR. Unpublished Manuscript. January.

29 Letts, D., 2015. Remembering John Bockris. Journal of Condensed Matter Nuclear Science, Vol. 16, p. 10.

30 Scholkmann, F., T. Mizuno, and D. Nagel, 2012. Diurnal Variations in LENR Experiments. (Contribution to Paper by Letts). Journal of Condensed Matter Nuclear Science, Vol. 8, pp. 37–48.

31 Higgins, B., and D. Letts, 2018. Modeling & Simulation of a Gas Discharge LENR Prototype. Twenty-First International Conference on Cold Fusion (ICCF-21). PowerPoint Slides.

32 Higgins, B., and D. Letts, 2018. Modeling & Simulation of a Gas Discharge LENR Prototype. Twenty-First International Conference on Cold Fusion (ICCF-21). Proceedings.

# 3 Lab Notebooks

Letts has kept careful records of his lab work since he began experiments in 1992. Approximately 11 or 12 hard-copy lab notebooks have been noted for the LLRDP[7] (Figure 3-1). Letts indicated that he changed from manual to electronic lab notes at some point. Because the notebooks and electronic notes may fall within a non-disclosure agreement, details of their contents, including the date ranges of each, are not yet available to the Project.

A notebook of particular historical interest to the LLRDP is an oversize volume (measuring about 12" x 17") [8]. It is entitled "Laser Stimulation of Deuterated Palladium, Dennis Letts, March 2002." The notebook was developed in preparation for a trip made by Letts from Austin to SRI International in Menlo Park, California with his LENR experimental apparatus. The purpose of the trip was to confirm observations of the effects of induced magnetic fields on excess power observations in a cell that he took on the trip. Participants in the event at SRI included Michael McKubre, Fran Tanzella, and Matt Trevitheck. The experiment was performed on Letts'sample #565.

Copies of two representative pages (of the 8 in the notebook) are shown in Figure 3-2 (pages 1 and 2). An electronic spreadsheet file to accompany the notebook has been included in the LLRDP. The results of the sample #565 experiment was referenced in items #2 and #3 in Table 2-1[9]. Letts indicated in a phone conversation that the experiment was a success and that his findings were confirmed.

[7] Laboratory Notebooks. Memo to Dennis Letts from Tom Grimshaw. June 4, 2019.

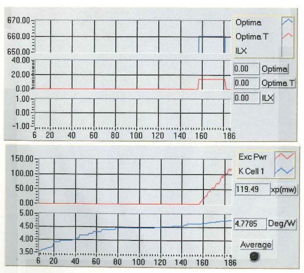
[8] Oversize Bound Volume with Experimental Information for Laser-Induced LENR. Memo to Dennis Letts from Tom Grimshaw. June 2, 2019.

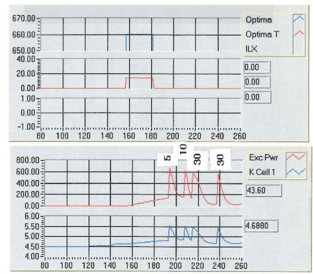
[9] Letts, D., and D. Cravens, 2003. Laser Stimulation of Deuterated Palladium: Past and Present. Tenth International Conference on Cold Fusion (ICCF-10). Proceedings.


*Figure 3-1.*
*Two Views of Dennis Letts' Lab Notebooks.*
*Photo Taken March 2019*

## Turn-Off Ability

DGL565Y

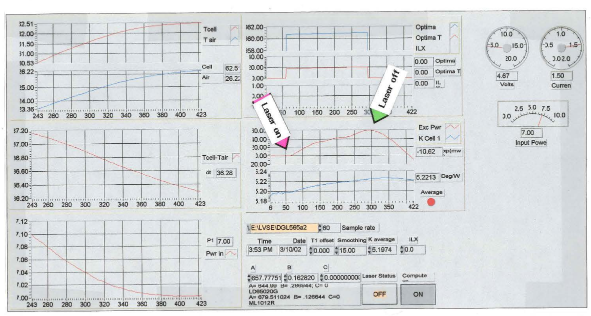


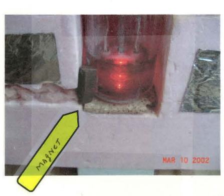

Laser turned on for about 20 minutes at 660 nm with approximately 20 mw of radiant laser power. The effect appeared and caused the cell to produce about 120 mw at the end of 20 minutes. I then turned off the laser at point 182 and attempted to manually kill the effect by turning off the electrolysis DC; four attempts were made at 5 seconds off time, 10 secs, 30 secs and 30 secs. I was unable to get the apparent excess power below about 35-40 mw. As the near surface loaded back up with Deuterium, the effect tried to return. Past experience has shown that the effect will eventually die out after several hours.


1

## Turn-Off Ability: Laser on/off




At Point 60 a 20 mw laser tuned to 660.74 was turned on; data was smoothed so that the data trace would be clear; the 20 mw laser triggered a reaction that produced at least 60 mw of thermal output. The cell output was still increasing when the laser was turned off at point 300. After point 300, the thermal output of the cell dropped to BELOW the zero baseline over a two hour period. This, of course, indicates a small measurement error with the calorimetry method BUT the error is conservative.




2

*Figure 3-2*
*Representative Pages (#1 and #2) of the Oversize Lab Notebook*
*"Laser Stimulation of Deuterated Palladium"*

# 4 LENR Books and Conference Proceedings

During the course of his LENR career, Letts has acquired books and proceedings of conferences on the subject[10]. For example, he has the International Conference on Cold Fusion proceedings for ICCF-4, 7, 10, and 14 (volumes 1 and 2). He also has the proceedings of the 8th International Workshop on Anomalies in Hydrogen/Deuyterium Loaded Metals. In addition, Letts has copies of the following books:

Arata, Y., 2006, Toward the Establishment of Solid Fusion as a perpetual energy for Mankind

Beaudette, C, 2002, Excess Heat: Why Cold Fusion Prevailed

Mallove, E., 1991, Fire from Ice: Searching for Truth Behind the Cold Fusion Furor

Marwan, J., and S. Krivit, 2008, Low-Energy Nuclear Reactions Sourcebook

Marwan, J., and S. Krivit, 2010, Low-Energy Nuclear Reactions and New Energy Technologies Sourcebook, Vol 2

Mizuno, T, 1998, Nuclear Transmutation: The Reality of Cold Fusion

Storms, E., 2007, The Science of LENR: A Comprehensive Compilation of Evidence and Explanations about Cold Fusion

Storms, E., 2014, The Explanation of LENR: An Examination of the Relationship between Observation and Explanation

Taubes, G., 1993, Bad Science: The Short Life and Weird Times of Cold Fusion

[10] LLRDP: Letts' LENR Biography and LENR Library. Memo to Dennis Letts from Tom Grimshaw. July 28, 2019.

# 5 LettsLab Laboratory

As noted in Section 1, Letts began LENR experiments in 1992. He uses the term “LettsLab” for his research entity. His laboratory is located in his back yard in north Austin near Duval Road[11] (Figure 5-1). It is in a 10x12 foot metal building that has 18 linear feet of bench space and shelves. It has electrical service of 50 amps and a 14,000 BTU air conditioner. Letts has provided a list of equipment in his lab, which is shown in Table 5-1.

[11]LLRDP LettsLab Inventory. Memo to Dennis Letts from Tom Grimshaw. July 27, 2019.

*Figure 5-1.*
*Dennis Letts' Lab (LettsLab) at His Home in Austin, Texas*
*Photos Taken March and July, 2019*

*Table 5-1.*
*Experimental Equipment in LettsLab Laboratory*

| | |
|---|---|
| Three stainless steel tool boxes | 1 Rohde & Schwarz ADS waveform generator |
| Hand tools | 2 Rohde & Schwarz CMU 200 spectrum analyzers |
| Two equipment racks | 1 Rohde & Schwarz signal generator to 4320 MHz |
| Metallurgical microscope | 2 Keithley 2000 multimeters |
| Four-digit lab balance | 1 gamma counter and detector |
| 3 HP 6654a power supplies | 1 neutron counter, detector and moderator |
| 2 HP 6643a power supplies | 1 iMac 21 research/computation lab computer |
| 5 HP 6632a power supplies | Several spare HP power supplies |
| 2 KEPCO BHK 1000-0.2 mg power supplies | Various analog RF meters and accessories |
| 1 Dell lab PC running Labview | Model 6552-1A 100W audio amplifier |
| 1 Agilent Infinium oscilloscope with probes & accessories | 1 HydroStik charger plus about 1 dozen spare HydroStiks |
| 1 Clarke-Hess 2330 power meter | 4 Sierra gas flow meters |
| 1 GPM 8213 power meter | 1 Fluke 87 multimeter |
| 2 HP 349870 data loggers | 1 Fluke 105B handheld oscilloscope |
| 1 Bird 4421 RF power meter | 2 HP RF power meters and sensors |
| 1 ENI RF amp, to 1 GHz | 1 ExTorr 200 AMU Residual Gas Analyzer (RGA) |
| 1 Clarke-Hess 2335a | Misc. lab glassware, beakers test tubes |
| 1 Agilent U8903 spectrum analyzer in the audio range | |

## 6 Dennis Letts Interviews

Two sets of interviews have been conducted with Letts regarding his LENR research[12,13] They took place in March (four segments, total of 102 minutes) and July (five segments, 131 minutes total) of 2019. Transcripts of the two sets are in Appendices A1 and A2.

[12] Letts LENR Research Documentation Project: Transcriptions of Interviews. Memo to Dennis Letts from Tom Grimshaw. April 8, 2019.

[13] LLRDP: Transcriptions of Second Round of Interviews. Memo to Dennis Letts from Tom Grimshaw. July 9, 2019.

# 7 LENR Research Phases

Dennis Letts was involved in several interesting ventures before he began LENR investigations. He has worked with a number of collaborators using different experimental methods and signatures, including electrolytic cells and gas loading. He has prepared a timeline of his LENR research activities[14] that is shown in Table 7-1 (provided in May 2019).

## 7.1 Pre-LENR Activities

Letts was born and raised in Missouri and graduated from Texas Tech University in 1972[15]. After being engaged in oil and gas exploration in West Texas for about eight years, including owning (one-fourth interest) and operating his own drill rig, he became involved in gold mining ventures in Bolivia. He set up two operations – the Chusimayo Mine on the Mapiri River and the Solacama Mine on the Solacama River (Figure 7-1).

## 7.2 LENR Research Initiation

Letts learned of the 1989 LENR announcement while still engaged in gold mining in Bolivia. During a return trip from his mines in Bolivia, he visited the chemistry department library of The University of Texas at Austin and made copies of relevant LENR papers[16], which he later studied while still in gold mining camps. The nearly 40 items in this initial collection (Figure 7-2) are listed in Table 7-2 in the order found in the volume. The items have been scanned for the LLRDP in seven parts as shown in the table.

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[14] LLRDP: Letts' LENR Biography and Library Holdings. Memo to Dennis Letts from Tom Grimshaw. July 28, 2019.

[15] Biographical Summary Document. LLRDP Memo to Dennis Letts from Tom Grimshaw. June 1, 2019.

[16] Description of Study Papers for Cold Fusion Familiarization. Memo to Dennis Letts from Tom Grimshaw. June 3, 2019.

*Table 7-1.*

*Major Events in Letts' LENR Research and Related Activities*

| | |
|---|---|
| November 1989 | Letts first hears about "cold fusion" while managing two gold mining operations in the Bolivian upper Amazon basin. Letts copies all available papers on the topic from the chemistry library at the University of Texas at Austin. |
| 1989-1991 | Study of early papers by Fleischman and Pons, Storms, Bockris, among others. Returned to Austin, introduced Charles Becker to cold fusion, who later formed ENECO. |
| 1992 | Began experiments using RF frequencies as triggering, worked with Bockris |
| 1993 | Attended ICCF4 with ENECO affiliation and contributed first conference paper with Bockris as the lead author. |
| 1998 | Built a small research lab in Austin that came to be known as "Lettslab". |
| 2000 | Discovered the single laser trigger for electrochemical cells, later reproduced by Ed Storms and Vittorio Violante. |
| 2002 | Demonstrated the single laser and magnetic field triggers at SRI |
| 2003 | Presented a paper on single laser triggering at the American Physical Society conference held in Austin in March, 2003; in August 2003, presented a paper at ICCF10 held at Cambridge, MA. Made first live cold fusion demonstration at ICCF10 in collaboration with Dennis Cravens. |
| 2007 | Performed the first dual laser experiment on March 21, 2007. The series of dual laser experiments formed the basis of many papers written in collaboration with Dennis Cravens and Peter Hagelstein. |
| 2009 | Contributed papers to a workshop led by Michael Melich, held at the Naval Postgraduate School in Monterrey, CA. Performed a replication of the Szpak, Boss codeposition method, initiated by Michael Melich. Several conference papers were written in collaboration with Peter Hagelstein based on codeposition experiments. Built the first air-cooled Seebeck calorimeter for the codeposition experiments. |
| 2012 | Assisted National instruments in hosting Francesco Celani at NI Week 2012. Provided lab space for the NI engineers to develop LabView code to run the Celani experiment at the NI conference. |
| 2013 | Developed a method to compute excess power from single and dual laser experiments. Method was published in Infinite Energy Magazine. |
| 2014 | Joined Industrial Heat as a research consultant to develop a high temperature Seebeck calorimeter and to perform LENR experiments using a vacuum/gas-based system. |
| 2015 | Built and tested the High Temperature Seebeck Calorimeter and performed dozens of experiments. Filed several patent disclosures. |
| 2018 | Presented a paper in collaboration with Dennis Cravens at ICCF21 and taught a short course on several calorimetry methods. |
| 2019 | Experiments using the High Temperature Seebeck calorimeter continue and power output is slowly increasing as better methods are developed. |


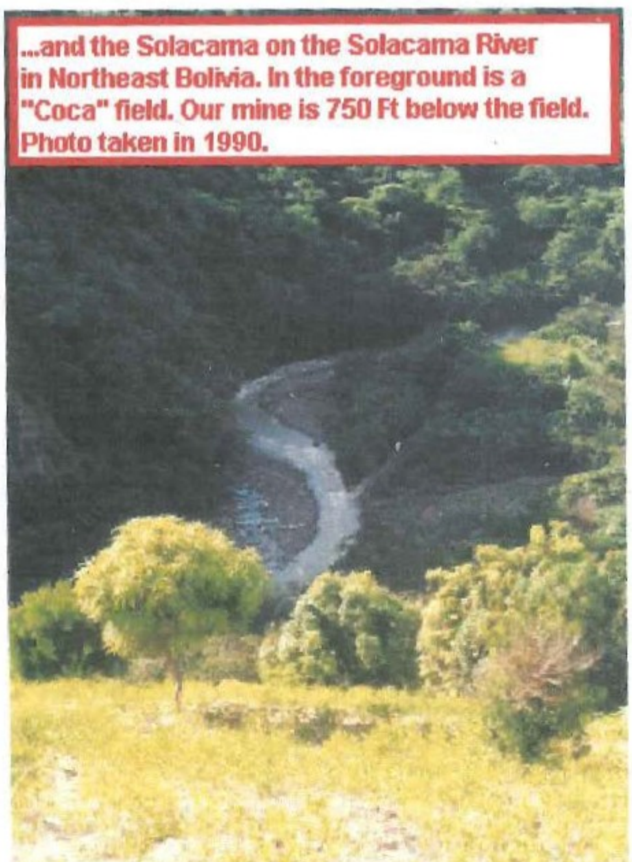


*Figure 7-1.*
*Chusimayo and Solacama Mines Operated by Dennis Letts in Bolivia*

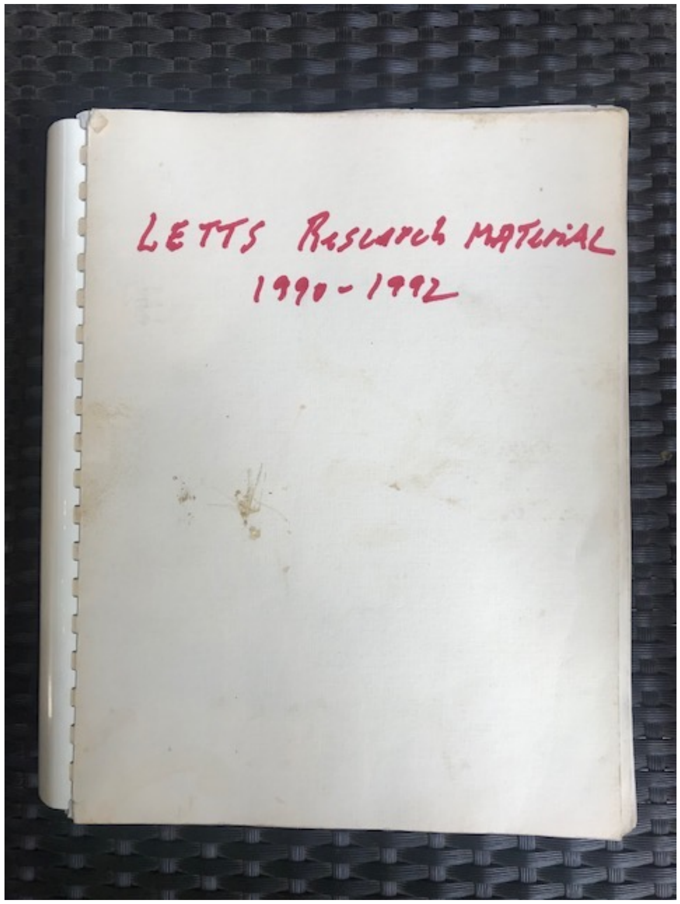


*Figure 7-2.*
*Bound Volume of Letts' Collection of Papers for Cold Fusion Study*
*Photo Taken July 2019*

*Table 7-2*
*List of Papers in Collection for Letts' Cold Fusion Familiarization, Parts 1 to 7*

| | | |
|---|---|---|
| PART 1 | --- | --- |
| 1989 | Fleischmann, M. And S. Pons | Electrochemically Induced Nuclear Fusion of Deuterium |
| 1992 | White, C. | Beyond Cold Fusion: A New Window on the Laws of the Universe |
| 1989 | Jones, S., et al. | Observation of Cold Nuclear Fusion in Condensed Matter |
| 1990 | Salamon, M., et al. | Limits on the Emission of Neutrons, Gamma-Rays, Electrons and Protons from Pons/Fleischmann Electrolytic Cells |
| 1989 | Taniguchi, R., et al. | Detection of Charged Particles Emitted by Electrolytically Induced Cold Nuclear Fusion |
| 1990 | Aiello, S., et al. | Nuclear Fusion Experiment in Palladium Charged by Deuterium Gas |
| 1990 | Cecil, F. | Study of Energetic Charged Particles Emitted from Thin Deuterated Palladium Foils Subject to High Current Densities |
| 1990 | Matsumoto, T. | Observation of New Particles Email to during Cold Fusion |
| 1991 | Austern, N. | Coulomb-Dominated Low-Energy Deuteron Stripping |
| 1990 | Gozzi, D., et al. | Nuclear and Thermal Effects during Electrolytic Reduction of Deuterium at Palladium Cathode |
| 1990 | Oriani, R., et al. | Calorimetric Measurements of Excess Power Output during the Cathodic Charging of Deuterium into Palladium |
| 1990 | Hagelstein, P. | Coherent Fusion Theory |
| PART 2 | --- | --- |
| 1989 | Lancaster, D. | Hardware Hacker – Try Cold Fusion for Yourself! |
| 1990 | Scott, C., et al. | Measurement of Excess Heat and Apparent Coincident Increases in the Neutron and Gamma-Ray Count Rates during the Electrolysis of Heavy Water |
| 1990 | Noninski, V. and C. Noninski | Determination of the Excess Energy Obtained during the Electrolysis of Heavy Water |
| 1990 | Rittner, E. and A. Muhlenberg | A Chemical Interpretation of Heat Generated in "Cold Fusion" |
| 1991 | Lewis, D., and A. Skold | A Phenomenological Study of the Fleischmann-Pons Effect |
| 1991 | Storms, E. and C. Talcott-Storms | The Effect of Hydriding on the Physical Structure of Palladium and On the Release of Contained Tritium |
| 1992 | White, C. | Japan Achieves a Big Breakthroughs in Cold Fusion |
| PART 3 | --- | --- |
| 1989 | Unknown Author | Untitled Paper (EIR) |
| 1990 | Storms, E., and C. Talcott | Electrolytic Tritium Production |
| 1957 | Worsham, J., et al. | Neutron-Diffraction Observations on the Palladium-Hydrogen and Palladium-Deuterium Systems |

| | | |
|---|---|---|
| 1989 | Sun, Z. and D. Tomanek | Cold Fusion: How Close Can Deuterium Atoms Come inside Palladium? |
| PART 4 | --- | --- |
| 1990 | Zakowicz, W. | Possible Resonant Mechanism of Cold Fusion |
| 1990 | Oriani, et al. | Calorimetric Measurements of Excess Power Output during the Cathodic Charging of Deuterium into Palladium |
| 1990 | McNally, J. | On the Possibility of a Nuclear Mass-Energy Resonance in D+D Reactions at Low Energy |
| 1989 | Cribier, M., and M. Spiro | Conventional Sources of Fast Neutrons in "Cold Fusion" Experiments |
| 1979 | Hasegawa, H. and K. Nakajima | Effect of Hydrogen on the Mechanical Properties of Pd |
| 1990 | Arata, Y. and Y. Zhang | Achievement of an Intense Cold Fusion Reaction |
| 1990 | Bockris, J., et al. | Unknown Article Title (Initial Page Missing) |
| PART 5 | --- | --- |
| 1991 | Eagleton, R. and R. Bush | Calorimetric Experiments Supporting the Transmission Resonance Model for Cold Fusion |
| 1991 | Bush, R. | Cold "Fusion" The Transmission Resonance Model Fits Data on Excess Heat, Predicts Optimal Trigger Points, and Suggests Nuclear Reaction Scenarios |
| PART 6 | --- | --- |
| 1992 | Hagelstein, P. | Coherent and Semicoherent Neutron Transfer Reactions I: The Interaction Hamiltonian |
| 1989 | Hagelstein, P. | Coherent Fusion Theory |
| 1990 | Hagelstein, P. | Status of Coherent Fusion |
| 1992 | King, M. | Tapping The Zero-Point Energy |
| 1992 | Fox, H. | Letter to Charles D. Becker from Fusion Energy Applied Technology, Salt Lake City, Utah |
| PART 7 | --- | --- |
| 1992 | Takahashi, A., et al. | Excess Heat and Nuclear Products by D2O/Pd Electrolysis and Multibody Fusion |

### 7.3 Independent LettsLab Research

Letts conducted independent LENR investigations at his home for 22 years beginning in 1992. He built the small lab behind his home in 1998. As shown in Table 7-1, he has undertaken a variety of research and related activities:

- LENR experiments with electrolytic cells using RF radiation as a trigger
- Electrolytic cell investigations utilizing single- and dual-laser radiation for triggering
- Development of a method for computing excess power in single- and dual-laser experiments
- Replication of codeposition LENR method of Stan Szpak and Pam Boss developed at the Navy Space and Naval Air Warfare Command
- Support for Francesco Celani gas loading demonstration and National Instruments' NI Week

### 7.4 Industrial Heat Collaboration

Letts began his work with Industrial Heat in 2014. He has built and tested the High Temperature Seebeck Calorimeter in his lab in Austin (Figure 7-3). Gas loading experiments continue with this apparatus, and power output is increasing slowly with experimental improvements.

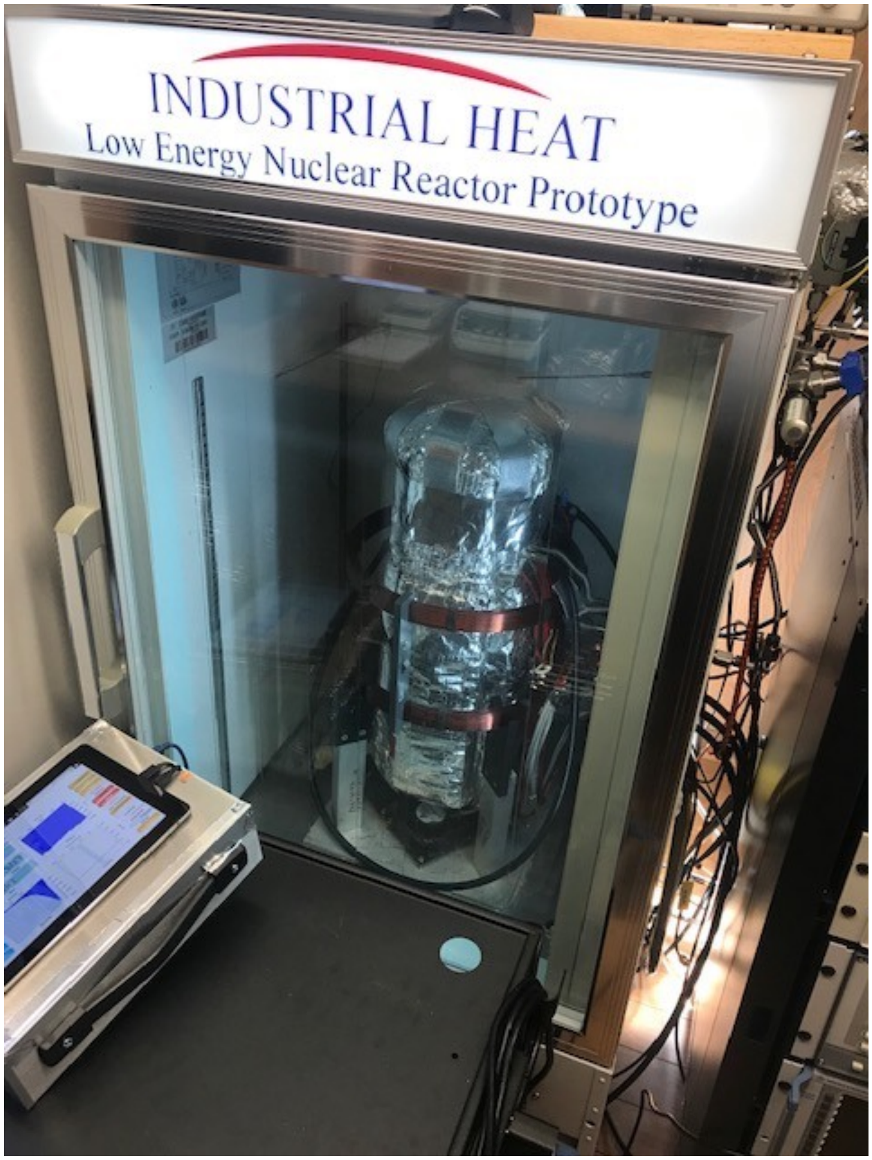


*Figure 7-3.*
*High Temperature Seebeck Calorimeter in LettsLab Laboratory*
*Photo Taken March 2019*

# 8 Future Opportunities

A number of opportunities have been identified for more complete coverage of the LENR research accomplishments of Dennis Letts. The following are set forth as possibilities for future expansion and in-depth documentation of these accomplishments:

- More analysis and integration of the research record with the interview transcripts
- Addition of information, such as lab notebooks and electronica records, when they become available under the terms of an NDA.
- Interviews of other persons who are knowledgeable of Letts' LENR investigations, such as his research collaborators

# 9 Project Methods

The LLRDP is being performed according to accepted project management practices[17]. The methods used are based on general LRDI procedures that have been modified to meet Letts' specific requirements. As noted in Section 1 the Project has its roots in the Storms LENR Research Documentation Project[18].

The LLRDP began with collection of reports in February 2019 followed by a number of on-site visits for additional interviews and information collection. As progress is made, it is recorded in the series of memos[19] (Table 9-1). These memos comprise the foundation for this report. A dedicated folder on Dropbox has also been set up to store Project documents.

[17] Approach for Documenting Progress in the Letts Documentation Project. Memo to Dennis Letts from Tom Grimshaw. February 13, 2019.

[18] Grimshaw, T., and E. Storms, 2018. Documentation of Dr. Edmund Storms' 29 Years of Cold Fusion Research: Experiments, Explanations, and Related Scientific Contributions. Draft Summary Report, Unpublished. May.

[19] LLRDP: Memos Prepared to Date. Memo to Dennis Letts from Tom Grimshaw. July 3, 2019.

*Table 9-1.*
*Memos Prepared for the Letts LENR Research Documentation Project*

| | |
|---|---|
| 2/13/19 | Approach for Documenting Progress in the Letts Documentation Project |
| 2/28/19 | LLRDP: Documentation of Publicly Available Works (Provided by Letts) |
| 3/1/19. | Documentation of Publicly Available Works: Documents Listed on LENR-CANR.org |
| 4/8/19 | Letts LENR Research Documentation Project: Transcriptions of Interviews |
| 5/15/19 | Publicly Available LENR Papers, Presentations, Etc. for the LLRDP |
| 6/1/19 | Biographical Summary Document |
| 6/2/19 | Oversize Bound Volume with Experimental Information for Laser-Induced LENR |
| 6/3/19 | Description of Study Papers for Cold Fusion Familiarization |
| 6/4/19 | Laboratory Notebooks |
| 7/3/19 | LLRDP: Memos Prepared to Date |
| 7/9/19 | LLRDP Transcriptions of Second Round of Interviews |
| 7/27/19 | LLRDP LettsLab Inventory |
| 7/28/19 | LLRDP Letts' LENR Biography and LENR Library Holdings |

# *Appendix A1. Transcriptions of Dennis Letts Interview #1*

Interview 1

| | |
|---|---|
| Tom Grimshaw: | I'm here with Dennis Letts, L-E-T-T-S. This is Tom Grimshaw. We are recording Dennis' experience in the L-E-N-R, the LENR field, cold fusion, going back to when he first heard about it. But before we get to that, Dennis is going to take a few moments to give us a context of when he heard about LENR and then how he got into it. I should also say that today is March 18, 2019 and it's about, nearly three o'clock, and we're at Dennis' home here in Austin on Ladrido Road, or whatever it is. |
| Dennis Letts: | Lane. |
| Tom Grimshaw: | And so what I'm going to do, Dennis, is I'm going to go ahead and pause here, and then I'll pick it up again, just to make sure that our recording is working okay. |

Interview 2

Tom Grimshaw: Okay. Tom Grimshaw again here. This is the second in a series. The first recording was just a test recording. So, I'm going to repeat what I said before. Tom Grimshaw, I'm here with Dennis Letts, L-E-T-T-S. We're recording his experiences in the cold fusion field with a little bit of context on what he was doing when he first heard about it. And I should also mention that this is March 18th about three o'clock in the afternoon. And so, Dennis, thank you very much for agreeing to do this, and what I'm going to do is turn it over to you. And as we said before we started the recording, if you could tell us a little bit about what you were doing at the time that you heard about cold fusion. Give us a little bit of background and what you'd been engaged with.

Dennis Letts: In March of 1989 on my birthday to be exact, March 29th, 1989, I was on my way to La Paz, Bolivia, to begin the gold mining operation in Northwestern Bolivia on the Missouri River out in the middle of the Amazon basin. I've always been in love with science, have kept up with mathematics and physics as an amateur, but had no strong desire to become a practicing amateur or professional scientists at that time.

Dennis Letts: A few months later while at the mining site, I got a phone call from my wife, a routine check in at the end of the week. And she informed me that she had read in the Wall Street Journal an article by, I believe his first name was Jerry Bishop, a staff writer for the Wall Street Journal, about two wild and crazy fellow's named Pons and Fleischmann who had achieved tabletop nuclear fusion at very low temperatures. It was called at the time cold fusion.

Dennis Letts: I'd never heard of it, but I was very excited to know that this might be something that an amateur scientist could pursue. Either as an amateur, I didn't dream then that I would jump into it and stay active in the field for 25 years as I've done. But, at any rate, I left Northwestern Bolivia on a routine break, came back to Austin, went down immediately to our chemistry library and pulled all of the key papers that were available at the time, including the Seminal Paper by Pons and Fleischmann, or Fleischmann and Pons as we should say.

Dennis Letts: I was taken with the science immediately and perhaps the accessibility of the experimental side of this. There was no guiding theory to to speak of. However, there were several people whose papers I was able to pull the immediately, and they were John Bockris, Ed Storms, Ed and Carol Storms, Mike McKubre, and an interesting chap from MIT named Peter Haggelstein who was working on that theoretical side of the experimental side.

Dennis Letts: At this time, and still to this day, a cold fusion or low energy nuclear reaction science remains an experimental job, if you will. And there's not an accepted theoretical approach, although I do favor Hagglestein's approach. Ed Storms had some good ideas as well. The upshot of this was that I carried their papers with me for many, many months while roaming up and down [Namaperry 00:03:59] River in the gold mining regions of northwestern and northeastern Bolivia.

Dennis Letts: I didn't expect that I would ever meet these people, much less get to work with them over time. And yet I did. I became a pupil of John Bockris who was a professor at a College Station, which is about four hours from Austin. And so we spend a lot of time together in the early years. I also prospected a gentleman by the name of Charles Becker, CB everybody called him, who had had interest in radio frequency manipulations of the cold fusion cells. That was my initial entry into the field, was applying RF to electro chemical cells. So, I met Charles Becker and brought him into the field, and he became an important early investor in cold fusion, forming the company called ENECO, E-N-E-C-O.

Dennis Letts: Charles provided me some early funding and some guidance on what to do with RF. I applied RF at 82 megahertz, 365 megahertz and 533 megahertz with some triggering success. Everybody in those days had to sit around and wait for many, many hours before the electrochemical cells would switch on my themselves. So, I thought I may be able to make a contribution by figuring out a triggering method.

Dennis Letts: And, I showed this to John Bockris. We wrote a paper about it, my first paper in cold fusion back in December of 1993 at ICCF4. My interest ... pause here?

Tom Grimshaw: Okay. Yeah. So, that's a really nice way to describe the events. And so every once in a while I'll stop and ask to fill in some details. So when you came back from Bolivia, after your wife had told you about this, you said you went to the chemistry library. You went to the University of Texas Chemistry Library? Is that where you were able to find the papers?

Dennis Letts: Yes.

Tom Grimshaw: Okay. And so you were reading these papers on your own while you were trekking through the jungles along the river in Bolivia. So, how much time was it, do you recall, between the time that you took your break up here and got those papers when you discontinued your work in Bolivia and started working in this field?

Dennis Letts: Are we on pause or no,

Tom Grimshaw: No.I didn't stop it. I just stopped you.

Dennis Letts: Oh, okay. Good. I first heard about cold fusion on that phone call from my wife, which is about 1990, early '90, I think, as I recall. Maybe even before that. Maybe late '89. Well, yeah, late '89, early '90. My official work in cold fusion is documented as having started on October 26, 1990, from a lab notebook entry, just on the theory side, learning about the metallic host structure of the lattice. Experimental science was to come along in about two years, after I had read all these papers and gotten some experience and some knowledge about what to do experimentally. And then experimental work began July of 1992, about two years later.

Tom Grimshaw: Okay, good. And where was the laboratory? Was it at this current location in the little building out in the back?

Dennis Letts: No, I didn't have the formal lab built until '98.

Tom Grimshaw: Okay.

Dennis Letts: So, I had six years of where I could here in my study, on the patio, wherever I could do it.

Tom Grimshaw: Okay. And just to retrace, we took some pictures of your lab and with you near the lab before we started this interview. And in addition to the work that's going on in the lab, you also have, your garage is the backup to your lab where you do some of the heavier work as I recall, like machining and that sort of thing?

Dennis Letts: Not Anymore, of course. My experiments have become much more sophisticated, and they've certainly bypassed ability to machine and do things. But in the early years, yes, I made my own cells, cell lids in a crude fashion with simple equipment. But yes, I did a lot of shop work out there. About when I got involved with Scott Little, he did a lot of machining for me. That was at a much higher level of quality than I could provide. And then in later years, of course, I started using machine shop for more professionals results.

Tom Grimshaw: So when you started, you spent the early months and years getting node up, learning about the field. And then you started experiments at the date that you said. And like so many in the field, like almost everybody in the field, you were using electrolytic cells. Talk to us a little bit about your initial cells and then pick up the thread, if you would, before I interrupted you.

Dennis Letts: July of 1992, I began with experiment number one, which was the electric chemical cell and was stimulated with a radio frequency at around 82 megahertz was my main frequency. A lot of this was done in conjunction with John Bockris in his lab. Charlie Becker provided a lot of the equipment, some of the funding. Within a few months though, Charlie Becker got very heavily involved with ENECO, and I was left to my own devices and continued to provide my own funding for continued experiments.

Dennis Letts: Right now I'm at experiment number 810. That's reactor number 810. And from each one of those, I typically do 10 or 15 experiments. So very quickly I was doing hundreds if not thousands of experiments starting in '92.

Dennis Letts: I worked for eight years with just radio frequency stimulation. And one day in the year 2000, I believe in the fall, September, October I had a failed RF experiment, because I had used a gold anode instead of a platinum anode to save money. And the golden road work fine for a little while until I got the current up pretty high and temperature up fairly high, and I was using a high concentration of lithium. And all of those three items conspired to make the goal transfer over to the anode and completely ruined my RF experiment.

Dennis Letts: So, I quickly opened the drawer to look inside the drawer for some other object, and I saw at laser pointer that I purchased from Radio Shack, and it was about a 670 nanometer one milliwatt laser pointer, quite harmless. I put a clothes pin to hold the button down on it so it would stay on, fixed it in a small vice, and aimed it on the cat though that had been globbed over with gold. And turn my back to do something else. Within three or four minutes, the temperature of the cell had risen a degree or two and was going up pretty quickly. So I realized right away there was something odd going on. A one milliwatt laser should not do that.

Dennis Letts: I immediately called my colleague Dr. Dennis Cravens and describe this to him, and he said the same thing, "You're onto something. Let's explore it." So, that led to buying a second laser and putting them on together in one spot. And as it turned out, I believe it's a 669 nanometer laser. So, it was just the right difference in frequency between the two lasers to create a beat. And as I recall, it might've been around eight or nine terahertz. And the two laser lasers together, still weak at two milliwatts total, caused the temperature to go up four or five degrees and a hundred milliliters or so of lithium deuteroxide. We all knew right away this was unusual, and there were only two of us at the time involved heavily in that laser experiment, myself and Dr. Cravins. So, we decided to explore it a little further and try other laser pointers.

Tom Grimshaw: So, this is a big part of the story. So, I'm sorry to interrupt you here, but I want to fill in a little bit of background information. I think you said earlier you got the original idea for stimulating the electric chemical cell, which was designed along the lines of a Fleischmann and Pons type of electrolytic cell. And you landed on an RF stimulation from Charlie Becker. Can you just briefly say how you did come to get to know Becker, and tell me about the conversations that led to the RF. And then we're going to get back to the laser in a minute.

Dennis Letts: When I was in Bolivia, spending my time in the evenings studying physics and reading these papers, I'd read a paper by CD Scott, Chuck Scott from Oak Ridge, Tennessee, and Dr. Scott had performed some experiments of that turned on very similar to Bockris's. We had a lot of data points, a lot of well record a data points. And I studied those and came up with the idea that this stimulation method might be related to nuclear magnetic resonance, these deuterons might be lining up in a certain way with a magnetic field, even though one wasn't present at the time, necessarily not a big one. But the anode could provide that for us. So I got the idea of internal magnetic fields created by an orbital electron in some of the deuterium, not all, and made the calculation. And that's where I came up with the three frequencies of 82 megahertz, 365 and 533.

Dennis Letts: I then needed to gain some expertise quickly in RF. And I just went through the phone book at that time. We had no internet. So I went through the phone book and looked up any keywords that had technical in it. And Charlie's company name in San Antonio was Technical Concepts. And that led me to Charles. When I described this to him. He said, "You know, that is really interesting." He said, "Come down and let's have a meeting." So, this was like '91 or so by this time.

Dennis Letts: And I went down and we had a meeting. He said, "You know, you may be on to something. Your idea sure matches the raw data pretty well from Dr. Scott." So he said, "I'll tell you what. Let's be partners. I'll establish a company called Energy Research Group.You'll own a quarter, I'll own three quarters, and I'll put some cash in." And that's how it began.

Dennis Letts: And that allowed me to start with radio frequency stimulation with some funding, some equipment, and Charlie's expertise on how to couple radio frequency energy to metallic objects. And we knew, of course, a high frequency RF won't penetrate very far into the metal, but it didn't need to. It's a surface phenomenon.

Tom Grimshaw: Okay, perfect. And you said you were working with John O'Mara or O'Malley Bockris who was at Texas A and M, you said College Station. Were you doing experiments at his laboratory in A and M? Or were they here in Austin?

Dennis Letts: I took my experiment to John's lab, Doctor B's lab. We ran it down there a few times. And then on one interesting occasion Dr Bockris went to the offices of ENECO up in Salt Lake City awhile later. And I flew my experiment up there and set it up in ENECO's lab and ran the experiment there and got a very strong positive result with the RF. At that time then Bockris invited me to write a paper with him based on those experiments at his lab.

Tom Grimshaw: Okay. So it's

Tom Grimshaw: worthwhile to point out at this, at this time that apparently in addition to the company that he had formed with you, he also formed another company which was in Salt Lake City, which became ENECO, E-N-E-C-O, which you mentioned earlier. That was a separate company from the one that he had formed with you, I take it.

Dennis Letts: That's correct.

Tom Grimshaw: And so, you apparently gotten him interested in the field, and then he went and contacted people in Hal Fox who was running the lab in Salt Lake City, right?

Dennis Letts: Under the name of FEAT, F-E-A-T.

Tom Grimshaw: Okay.

Dennis Letts: Fusion Energy applied Technology, I believe was the name of that company.

Tom Grimshaw: It's interesting. Then you say, you got him hooked on the field. And so he went branching out, and he formed a different independent concert in Salt Lake City, which became ENECO, which is a sidebar to this story.

Dennis Letts: I think it was a positive influence on the field to have Charles come in at that early time. I think it was stressful for him, because that early on when nothing's going to go well. First efforts never do.

Tom Grimshaw: Right. And I know a little bit about the ENECO story from my work with Ed Storms, and again just a sidebar because our main team is your work, but what ENECO was trying to do was to get the patents that Fleischmann and Pons had filed with the patent and trade office trying to get those approved. And they did that with the laboratory in Salt Lake City, the ENECO laboratory with Hal Fox. and the lab manager became this Russian guy-

Dennis Letts: [Yan Kuchroff 00:19:41]

Tom Grimshaw: Yan Kuchroff. And Ed Storms was involved for a while, even on the board of directors.

Tom Grimshaw: So, there's a whole side story there as part of it.

Dennis Letts: Yeah, all related eventually.

Tom Grimshaw: So anyway, Charles Becker saw that through until it was clear that the patent and trade office was not going to approve the patents. And so he threw in the towel there. So, having gotten through that sidebar, let's get back to your work. You were doing RF, you were using equipment and funding and expertise from Charles Becker, and then you happened to shine this laser and then two lasers. So, perhaps if you could pick that story up where it was before I interrupted you.

Tom Grimshaw: So, we had a brief pause there, and so Dennis, you were talking about when you first shown the laser on the cathode. Where were you at that time? Where was the laboratory you were in? Pick up the story please.

Dennis Letts: Yeah, by that time.

Tom Grimshaw: Go ahead.

Dennis Letts: Oh, by that time, the calendar has advanced to the year 2000. And in the year 1998, I built my current laboratory behind my house, a 10 by 12 metal building currently filled with lots of equipment. But-

Tom Grimshaw: I was just looking for a coaster.

Dennis Letts: Oh, no.

Tom Grimshaw: That's okay. All right.

Dennis Letts: Anyway, in 1998 I built my current laboratory and equipped it fairly well. It's job in 1998 was to perform the single laser experiments. By the year 2000, I had purchased the laser equipment and everything to do that. And word got out.

Tom Grimshaw: So excuse me again for interrupting. When and where was the very first incident when you shown the laser and got the temperature increase?

Dennis Letts: That was in September of 2000, and it was in my laboratory behind my house. And it was done by accident.

Tom Grimshaw: Okay, thank you.

Dennis Letts: Brilliant stumbling. Yes. The significance of it at that time hadn't really impacted me. I was just thrilled to be able to turn something on and off pretty well, because the RF was harder to do. And I found that if you use certain frequencies or wavelengths of lasers, you would get results.

Dennis Letts: By 2003, Cravens and I had beat on it ourselves. We haven't told anyone about it, really just kept it between us pretty much. And a fellow by the name of Bill Harrington called one day, who is outside the field, but he's knowledgeable, knows the people in the field and something about the field itself. And I told Bill about the laser thing, and he said, "Oh my goodness, that sounds like something Peter Haggelstein needs to hear about."

Dennis Letts: So he called Peter up fairly quickly. This is late 2000 maybe one-ish or two in there somewhere, I think probably 2002 maybe. Anyway, he called Peter up and said, "Letts is doing something weird in his lab. He's getting results with single and dual lasers and all of this." So Peter got excited because it sort of fit in with his thinking. And he called Mike McKubre. He You was working out at SRI, and said, "Let's go to Austin and see Letts's stuff. And they got Cravens and had him come and brought Matt [Trevorthick 00:23:52] along who was a former student of Peters. And they all showed up in my lab, I think it was 2002 ish, as I recall. I'm a little fuzzy on that.

Dennis Letts: That resulted in getting some exposure with Haggelstein and McKubre. And as a result of that, I ended up out at SRI's lab a short time later, demonstrated the experiment out there, drove all of my equipment out in Kathy's Expedition, put on a demo for Mike and Fran. And it worked. On the way out, we stopped on the south rim of the Grand Canyon with my cell running in the back of her Expedition on battery power. So, I became the first and probably the only cold fusion researcher to run a cold fusion cell on the south rim of the Grand Canyon.

Tom Grimshaw: So, this is another place where I'd like to interject to get some more details. Tell me about Dennis Cravens. So, where was he working and how'd you get to know him? And then we'll come back and ask about some of these others as well.

Dennis Letts: Okay. I first met Dennis Cravens through Hal Fox. He was publishing fusion letters or a fusion newsletter or something like that back in the early nineties. Dennis had interest in magnetic fields simulation and spin chemistry and things like that. He has a Ph.D. in Biophysics Chemistry and a good background in that. So he came down to see my experiment in September of 1992.

Tom Grimshaw: He was still living in Texas.

Dennis Letts: He was in Vernon, Texas, at that time. He moved to Cloudcroft, Texas in '93.

Tom Grimshaw: Cloudcroft is in New Mexican.

Dennis Letts: New Mexico. Yeah, Cloudcroft, New Mexico. And he has a lab there now, has a pretty large facility. An aside of Dennis Cravens, he's a brilliant chap. We've been colleagues for many, many years, 27 years now. Shortly after he moved to Cloudcroft, he presented a paper at ICCF4, where Bockris presented our paper on RF stimulation and other things. But, Dennis's paper and his presentation and his background and history so impressed Martin Fleischmann that he nominated his paper as best in conference. And Dennis didn't even know it. He and Brenda, his wife, had already left to go back Cloudcroft before the conference ended. And I had to call him from the hotel and tell him that his paper had won best in conference. And he was thrilled of course.

Dennis Letts: And now we all know, of course, that he's the only winner of that award in the history of the fields and will be the only winner of that award. So that's an interesting aside.

Dennis Letts: But that's how we met, through Hal Fox. I published a paper in his newsletter, and Dennis had also, so he connected us and told Dennis, "You ought to go down and see that guy in Austin." So, he drove down. We've been colleagues ever since.

Tom Grimshaw: Good.

Dennis Letts: Going forward now again, about 2002 when we had our meeting with Haggelstein and Mckubre and Cravens, Letts, [inaudible 00:27:36], the upshot of that was we needed to work more with Peter. Peter had suggested and said, "Look, you know, the way these things work" the way he sees it, "there ought to be two frequencies that would be effective. There's a lower frequency around eight terahertz that stimulates the deuterium and palladium, and there's one around 15."

Dennis Letts: And so we said, "Okay. that's interesting." I was working with single laser stimulation at that time and was having pretty good success, about an 87% success rate with that. So, I was busy demonstrating that here. And we got a chance shortly after this meeting with Haggelstein and them to give a talk. I got a chance to give a talk at The American Physics Conference, American Society Physics Conference here in Austin in 2003. And I had been working some with Earth Tech International Health, Putoff and Scott Little. And so I did a demonstration, first at their offices, and at that time it was ... goodness, I can't remember exactly what month it was, but it was in 2003. It was March, I believe, 2003. And I demonstrated the single laser trigger to how Scott, Dennis Cravens, Tom Claytor, Ed Storms, the whole ... and Peter Hagglestein, to everybody added

Earth Tech's lab at one time. And then they all got to see it. George [Mildly 00:29:30] was even there.

Dennis Letts: I turned it on, it went up, and turned it off, and it went down. And turned it back on. It went up. Perfect synchrony with the on and off, with the laser, the single laser. So Peter had made a recommendation in 2002 or thereabouts, to use two lasers. And we of course ignored Peter to our apparel. And five years went by before we switch to do a laser stimulation out of sheer necessity because I changed metals and I was unable to get the effect back with a single laser. So in March again, I think it was, of 2007, five years later, I called Craig and said, "You know, Peter said we should try this. You know, why don't we do that?" And he said, "Good idea, let's try that."

Dennis Letts: So I had a palladium heavy water cell going and I decided I would try eight and a half terahertz, which was the lower frequency, I believe, that Peter recommended. And I put the two lasers on and tuned them to give that beat frequency. And lo and behold, the temperature went out very nicely, three or 400 milliwatts.

Tom Grimshaw: Okay. We're going to pick up that part of the story, because that's again an important milestone to have achieved with the dual laser. I want to back up and fill in a couple of things before we press ahead. Tell me about Earth Tech and how that connection started then, and how they became interested. And was yours the first that they had a evaluated, because Earth Technologies here in Austin helped Puthoff, P-U-T-H-O-F-F I believe, was the mastermind of earth tech. Scott Little was his-

Dennis Letts: engineer lab tech.

Tom Grimshaw: engineer lab tech. So, they'd been prominent in the field in the past, not so much now I think. But tell us a little bit about the Earth Technology connection, how it started and so forth.

Dennis Letts: I first heard of Earth Tech probably through Charlie Becker back in the early nineties. And my first contact with them occurred in 1995. Their office is literally five minutes, their old office on Breaker Lane was five minutes from my house. So I just dropped by one day and said, "Hi. I'm Dennis Letts. I do experiments over here." So they were very cordial, invited me and we talked a bit. And immediately I learned from Scott that he, too, had great interest in cold fusion and had interested Hal in it. And through the back door Hal was mainly interested in theory of other things at the time, but he had interest and wanted to discover something like that, but only if it was a real thing, not some fly by night business. So Scott was his gatekeeper, if you will. And if Scott said it was real, then he would accept it and go ahead and study it.

Dennis Letts: So I started with single laser stimulation over there with them and about, I'm guessing just shortly after I discovered it 2000, 2001, I took it over and had Scott come over. Then I took cells over there and set them up. So the idea was that I would show them an affect, and Scott would try to find the mistake. And as it turned out, he never was able to find the mistake that explained why the temperature of these cells would go up when you shined a puny little laser on it. And we kept at it until 2003, at least two years, maybe two and a half years. And finally after the demo that I mentioned are the ... well I didn't mention it now, we did the demo there and then I did a demo down, or it didn't do a demo. I gave a talk down at the 2003 American Physical Society Conference. That was in March.

Dennis Letts: Well, come along in August of 2003 ICCF10 occurred, and I did a demo. Cravens and I did a talk. We were invited. They created a section called triggering and we let it off. The talk we gave was also a demo. And we set it up at Earth Tech with cameras and remote control and the whole nine yards. And we did our first demo in August of 2003. And this was done with the help of Scott Little. He stayed there and made sure that everything was queued up, it didn't get stuck. So we did a successful demo, demonstrated about an 800 milliwatt trigger with single laser from Boston, first of its kind.

Dennis Letts: After the conference, Scott came in and told Hal. He said, "Hal, I have looked at this thing with as much detail as I can. I still cannot discover how Dennis is doing this by mistake or by crook or however. I won't say it's real necessarily, but I cannot find that mistake." And so Hal said, "Well, I guess we have to make a [inaudible 00:35:29], and that was the beginning of [Moac. 00:35:33]

Tom Grimshaw: Okay. All right. I'm going to pick up with Moac and the whole Earth Tech in our next recording. We're out of time on this one. It's time to start another one. And so, with that, I'll a sign off. This is Tom Grimshaw here with Dennis Letts. It's March 18th. We've been talking about Dennis's journey in the cold fusion field, starting when he was in the gold fields of Bolivia, northwestern and northeastern Bolivia I heard you say. So we'll stop this one now, Dennis, and we'll pick it up in just a few minutes in another recording.

Dennis Letts: Okay.

## Interview 3

Tom Grimshaw: Tom Grimshaw again here with Dennis Letts. It's March 18th, 2019. It's about 3.30 now in the afternoon. Dennis and I are now recording his journey of cold fusion. We have had two recordings so far. This is the third and Dennis toward the end of the last one, you were talking about Earth Technology, Hal Puthoff and Scott Little were the main players and you had taken your cell and your single laser experiment to Earth Technology for them to evaluate it. And then you had given a demonstration, a remote demonstration, at the ICCF in, I guess it was in Boston, you said. So pick up the thread there if you will please, complete that story and we'll move on and on.

Dennis Letts: Scott Little worked for Earth Tech International, founded by Harold or Hal Puthoff. Dr. Hal Puthoff, who's a famous, pretty famous theoretician, very smart fellow. Very nice generous guy. Hal wanted, his goal was to find an energy source that could help save the planet from itself, and was funded by some famous European people, famous European family.

To that end, Scott was his gatekeeper, and was always looking for experiments that claimed over unity, more energy out than put in. And I was making such a claim, albeit a small amount, a watt or half a watt. And his job was to find the mistake and report it and clarify it. In my case, in August of 2003, after working with Scott for two and a half to three years, he came to the conclusion that he could not find the error in my work. Not that there couldn't be one, but he was not able to find it easily.

So Hal told him, well, it's time to make our own calorimeter to study these single laser cells. And they then budgeted and designed and built a large machine called MOAC. I actually believe I named it, I called it the mother of all calorimeters one day and so the anagram stuck, MOAC it became.

And MOAC was a marvelous machine. It was capable of a fraction of a percent precision, measured things very, very carefully and it was designed by three people. Scott Little, his daughter, Marissa Little and George whose last name escapes me at the moment, but he was an affiliate of Scott's who used to be his old boss, I think, at one of his jobs for the 70s and 80s. George did a lot of electrical work on it and programming and so on, so forth.

So it became a high level precision instrument and it, for me, it became the thing that I had to overcome and challenge. I wanted to make progress. The short notice on that was I was never able to successfully overcome MOAC and present a clear image that there was real excess power. This is a flow calorimeter and it was very hard to work in, are some excuses I could use. But I was just never able to make a cell work there with a single laser.

It was about the time that I was losing my ability to do so, as I recall, I spoke of this earlier, that by the time August 2003 rolled around and I did that plastic experiments up in Boston ICCF 10, we did a demo, and that was my last piece of palladium for my original batch. So I had to change palladium batches and I never could regain single laser stimulation.

Tom Grimshaw: Where was your palladium from?

Dennis Letts: That particular batch of palladium was a very large chunk that made many palladium pieces, cathodes over the years. I got it from Ebay or lab x, one of the two, I don't recall where, but one of the Internet marketing places and I got that and perhaps, trying to think, 2000, late 90, early 2000.

I kept it around for quite some time, made several cathodes out of it. It was a piece that had been taken out of a instrument they used in a nuclear measurement business. I don't think it had been radiated, it was not that kind of an instrument, but it was a big... Think it was used for purifying heavy water further, get it ultrapure.

So I ran out of that. And about the same time that MOAC was being designed, I had run out of that in August or so of 2003. So I lost my Mojo, if you will. I worked from 2003 until 2007 and made many, many cells. A number 602 was the last cell that produced single laser excess power production. And by the time I had made my next cell that worked was number 662, and it was the first cell in a series that worked with dual laser stimulation.

So four years went by and some 60 cells were made that were not successful at all using single laser. And that's what motivated Cravens and I to give up and use, finally listen to Peter Hagelstein, which experimentalists are sorely disturbed when we have to listen to a theorist who happened to be right in this case, may happily admit.

So that is the long and the short of my excess power production and it was single lasers and everything then switched to dual lasers. And that story began in March of 2007 and ran only two years. 2007, 2008 we did those experiments. We started with 662 and experiment number 662 and I believe we were through, we were finished by 670. So we made eight cells, but they ran for very long periods of time. We typically ran 50, 60 tests per cell. So we made lots of experiments.

Tom Grimshaw: You and Dennis Cravens were doing this work at that time and was Earth Tech still involved?

Dennis Letts: Earth Tech was not involved with dual laser experiments for probably several reasons, but the main one was because it's not room enough in the calorimeter to at least conveniently have two lasers going. So Cravens and I, and joining doctor Peter Hagelstein at MIT. To join in we had to embrace him as our theoretical voice and apologize profusely for ignoring him for five years. But the three of us worked together for the two year period, 2007, 2008, and wrote several papers together, on phonon stimulation and dual laser simulation of the palladium lattice and our work terminated in 2008 on the dual laser experiments. We did, however, continue some collaboration following that in co deposition work. If you're ready for a discussion.

Tom Grimshaw: Yeah, just about. I would also point out that 2008 is about the time that you came over to the LBJ school and we met in the undeveloped third floor of the LBJ school at that time. And you fill me in on cold fusion because I was, I had used that topic for a term paper and then it became a thesis. And so that was about the time that we started our communication and having lunches and so forth.

Dennis Letts: It's been a decade.

Tom Grimshaw: Yeah, it has been. And so, let's go ahead to the next step. Tell what happened after the dual laser experiments came to an end. Why did they come to an end and what was next?

Dennis Letts: Well, the dual laser experiments had to season a bit and I think percolate through the community before they became recognized as something of value. And I believe Peter had a lot to do with that. He used them in the basis of his talks. So my interest in cold fusion continued, but I chose to express it with doing some different experiments. By the time you do a few hundred experiments, you are ready to plough some new ground and there was no big driving interest in them at the time. That came later.

Tom Grimshaw: So was this also when you developed the multilayer cathode preparation procedure? Was that part of this exercise or was that another time?

Dennis Letts: Well, let's see. The... Sorry. I was afraid that would happen.

That's probably Dennis.

Tom Grimshaw: Okay, we'll stop.

Okay. So you decided not to answer that phone call, so go ahead.

Dennis Letts: The protocol that I follow to make the dual laser and the single laser stimulation work was a 17 step protocol that I developed just empirically, just by guessing at what to do. And when the single laser protocol worked, I made note of my lab notes very carefully and wrote down every little step that I did to make the cathode to make that work. So that was, that became the basis for a single dual laser stimulation.

Tom Grimshaw: So, tell us a little bit about that procedure and how did you figure it out?

Dennis Letts: Well it was just trial and error. Basically it's detailed 17 steps, but the general approach is one of cleaning the cathode and scrubbing it, if you will, with the brushes on a Dremel tool, a fiber brush, actually a metal brush first, then polish the detail down with a fiber brush, metal fiber. When you finish with the metal, it's all, it's highly textured surface. And then you get the fiber brush using a compound that's used to make very highly polished surfaces and it's aluminum oxide basically.

And I found that if you did that, and then if you went through some of the steps after you did all that and you cleaned it thoroughly, ultrasonically cleaned it, and then you did an annealing step to relax all the metals back. There were three annealing steps in the process. One, the first one, at 750C, see the other two at 850C.

The higher temperature ones tend to rearrange the crystalline structure a bit. And I found that I never could find out which steps to leave out. I tried for a long time trying to shorten this down and find out which ones are critical. Well, I never did have a cell that would work if I left out a single step. So I bit the bullet and followed all 17 steps. And then the loading protocol can be found in all the papers that we've written. Low and slow loading as recommended by Cravens. And then high current loading at the end.

And then we plated things with gold intentionally this time. And then I found that they could be stimulated with single and or later dual lasers to produce excess power.

Tom Grimshaw: Okay. Thank you for that little side trip there on that 17 step procedure. Because I did remember that from our previous conversations. Anything else you want to mention before we go on to what you did after you kind of got completed with the dual laser experiments? Ready to move on and plough new ground?

Dennis Letts: Probably ought to recognize the contribution of Ed Storms to all of this. Back, I'm not sure how he found out about this exactly. I may have called him and told him, but Ed got interested in the single laser stimulation and requested some information on how to do it. And I sent him a laser, a little premade laser holder that I had made up, that would keep his laser at about the right wavelength. And then, I think I might've even sent him a prepared cathode. I don't recall.

Certainly he made one himself. And in Ed's usual style, he figured out a better way to do it and that didn't need all the steps, so he was able to figure that out. But the important thing there was that he said it's refreshing to see something that actually works. Because he was able to see the turn on, he had a cell that was already making some power and then he shined the one, was enough, maybe a 10 or 12 milliwatt device on there, but this time in his highly sensitive Seebeck calorimeter I believe, and temperature took off and you know, made a half a watt or something like that, but very significant, much, much stronger response than just the laser. So Ed more or less made me, turned me into a made man, if you will, in the Cold Fusion field by doing a replication.

It was the first replication that really made big news. Cravens had replicated it before in his own lab, but when Ed Storms does a replication, it has far reaching repercussions. So it really helps spread the news about the single laser.

Tom Grimshaw: But he did it without the 17 steps you said?

Dennis Letts: Yeah, he'd modified a few things and figured out some shortcuts and I don't recall exactly what they were, but he wrote a paper on it in ICCF10.

Tom Grimshaw: Okay.

Dennis Letts: So, his influence in the field is always great and it has borne true in our case too with the single laser.

Tom Grimshaw: So I want to step back. I returned a large oversize experimental description document to you from when I visited McKubre when he was getting ready to leave the laboratory. Was that from that very early work? So that document is probably still available somewhere around here?

Dennis Letts: Yes, I have it in the drawer. As you recall, I mentioned that [inaudible 00:17:13] and I drove out to SRI in 2002, I think. April, as I recall. And went to Mike's lab. Took all of my lab equipment out to his, set everything up and the cell had traveled a long ways out there so it wasn't producing immediately on this. We arrived on Sunday, set up everything and got it ready for Monday morning and it wouldn't produce.

So I told Mike, I said, and of course everybody's gone, Oh Man, not another. Can't get it to run. I said, give me a moment. So Monday night Mike and I spent an extra hour in the lab or so and I took the cell in and took it apart and cleaned the cathode off and rubbed it with my fingers and cleaned the crud off the cathode and reloaded overnight at a low kind of a modest current density and then cranked it up that next morning at nine o'clock and it didn't take long, a couple of hours to get stable. And then I shined on the light.

My claim to fame was I could do this with a magnet, also magnetic field stimulation and also with a single laser. I demonstrated both successfully in front of Mike McKubre, [inaudible 00:18:33], Matt [phonetic 00:18:35] (Trevithic) and [inaudible 00:18:36] another person. Worked fine and kind of established that it was a real deal.

So as part of that, I made this book up for Mike and that's the large oversized book that you see about how to make things go.

Tom Grimshaw: Yeah. Okay, good. Maybe we can include that in this project. Okay. So I think we're now back to where you had completed your single laser and dual laser experiments. What happened then?

Dennis Letts: Well, the next thing up was work by a very well known colleague, Mike [phonetic 00:19:15] (Milich), Dr Milich, he wanted us to do and really funded a nice program. He was instrumental in getting the navy to fund, I think five laboratories, mine, Craven's, Al Miles, Dave Nagel and [inaudible 00:19:32] One other person whose name I don't recall at the moment. And no one in this particular, it was a co deposition experiment by the way, which was developed by Pam Boss, Dr Boss and her colleagues out at the west coast NRL and-

Tom Grimshaw: Also known as SPAWAR, space and ware for my systems. And I think that it was my understanding, the original idea for co deposition was from Stan Spzak.

Dennis Letts: Yes.

Tom Grimshaw: Which is S-P-Z-A-K, I believe.

Dennis Letts: I believe so. Yes. Of Stan was very advanced age fellow at the time, but brilliant. And he discovered that if you co dep, if you co deposit palladium and deuterium at the same time onto a copper substrate, it produces excess power readily. And this was discovered in like 1990 or so.

Tom Grimshaw: Very early.

Dennis Letts: Very early on. The problem is it was very hard to reproduce if you didn't have the skills of a Stan Spzak or a Pam Boss, and electro chemistry became very hard to do. So Michael, being a navy man himself and highly respectful of what they've accomplished, he asks several of us people in the lower echelons of experimental science to see if we could reproduce this effect. And Michael got the admiral to grant about, I think it was a $20,000 grand for each one of the labs. And we were tasked with repeating or trying to replicate their work.

Everybody replicated well at first, Mike, I asked Mike, what do I do here if I don't get results? He said, throw everything at it you know including your grandmother's corset. Exactly what he said. I said, okay, so out comes the corset. None of us were, I don't think any of us got any of the labs got, were able to reproduce the effect as prescribed.

Tom Grimshaw: And so other names that come up in connection with the co deposition work in the CR 39 work at SPAWAR. I think, let's see, Larry [phonetic 00:22:02] (Horsley) was involved and who helped with ICCF 17, Frank-

Dennis Letts: Gordon?

Tom Grimshaw: Frank Gordon was a part of that effort as well.

Dennis Letts: Right, yeah, they did a lot of fine work out there.

Tom Grimshaw: At SPAWAR and this, and it was their co deposition work that Milich was trying to get verification at maybe five labs, you said?

Dennis Letts: Yeah. Let me see. Let me read those. Mine, Cravens, Hal Miles Nagle.

Tom Grimshaw: Miley?

Dennis Letts: No. I don't know who the fifth was. I'm sorry, I'm just drawing a blank.

Tom Grimshaw: That's okay.

Dennis Letts: But anyway.

Tom Grimshaw: But nobody was able to do so?

Dennis Letts: I don't believe any of us were able to follow the protocol and get results. So in the spirit of throwing my grandmother's course it at it, I decided well gold was effective in our experiments, so why wouldn't they be helpful now? So I plated gold on top of the copper and then instead of waiting for a long period of time and slow and easy co deposition, I intentionally upped the current pretty strong, half an amp at least. And they would go along in milli amps for a long time and put a nice smooth surface down. I wanted a gross ugly course surface, had lots of unbound space, lots of vacancies.

I did my first test and as soon as I put the co dep on it, on that gold surface, up comes the excess power like crazy. It would make a half a watt pretty easy. And so I reported this back to Mike and everybody and so they said, do it again. So repeated this several times.

And Peter was the theoretical assist on that to clarifications for clarification. So we consulted with him, what in the world this could be and he said, well, it's probably the coarseness has helped get that surface developed for that. And so we wrote a paper on it later and reported to the admiral and to the navy first, full report, still have all of that on my computer.

And then we wrote a paper for one of the conferences around probably an ACS conference, probably 2010, I'm guessing, and pretty well received. Had all the explanations and I was using at the time, I developed a low temperature Seebeck for this experiment that would show I have about a 1% precision and show very clearly when these excess power signals switched on.

And, we found it in a protocol that we used for these co dep experiments, light water definitely did not work, but heavy water did. In fact, I had, I was pretty bold back in those days, I guess. I would, I ran a 684D was the number of the experiment. I turned on the experiment with co dep and it made a quarter of a watt in that range. Nice, clear signal. Five or five times the variation in my calorimeter. And then I pumped very quickly pumped the electrolyte out of the cell and replaced it with a white hydrogen, H2O base electrolyte. And over a period of several hours, 10 or 12 hours, slowly, slowly, slowly the excess power signal disappeared and went back to baseline.

So it was a textbook case of power on, excess power appears with D2O, disappears with H2O. So that proved that an isotope seemed to be important that-

Tom Grimshaw: You still working with Cravens during this period?

Dennis Letts: Actually that was, this was with Peter. Cravens had his own [inaudible 00:26:47] experiments going out there. They didn't work. He chose not to do the grandmother's corset approach. So he didn't feel that he was motivated to do anything else what he had contracted to do and returned to some of his experiments he was interested in.

So this was kind of individual laboratory efforts.

Tom Grimshaw: And here is Europe. Backyard laboratory.

Dennis Letts: Yeah.

Tom Grimshaw: Yup. Okay.

Dennis Letts: And so Peter and I wrote a pretty nice paper and a slide show for a couple of the conferences and the co dep in my opinion was clearly demonstrated that it really worked isotopically dependent.

Tom Grimshaw: Anything else you want to say about that phase before we move on to the next one?

Dennis Letts: I think that's about all. I think it's important to stress that Pam and Stan were correct in their claims that excess power came on very quickly with co deposition.

We did have to change the protocol just a little bit, but the basics, the basic tentative co deposition I think was upheld.

Tom Grimshaw: And they were using excess heat as the signature at that time, I guess. And then the CR 39 nuclear tracks came later.

Dennis Letts: Right.

Tom Grimshaw: Okay. So you weren't, so the work you were doing as a follow up for them was before they started doing the plastics tracks.

Dennis Letts: I never did. I have a book on CR39 use, but I've never really applied it.

Tom Grimshaw: Yeah. Okay. What's next? What was after that?

Dennis Letts: Well, there was sort of a period of time we re wrote some papers based on the older work. 2010, 11 and 12 were pretty uneventful. I didn't do anything. I didn't plow any new ground at the time. Wrote a few papers here and there and did a lot of internal papers and studies on my own. Then in 2012, my life began to change, I think for the better.

National instruments contacted me in 2012 and said, hey, would you help us put on a Cold Fusion demonstration for NI week involving your colleague Francesco Celani from Rome? And I said, well, of course.

And, Dr T and his group of engineers came over to visit my lab several times. We're a mile apart or less. And so 2012 found me with heavily involved in the heat of summer with Francesco here developing his reactor, his rocket as he called it, for presentation down at NI week at downtown Austin.

This heavily involved Dr T, Dr [phonetic 00:30:03] Jim T Shari and [phonetic 00:30:06] Kumchezea, doctor Kumchezea who was his research right hand person, I think they're called vice presidents in the corporate trade. And it allowed me to go down and interact at NI week and I met some very important people that became very important to me later in the following years.

Tom Grimshaw: A couple of other names to mention and in that connection were Stefano [inaudible] and I think the tech at that time was glass, wasn't it? Brian Glass?

Dennis Letts: Yes, Brian Glass was kind of a newcomer, a trainee or a neophyte, whatever you call it, a newbie engineer at national instruments. So he drew the black bean and the short straw and had to work with the cold fusion nerds and did a great job by the way. And came over and camped out at my lab and wrote code and did all kinds of great things.

Tom Grimshaw: And, let's see, the other person I'm trying to think of it and all of a sudden it flew out of my mind the guy from East Germany.

Dennis Letts: Oh, Lother Vinsel? [phonetic 00:31:14]

Tom Grimshaw: Lothar vinsel, he was involved at that point was he not?

Dennis Letts: Heavily involved, Lothar was, as you know, was Dr T's right hand guy for Cold Fusion and various other things. And Lothar came from East Germany and with a PhD in physics and a master's degree in computer science. So he was very savvy on how to program things and how physics works and the impossibility of Cold Fusion, in fact, which made him a great advocate for doing this. You know, he sees the impossibility of it.

Tom Grimshaw: Yes. He was always a considered a kind of a skeptic.

Dennis Letts: It made him a valuable asset I think for Doctor T. However, he did a very good job of putting all this together and we went down to the conference. Brian was writing code an hour before we were to leave for downtown and finishing things off and we all went down as a group and set up Chobani's experiment on the conference floor.

Tom Grimshaw: And the programming you're referring to, of course, is lab view. Lab view was central to this operation in terms of detection and signal processing.

Dennis Letts: Yes. He did a great job and lab view is what I use. I've used lab view since about 1995 or so, in one form or the other and it's a wonderful product. It's running right now on my computer out in the lab. We're monitoring its activities here.

Tom Grimshaw: Okay. So we're gonna stop here. We're at another 30 minutes and we'll hopefully pick it up on another session here shortly.

Dennis Letts: Okay.

Interview 4

Tom Grimshaw: Tom Grimshaw here. This is session number four, I believe, with Dennis Les. It's March 18th, 2019. I believe it's now about 4:15 PM. Dennis, I think we're doing great on these recordings. And, I think in the last one we got up through about 2012, when you were talking about working with National Instruments to set up the Francesco Celani experiment for NI week. And then that went on to ICCF 17 in Korea. He took that same demonstration, later I think, even in the same month of August of 2012.

Dennis Letts: Yeah, he left from here.

Tom Grimshaw: Left from here and went to ...

Dennis Letts: Straight to Korea.

Tom Grimshaw: So, I don't wanna be telling your story. Pick it up please.

Dennis Letts: Okay. In the Summer of 2012, I was asked by the National Instruments people to help host Francesco Celani demonstration that he was going to give at NI week, which is a week long technological fest in Austin, Texas, hosted by National Instruments. Dr. T likes to invite a key market segment to the conference every year. And that particular year, the conference that was selected was coal fusion, or low energy nuclear reactions, LENR.

How that came about was the splash that Mr. Rossi had made recently, right before that. That caught the attention of Dr. T, and Stefano Concesi. Stefano is, of course, Italiano. So he had great interest in a fellow Italian making good. Unfortunately, it became very clear to Dr. T, and his group that a deal could not be struck with any rationale to it with Mr. Rossi. So, they backed off and sought the participation of another fine Italian colleague of ours, Francesco Celani.

Celani's the real deal. He was works hard. He's contributed a lot of discovery information to our field. And he had a device that worked with concertina wires, relatively low gas pressure. He would heat the wire and it would get hotter than it should with light hydrogen, I believe is what he would use. They needed a place-

Tom Grimshaw: He used both.

Dennis Letts: He used both, okay. And I needed a place to set up shop and that could host the Celani experiment here, and also give some assistance downtown at the conference. And I agreed to do that. So, they spent about a week. Francesco came to town about a week before the conference, and spent all that week in my lab with Brian Glass, and the NI engineers putting things together and writing code [inaudible 00:03:30] to handle Celani's demo.

Now, Celani did not plan for this to be a real scientific experiment because he was not allowed to do calibration work down at the conference. He had to just come in cold and do a demo. This is how it works, and this is what it looks like. The calibrations were not sufficient because they had to be made on site with Argon gas and gas bottles, which they would not allow in their conference center.

So, we did all of the loading of the reactor out here at my laboratory with, in this case, light hydrogen. And took it down on the morning the conference opened. An hour or two, or so, early. Barely got everything up and running by the time the doors opened. He had a successful demonstration. In fact, Dr. T received the most emails, and notices and feedback from the conference attendees that he had ever received before by a factor of several. He was quite pleased with that. So, it was a good marketing success.

Benefit for me was that I got to do a favor for a great guy, Dr. T, and meet Lothar ... Lothar Vinsel and Brian Glass. But I also ran into an interesting chap named Dewey Weaver, from Raleigh, North Carolina. I'd never heard of these guys before. Totally cold. Slowly got introduced to them over the course of the conference.

Tom Grimshaw: So, let's pick up on Dewey Weaver and that organization. We'll pick that up in a minute. Let's catch up on a few details. It was in 2008 where you and I ... I think around 2008, that you and I first worked together. And I think it was you who reported to me that during that particular NI conference, and during the key note speech, Dr. Truchard made mention of a master's thesis from the University of Texas, that he had read about the level of evidence for the existence of cold fusion.

So, I'm forever grateful for you bringing that to my attention because that's stuff got in touch also with NI and worked on the Celani experiment. Not in setting it up, but in ... I had a project with him. Funded by Dr. Truchard to see if others had been able to replicate what Celani was claiming. So, I wanna thank you for that 'cause it was a big step in my career, and my trajectory in the cold fusion field.

Anyway, go ahead if you would. Is there anything to close on the Celani experiment?

Dennis Letts: Yeah, I will but I would like to reinforce what you just said. I was at a lunch ... Having a lunch over at NI with Lothar, early on. With Lothar, Dr. T, and a couple other guys at the lunch table, and he mentioned to me, he said, "You know ..." I May have asked him how he got involved in this and all that. But he said, "You know, I got involved with this because I did some research on cold fusion." After he'd heard about Rossi. And he was saying, "Does UT have any knowledge of this sort of thing?"

And he looked up some information down at the University of Texas. And he said, "I didn't connect the two immediately, sorry to say. But, it dawned on my pretty quick after that." He said, "I've found a master's thesis on cold fusion and it's impact that's it's gonna have, possibly, on federal policy. State, local, and federal policy.

I though for a minute. I said, "Gee, that sounds familiar." Then I said, "Oh, my goodness. " I said, "Is that the work of Tom Grimshaw, Dr. Tom Grimshaw?" And he said that's exactly who it was.

So, you, Tom, my colleague of a decade greatly influenced the field because it was you who brought National Instruments into cold fusion, albeit for a couple of years. But more importantly, it linked up industrial heat and the researchers in cold fusion.

Tom Grimshaw: Good.

Dennis Letts: That was a milestone, and I apologize for leaving that out. I'm being self centered today, but it's your fault.

Tom Grimshaw: As instructed. Yeah, and so, I think before we go on to the Dewey Weaver, and the industrial heat connection, there was a period of time after Celani where you and I worked together with National Instruments trying to ... You had this idea that you actually described to Lothar over lunch, about your equation. And Lothar said, "Well, let's pursue that at your laboratory, and I would be involved." Tell us a little bit about that.

Dennis Letts: Well, yes that's exactly right. There was a little interlude there. After the NI conference ended in the Summer, probably August of 2012, we had a year or so to kill in between that. The next NI conference, the following year, which was equally important for me, anyway. And I suspect for you too. We did some work with Lothar and Dr. T over at Earth Tech's new lab. Again, five minutes from my house.

The goal was to, perhaps nail down some of the objections that Lothar had developed. And that was the effect of gradients upon our measurements. Temperature gradients in a cell. So, we sought to prove some of that out, and too demonstrate that we could turn it on. We even used some lasers for that. Lasers weren't terribly effective at that time, but we tried them. I think we had some reasonably good results.

Tom Grimshaw: It was a very large magnet, I remember, that was a part of that.

Dennis Letts: Yeah. We set the magnets up because that seemed important to the theoretical side of it. Why it runs. But, if you recall we did some tests that involved putting a temperature probe down inside of a tube, and then we plated the tube with co-deposition material using the spot boss method. Low and behold, when you switched from an inert cathode to an active cathode you would get a couple watts, or thereabouts. A watt and a half of excess power would show up very quickly.

That seemed to warrant thinking that this was a real effect. The reason that the temperature probe was put inside the cathode tube was to simply eliminate the possibility of thermal gradients. The idea behind the thermal gradient is, you take a temperature at the coolest spot with one probe, and then report the temperature with another probe at a hotter spot. And you say, "Oh gee, I'm getting a big power gain." Well, stirring is supposed to fix that, which it does in many cases.

However, if you put your temperature probe inside the cathode where all of the energy is deposited first, it, by the laws of thermal dynamics, it is the hottest spot in town. There is no way for you to find a warmer spot in that electrolytic cell, than right where the electrolysis is occurring. That's the hottest spot.

So, it completely eliminates the argument of thermal gradients being responsible for a false positive excess power signal. So that's why we did that, and it worked. There may be other issues, but it certainly cannot be a thermal gradient doing it.

Tom Grimshaw: Right, and you observed an effect, a linear effect, which I think then became important later when you started your affiliation working for Industrial Heat, if I recall. Which we'll get to in a minute. And then it evolved from there. Tell me about your equation. The one that you and Lothar discussed over lunch that kind of triggered this whole episode of collaborative work with NI.

Dennis Letts: The equation you refer to, of course, is one that I developed, somewhat out of despair. Rossi came in the picture pretty strong by 2011, and thereabouts. '11 and '12. And it appeared that he had it figured out. There was no reason to do milli watt experiments when he'd already figured out how to make megawatts. But, we pretty quickly concluded that that probably wasn't all it was meant to be.

However, for a period of time, I was discouraged from doing experimentation so I worked on the board behind you, under the banner of modeling excess power and DPD systems. That was written about 2012, or thereabouts. And it stayed there all the while. That's where I developed my equation. This was published in the journal that we have edited by Christie ... What is her name?

Tom Grimshaw: Christie Frasier. It's Infinite Energy.

Dennis Letts: Yeah. Back in 2013, I believe. What it sought to do was to find one equation that you could fill in all of the parameters with only experimental data and get the right answer for the excess power observed. I discovered that relatively simple for a component equation, which I won't get into. But, if you account for the four elements that make up the equation, that information can be provided directly from the experiment. No reason to make up numbers, no reason to massage data. Use direct experimental data, you'll come out with the right answer.

Tom Grimshaw: What are the four? Do you recall?

Dennis Letts: Yes. I might have to stutter and stumble a bit since I haven't thought about it for two or three years. But the magnetic field strength is one. The temperature of the cell is another. The mass of the cathode, or the weight of the cathode, or how much material you have present. And the queue value for the DD reaction. So, with that you find out how fast the reaction occurs, how much energy is given off per reaction, how much material you have there to compute the number of vacancies, and so on and so forth.

So, it's basically driven based on Hagelstein's ideas, that D and D will enter the vacancy, get together to form helium 4, and then give out 24 million electron volts every time a reaction occurs. And, with those basic items you can compute excess power. And I've applied this to more than 50 experiments and it nails it every time.

Tom Grimshaw: It's an empirical equation, of course.

Dennis Letts: Empirically based equation based partially on a little theory from Peter.

Tom Grimshaw: Yeah.

Dennis Letts: His idea of where this occurs. You can compute, if you know the temperature of your cathode or your catalyst, and if you know how much there is, you can compute the number of vacancies that are available for occupancy. And that's what I was able to do. And that caught the attention of Lothar because it was physics, and he was interested in that. I was able to show that it applied perfectly well to our 50, or so, dual laser experiments.

Tom Grimshaw: Okay. So, that kind of covers the NI connection, I think. You were starting to talk industrial heat, and Dewey Weaver, and you made reference to the connection with industrial heat and NI. Why don't you pick up the story at that point.

Dennis Letts: In 2012, I was with Celani down at the conference center here in Austin. And there's a very tall fellow, southern accent. Very nice gentleman named Dewey Weaver came up to me and introduced himself, and he said, "I've seen your work around, heard of your name. And I just wanted to shake your hand and let you know that we're interested in your field, and we're just kind of looking around and kicking tires. If you have anything you would like to discuss with us in the way of a project, or anything like that, please let us know."

Well, I was distracted, other issues at the time, so I just filed it away, took his card, and I told my wife about it. I said, "I met a very nice southern gentleman down there at this NI week. It sounds very promises." I didn't know about IH, I didn't know about Rossi. The connection there with Rossi, even though I'd heard nothing by that time.

So, time passes. I'm still doing my work, and doing my calculations. Not too much experimentation at that moment in time. 2013 rolls around, Dr. Cravens says, "Would you host my experiment like you did for Celani? I'd like to bring down my brass spheres experiment, and demonstrate that at NI week.

Tom Grimshaw: The following year?

Dennis Letts: The following year, 2013. So I said, "Sure. Yeah, sounds like fun." So, August shows up, he applies for a both and he and ... Who went with him? Rod Gimpel, I think. I believe Rod Gimpel, kind of a side experimentalist in the field. They came down to work in a booth. And so I set it up the best I could. I helped them as I did Celani. Introduced them to Lothar and Dr. T, and everybody there.

Tom Grimshaw: Had you used your laboratory in getting his cell ready for setup, at all? As you did Celani?

Dennis Letts: I didn't have to because he had everything prepped.

Tom Grimshaw: Okay.

Dennis Letts: He didn't have to disassemble it for travel. He brought everything in a car, so it was all pretty well prepped. I did help him move it in and help set it up. I think I wrote the labview code for the collection of the data for him. It caught Dr. T's attention, and several of the engineers came down. The idea behind it was, you put the same amount of power in each one of these spheres, similar environment, and one has some magic sauce in it. Some catalyst that is prepared to host a reaction, and the other one is just a sphere. Otherwise, they're as identical as he could make them.

There was a significant temperature difference in the one. They were running side by side in a controlled environment. So the question is, how can you provide the same power, or heat, if you will, to the identical spheres prepared in identical fashion, and identical environment, and one is running hotter than the other one for days, weeks on end. So, that was sort of a fun demonstration experiment.

Well, it also caught the attention of Dewey Weaver. He came by again and introduced himself. This was 2013. And he said, "Oh, Dr. Cravens, it's so good to see you again." They'd met before, somewhere. "Oh, and Dennis, good to see you." Again, here at NI week. He said, "Have you thought about anymore about what you'd like to do next. We'd like to consider funding one of your experiments, or whatever you wanna do?" And I said, "No, I really haven't." And I hadn't.

But, I went home after NI week in 2013 and I thought about what he said. And I said, "What would I possibly do?" And I was in my lab at the time. I looked over at my helium 3 neutron detectors, which is a foot long, and an inch stainless steel tube with a high voltage connection on the end of it. And immediately saw what I wanted to do next. I wanted to go to gas phase because electrochemistry was waning and interest in electrochemical cells was waning at that time due to the influence of Rossi and others. Most of felt that a gas system was where the field was gonna go.

So, I made some drawings in a week, or so. Proposed to Dewey that we make a gas system, a foot long tube that could do high voltage discharge. And it could run on hydrogen or deuterium gas, and had good CBEC calorimetry. High temperature CBEC calorimetry. We'd run between 200 and 250 C. And I proposed that. Sent them drawings, as much as I could. And they said, "Okay, we'll fund your next project."

By 2014, I was on board. And I must say publicly, and on record, they're the finest group of people that I've ever worked with, anywhere. Fine southern Christian gentleman. The ones that I met initially. I believe that's what they have working down there. It's not popular to be Christians these days. Particularly professed and proud of it. But, they seem to be and practice what they preach.

Tom Grimshaw: Okay.

Dennis Letts: Good people. Proud to have been associated with them ever since. It's been five years now. Coming up on it. Four or five years. We have created a system called the High Temperature CBEC system, which was reported on at ICCF 21. It isn't flawless by any means. And it's got a few imitations here and there. But, it's essentially a rugged, reliable system. I haven't caught it with any indiscretions yet. It has produced excess power on many occasions, and pretty significant excess power in the past few weeks.

Tom Grimshaw: Good.

Dennis Letts: So we we're very pleased. We're using all kinds of stimulation, thermal. And other types of simulation that we have developed.

Tom Grimshaw: And there'll be a part of the work that you're doing with Industrial Heat that we won't be able to cover in this project because of a non disclosure agreement, of course. That's the rules of the game. If it's under an NDA, we don't touch it. But, to back up again, my recollection, since I was personally involved with the Lothar experiment, that you had observed in the electrolytic system some excess heat. And that because of the temperature gradient at the cathode, or something like that. It was my misunderstanding that you did some of that work to follow up on that observation with Industrial Heat. Is that true or not true?

Dennis Letts: No, it does not seem to be true at the moment.

Tom Grimshaw: I just misremembered then.

Dennis Letts: Yeah, I'm trying to think.

Tom Grimshaw: There was a disagreement in the project we were doing, between whether the ... Due to the gradients question and Lothar was kind of digging in his heels about that. We have multiple probes in one cell, at one point. I was kind of the ... Supposed to be the scribe, but I never was able to write a report because we couldn't get an agreement on what the report would say. That's just the way science work sometimes. Participants don't come to agreement, and so it kind of comes to an end. That was my opinion, that was what happened in that case.

Dennis Letts: Yeah.

Tom Grimshaw: But, it seemed to me that there was some outcome from that effort where you had come up with a little bit of excess power demonstrated in the electrolytic cell, which Lothar did not agree with. And I thought that went somewhere, but maybe not.

Dennis Letts: Yeah, I don't believe ... My only involvement with Industrial Heat has been through the gas system. The vacuum gas based system. The dual laser experiment was demonstrated down at their labs, 2016. But, it was never done to the satisfaction of their engineering management to prove that it was really there. And then, they got distracted with the Rossi business. It took away [inaudible 00:26:27]and everything, so that had to take a back seat for that time period.

But, there is continued interest in the dual laser experiment on their part. However, there has not been any professed interest in the co-deposition work, as of yet.

Tom Grimshaw: Yeah, okay.

Dennis Letts: But, that can change.

Tom Grimshaw: Sure, of course. So, we won't be able to get into the specifics of your most recent work, because of the NDA. But, as we pan back now over the past 30 years of your involvement. You know, you first heard about it when your wife told you about it. It was shortly after March 23rd, 'cause I remember it was the Bishop article in Wall Street Journal where the name came from. That was cold fusion. That was his invention of that term in that article. Whether good or bad, it stuck.

Dennis Letts: Well, yeah. Actually, I may be misremembering this as well. But I think it was Steve Jones who actually came up with ... You might wanna check me on that. Steve Jones may have come up with the original phrase. And Bishop was quoting it perhaps.

Tom Grimshaw: Yeah, and Steve Jones was, of course, working in this field from a completely different angle.

Dennis Letts: Right.

Tom Grimshaw: Of course, we know the history between Jones, and Fleischman, and Ponds, and how that agreement kind of blew up because of lawyers at the University of Utah, as I understand it. So, as we close out here, thank you again for an excellent set of observations. Any final parting words, as we wrap it up here about this field?

Dennis Letts: Well, as you know, I'm now considered an old timer in the field, which is quite true. You can look at my gray hair and see that. The future of the field is what old timers tend to think about. We have some, I think, very sterling newcomers to the field in Matthew Valot, and his European allies. I don't know of any US based newcomers short of a young man named Bocar. Bocar ... I don't recall his last name at the moment. But we can look that up.

Tom Grimshaw: Yeah, we had lunch with him. He's from Saudi Arabia.

Dennis Letts: Yeah.

Tom Grimshaw: And there's the young man that works with Hagelstein. Florian is another possible interesting party.

Dennis Letts: Yeah, he's a very capable young man, too. There aren't too many newcomers in the field because of the inherent lack of funding and so on, and so forth. But, I think, thanks to the efforts of Industrial Heat, and others who are getting involved now, and other funding location, I think that maybe there's some hope. That newcomers will enter the field. Young people will pick up where we left off.

But, that's my concern is that we need to prepare the future by helping young people get started.

Tom Grimshaw: I agree. And meanwhile, one of my interests, as you know, is what we're doing today, is to do what we can to capture the work that's been done. The observations, the reports, and so forth. That overall initiative is what we're doing, this project is a part of.

Dennis Letts: Yeah. I think to put it in a phrase for your contributions, I think the future is best viewed with a good historical perspective. And I thank you for doing what you're doing in this regard.

Tom Grimshaw: Well, and thanks back to you for participating in this initiative with another project. We have a few under way at this time, and this is terrific. Any final words?

Dennis Letts: Adios.

Tom Grimshaw: Okay. So, this is Tom Grimshaw with Dennis Les. We just completed a set of interviews on Dennis' journey with the ...

Dennis Letts: I don't like the word stutter to be used in our ...

Tom Grimshaw: Yeah. Okay, Tom Grimshaw here. We were interrupted by an incoming phone call, a nuisance call. I'm here with Dennis Les. We just completed a round of interviews regarding his cold fusion journey going back to shortly after the announcement in 1989. Dennis, you've been with the field almost the entire distance, so thank you for your good work. And thank you for this interview, and participating in this project.

Tom Grimshaw, Dennis Les. It's March 19th ...

Dennis Letts: 18th.

Tom Grimshaw: Thank you. March 18th, 2019. Thank you.

# Appendix A2. Transcriptions of Dennis Letts Interview Set #2

Interview 1

Tom Grimshaw: [inaudible]. This is Tom Grimshaw. I'm here today with Dennis Letts, L-E-T-T-S. It is about 2:30 on Saturday afternoon, July 6th and we're here to talk about Dennis' career in cold fusion research. This is our second round of interviews and we'll probably take it from the beginning on up to the present and so far as we're able to do that, Dennis. We'll do it about 30 minutes at a time with breaks after each of the 30 minute intervals, more or less. So Dennis, let's get right to it. The first question I have for you to maybe talk about is when you first heard about cold fusion, we have it elsewhere that you were engaged in gold mining in Bolivia at that time. But what I'd like to address with you is what it was about cold fusion and the announcement of it by Martin Fleischmann and Stanley Pons in 1989, can you kind of describe what it was about that announcement and about the phenomenon that attracted you to it so that you gave up your gold mining operation?

Ultimately, you did a lot of independent study. We collected papers that you ... I mean, we documented papers that you had collected. You were very well, highly, highly motivated. So can you talk to me or talk to us a little bit about that motivation and why?

Dennis Letts: At the time I was 6,000 miles away from home and on a radio telephone broadcast from the post in Bolivia out to the mine site. I spoke with my wife twice a week and this was one of those days and I was sitting in a mining camp with about 30 miners sitting around listening to our conversation. Kathy told me, my wife Kathy told me that she had read an article by Jerry Bishop, the late Jerry Bishop who was Wall Street Journal Science Writer. She read the the journal everyday at work. This was about 1990, early 90, and when she told me that, I said, "I knew someone would figure it out sooner or later, but I thought it would be later rather than sooner." I said, "That's exciting news. I wonder how they did it." So it was curiosity at first on how they could pull this off and make this claim.

The rest of the motivation came after I got home a month or two later on my time off. I of course remembered that conversation very strongly and heard another report on over the BBC, over the short wave radio out in the mining camp and it got me even more interested. So when I got home on my time off, I generally had two or three weeks off back in Austin, I went straight to the [Welch 00:03:34] Chemistry Library and asked if they had any information on this new thing called cold fusion. they said, "We do. There's a lot of interest right now, but some of it has waned." By the time I got back, it had been denigrated, perhaps you could say by mainstream science to some degree, but it didn't dampen my enthusiasm. I've collected all the papers I could and started reading.

The second part of the motivation factor came in that I saw something that I thought would make and have an impact on the field. Even from a newcomer, I thought I could make an active contribution to this, whereas not being a professional scientist with academic background, I had a good math background, but not formal. I thought this was something that I could work on and actually make a contribution to some pretty big science. It also didn't hurt anything at all to find that Dr. John [Balcris 00:04:42] was, his laboratory was a few hours from my home in College Station, Texas. So those, the proximity factor, the able to contribute factor and just the wow factor that someone had figured out how to overcome a Coulomb barrier really contributed to the motivation.

Tom Grimshaw: Very good. Now we're going to pause here and just check to make sure this damn thing, this darn thing is recording properly and we'll pick up the thread immediately, okay?

Interview 2

Tom Grimshaw: This is Tom Grimshaw again. This is session two with Dennis Letts. We're talking about his early involvement with cold fusion, and what was the motivations that he was feeling that caused him to get involved in this field. Dennis, I think I interrupted you and you were talking about John [Bockris 00:00:23] and his proximity was a contributing factor. Please go ahead.

Dennis Letts: Well, one of the things that I noticed early on was that John Bockris, Dr. Bockris, or Dr. B., as we called him fondly, he noted, as others, that you really never knew when this thing was going to begin. When was the effect going to be observed, if at all? He reported many times waiting 500 hours to see the effect when it did occur, and the occurrence was rather sporadic. I thought maybe my contribution could be what later came to be called the trigger mechanism to kick this off when you wanted it, rather than having you sit around and wait for it.

I read the papers with that sort of thing in mind. One of the first triggers that I found, or thought I found, was using radio frequency stimulation. I tried ... I set that up and tried it here in my makeshift lab in Austin. When I started seeing some results, or at least my calorimetry was very poor at the time, I decided that it was time to go down and see a real scientist, John Bockris. I reached out to him. We reached out in those days by mail, or fax, or telephone. We started communicating.

I got my most memorable letter from him, at least early on, was where he said that Dennis, he said, "Dirty solutions work in these electrochemical cells. Clean ones don't." So he said, "There's something about there has to be some conditioning of the cathode to prepare it to make it work, whether you do that on purpose or by accident."

I took a trip to his lab and showed him my RF trigger at the time. As fate worked out, he was about to take a trip up to Salt Lake City to present things at FEAT, and they later became [INNENCO 00:02:56] at about this time. FEAT was spelled F-E-A-T; Fusion, Energy, Applied Technology. Hal Fox's brain child.

Anyway, [Yan Kutteroff 00:03:07] and a lot of good Russian scientists were up there at the time. So Bockris went up, and I packaged up my limited equipment laboratory with RF stimulation and all, and took it up to Salt Lake for an extended run. It was not well received by a dear friend and colleague, Yan Kutteroff. He didn't really believe that was possible for a number of reasons.

I was able to set up my equipment and Bockris was there. I turned it on, and the heat and the cell temperature of the cell went up and produced an apparent excess power signal that was pretty large, several watts. Yan Kutteroff was not present in the lab at that time. This was about, oh probably '92, around 1992.

But when he heard about it, he came into the lab very quickly and rushed around, and said, "Wow." He said, "I heard this thing was working." He said, "It's amazing. I really don't see how that's possible."

Yan and I became pretty good friends over the years. I was lucky to see him in Washington for the last time before he passed on a few years later. I was pleased to have that closure with Yan, but that ... the trigger effect of radio frequency stimulation is what drew me, pushed me toward Bockris. With that, we wrote my first paper. I was fourth author, but it was my entry into the field, with one of the greats of electrochemical science, John Bockris.

Tom Grimshaw: Okay, so I'm going to jump in. I think in our last conversation, not recorded transcription, but it was your opinion that John Bockris in the United States was the American equivalent to Martin Fleischmann from England. Both of them, I think came from other countries in Europe originally, but I do remember your making that point that it was a real kind of stroke of genius on your part to be able to establish that affiliation with Bockris.

I'm going to come back again to the original question briefly here that given your history, as I understand it, in being an oil field entrepreneur, then buying gold from certain entities in South America, and then mining gold in South America, it seems to me, my perception is that you have kind of an entrepreneurial spirit to you, or angle, which is in many people's minds, that would be similar to some of the fundamental digital revolution things that we've observed in the last 20 years. People like Michael Dell, maybe Bill Gates, ... many others in the field. I was, last time we talked, I kind of drew a comparison there.

As I understand ... if I understand what you're saying, it was the novelty of it, and the opportunity for a non-PhD academic person to participate. Can you tell us a little bit more about that angle? Well, go ahead and tell us a little about that.

Dennis Letts: I originally took to the business side of it as much as the science, because I saw the great economic potential. After I worked in it, I realized, in the field for a little while, I realized two things: that I was going to have to decide pretty early on whether you wanted to do business or whether you wanted to do science. I had proven adequately to myself in the past that my business ability was way far below the giants like Michael Dell and Bill Gates.

I thought maybe I should concentrate on the science end of it, and just developed methods and techniques to try to make this more presentable, more demonstrable. That was my goal. I originally sought to protect the intellectual property by filing patents and keeping things a little bit under wraps, but then I talked to and was influenced to some degree by a valued colleague, Jed Rothwell, and the late Gene [Mellov 00:08:17], who said forget about patents, forget about trying to make money off of this entirely for yourself or even others. Just do the science, and do a good job on that, and everything else will follow.

At some point in time, and I don't really remember where that was, it might have been around '95 or so, after three years in the field. I decided to just be as good a scientist as I could be, and got out of any notion that I could actually bring this to market, and produce real useful products. That was beyond what I could do as a person, as an experimentalist.

I think that served me well because I shared all of the information with the field to the best of my ability, published papers, gave talks when I could, and if I couldn't go to the conferences, colleagues like Peter Hagelstein presented our findings in good form; but the main thing was that whatever I found in my little laboratory got out to the field as completely as possible.

Tom Grimshaw: Okay. So what I'm hearing you say is you kind of got captured initially by the financial gain, but later it was just the intrigue of the phenomenon and the possibility of being able to make it work. So it's more like a satisfaction of curiosity, but it does ... There are other things that you could have gone into. I think your time was wrapping up on the gold mining operation. There are many other things that you could have followed. Is there anything that you can say about cold fusion specifically that brought you to this field?

Dennis Letts: Well, cold fusion itself, of course, is it's like ... it's a little bit like theater in the sense that you have many disciplines at work. You have to know something about nuclear physics, solid state physics, electrochemistry, and a lot of math. That was interesting to me, and was a big magnet to draw me into the field even further, and keep me there. Plus, I had a conversation with John Bockris one day down at his lab.

He said, "You know, Letts," he said, "I've been in this electrochemistry business for a long time. I've written like 28 textbooks, and 700 papers." He said, "Out of everything that I've done, this, to me, seems to be the most important project of my career." So, in my view for a guy like John Bockris to make that kind of a statement, certainly it would and should be the most important thing I've ever done in my career as a gold miner and a gas operator at one time, movie producer and maker, who knows ... well, knew. He just passed away recently, Bill Wittliff, the screenwriter here in town who wrote 'Lonesome Dove.' Bill and I, I won't say we're friends, but we were colleagues back many years ago.

Out of all of those opportunities, cold fusion is the one that grabbed my attention and has maintained it for 30 years.

Tom Grimshaw: Okay. Good. Well, I think you've done a really solid job of relaying to us what it was about this field that captivated you for this long period of time.

Dennis Letts: Good questions.

Tom Grimshaw: So, next I'd like to ... You did a nice job of writing out your ... the sequence of activities called Dennis Letts, L-E-N-R Bio, which you provided to me a few weeks back. I'd like to have that kind of be a guideline for us, for the next phase of things here. As we go through, what I'd like to ask to emphasize is who you were collaborating with. In other words, as you were making your way through your cold fusion sequence of activities here, what were you doing and with whom in particular?

Okay, so if you could tell us at ... Well for example, you just told us about Bockris. He was probably your initial person that you collaborated with. You mentioned Yan Kutteroff at INNENCO. That would also include the gentleman in San Antonio whose name flew out of my head.

Dennis Letts: Charles Becker.

Tom Grimshaw: Charles Becker. So you said that one of the things that you thought you could contribute was the trigger. You said RF, and I remember that Charles Becker had some involvement in the RF experiments, because he was a ... He knew a lot about RF from his professional career. Tell us a little bit about those early days with Charlie Becker and RF. Why RF? Why did you think RF might work? How did you even know about RF?

Dennis Letts: Well, pardon me. Before I left Bolivia, after the mining project ended, I was able to get a reasonable small portable library built up of papers and technical books. I noted that radio frequency stimulation had been used in the past for chemical activities. I figured this was part chemical and part nuclear. At the time, I didn't know enough about RF to know all about skin effect, and it doesn't go very deep into metals. It tickles the surface. The higher the frequency, the shallower the tickle.

I studied a lot in a bamboo hut down in Bolivia from about '90 to '91, late '89 and '90 to '91; so a year and a half, two years. Project, gold mining project ended, I came back to Austin. I wanted to do an RF stimulation. I had no equipment, didn't know what to do with it. I didn't have any experience, limited funds at the time. I contacted Charles Becker just by research. I got ... used primary source. We didn't have the internet, of course, in those days. Primary sources being Yellow Pages, White Pages, anything you could dig up at the library.

I found a company in San Antonio called Technical Concepts, Inc, or Corporation, but same idea.

I called the number up, and said, "Can I talk to the principal?" It was cold calling. I got Charles on the phone and told him what I was about.

He said, "You know, I heard of that just recently in the Wall Street Journal." He said, "Why don't you come down and tell me what you think you know, and I'll tell you what I know, and maybe we could hit it off."

Well, I went down for a couple hours. We did hit it off. He happened to have ... he had just sold it, another company, and had lots of cash on hand.

He said, "I'll take a stand with you on this." He said, "Let's form a company called Energy Research Group." ERG, clever little name. "You take a quarter, I'll take three quarters, and I'll fund it, limited fashion." This was '91-ish, or so ... Yeah, in that range. Sometime in '91. Spring of '91.

So we started out, and he said, "I've got some RF equipment here. I'll loan you some, and you can go borrow some from somebody else, buy a few pieces, and we'll do this on the cheap."

So I got the equipment lined up and the chemistry lined up, and built a little cell. It wasn't very good. It didn't do all that much, but it got the mechanics down. By September, late summer, September, I was seeing some effects that could actually be identified. I then introduced Charlie Becker to Hal Fox, and the FEAT group, F-E-A-T, in Salt Lake City. Charles agreed to fund INNENCO, which was a major step forward. That was, I think the first significant venture capital that came in to cold fusion. As it turned out, it overall was not a successful venture.

Charles lost a lot of money, but he told me, he said, "Listen, it's the most fun I've had in a long time." He said, "I wish it could have turned out better, but it is what it is." But, he made many significant contributions to the field in a business side, and should be recognized for that one day, I would hope.

Tom Grimshaw: Okay.

Dennis Letts: Maybe you can help.

Tom Grimshaw: [crosstalk 00:17:56] Possibly so. I owe him a visit.

Dennis Letts: Yeah.

Tom Grimshaw: In San Antonio.

Dennis Letts: So he was my first collaborator. He knew a lot about RF and how to tune things, and how to do things.

Tom Grimshaw: Which you had already been in touch with Bockris by then.

Dennis Letts: I had not, no.

Tom Grimshaw: Okay.

Dennis Letts: He was my first collaborator.

Tom Grimshaw: Okay.

Dennis Letts: In '91. Bockris came along a few months later. Charlie went down and provided some funding to Bockris. This was in '92. The sequence is roughly 1990, late '89, '90, I find out about cold fusion and do the research. '91, I leave Bolivia and come home. Spring of '91, I meet Charles, in that range, and spring/summer, I can't remember exactly, but in that time. Then, '92, I began experimenting and then my experiments take me to Bockris. It's Bolivia, Charlie Becker, then Bockris.

Tom Grimshaw: Right, and it was through your connection with Bockris that you met Kutteroff.

Dennis Letts: Yeah, and I never did ... We never did collaborate past a litter interaction in Salt Lake.

Tom Grimshaw: Yeah, okay.

Dennis Letts: But I liked him. He was a very smart fellow.

Tom Grimshaw: Yeah, and as a side note, on this part of the INNENCO story, this was in the early 1990s right after the fall of the Soviet Union. There were a lot of starving Soviet scientists who came to the United States for fairly small compensation. It's my understanding that a number, that Kutteroff himself may have been among that group, and certainly some of the other scientists at INNENCO at that time were from that source.

Dennis Letts: Yes. There were at least three and maybe four top notch scientists working at INNENCO that were from the Soviet Union.

Tom Grimshaw: Right.

Dennis Letts: Former Soviet Union.

Tom Grimshaw: Former Soviet Union.

Dennis Letts: Yeah. Yon told me.

He said, "Yeah, we were over there timing nuclear reactions and events with stopwatches, because that's all we had in the early days."

Tom Grimshaw: Okay, so let's jump in and talk about the next step. I mean as Becker moved on toward INNENCO, I remember the main mission of INNENCO was through documentation of existing literature and through lab research to provide the ... develop and provide the evidence of cold fusion to gain the intellectual protection from the patent and trade office. I think they were in pursuit of the original University of Utah and Fleischmann and [Ponds 00:20:45] patented filings or filings for patents that they were trying to prove up on and gain those patents. That's kind of a side note.

As you pointed out, ultimately the patent trade office had gained such a bias against cold fusion that, that was never successful. The name Harvey Behrens comes to mind, B-E-H-R-E-N-S.

Dennis Letts: Actually, Behrend.

Tom Grimshaw: Behrend, okay.

Dennis Letts: Behrend, D, with a D.

Tom Grimshaw: Okay, Behrend, okay.

Dennis Letts: Yeah.

Tom Grimshaw: So anyway, that's kind of a side note. So Charlie went off and did the thing in Salt Lake City with INNENCO. Whatever happened to ERG? Did-

Dennis Letts: It's still in existence today. It's not active, of course, but still in existence. As far as I know. I get an accounting report once a year. My particular progress in the field, when Charles and I, more or less, went our separate ways in '92-ish when he went to INNENCO and I just continued going on my own, I ran into a brilliant chap by the name of the Dennis [Cravens 00:22:00]. He came down to Austin to see me when I was still working a little bit with Charlie in San Antonio, kind of to transition how Fox introduced us.

Tom Grimshaw: Okay. I wanted to interrupt because I wanted to ask you had this small laboratory in your backyard. When did that come into the picture? When did you buy that little building and put it in your backyard in this context?

Dennis Letts: Six years later, 1998.

Tom Grimshaw: Okay, not until '98.

Dennis Letts: Right.

Tom Grimshaw: So you were doing experiments in your home laboratory in your garage?

Dennis Letts: Some in there in the garage, and some in this study.

Tom Grimshaw: Okay, okay.

Dennis Letts: Yeah.

Tom Grimshaw: Good.

Dennis Letts: Kathy wouldn't let me put it just anywhere. If it blows up, ...

Tom Grimshaw: [crosstalk 00:22:43] Take out that upper wing. Okay, all right. So back to where you were. You ran into Dennis Cravens. He was your next collaborator, I guess after ... in the sequence of things?

Dennis Letts: Yes, and has remained my principal collaborator for 30-ish years, about 27.

Tom Grimshaw: How did you meet Dennis? What was the connection? How did it evolve?

Dennis Letts: Well, I wrote a little blurb or a little part of my paper and patent application was printed in Hal Fox's little newsletter called 'Fusion Facts,' and Dennis had one in there as well. We both were interested in magnetic fields, and stimulation in general. He was interested in pulsing, pulsing current, which we're doing these days now, as a matter of fact. Kind of interesting it's lasted all these years. He was interested in pulsing the current. I was interested in applying RF.

So Hal Fox connected us, and Dennis drove down from Vernon, Texas, where he lived at the time, and spent a couple of days here in Austin, several days. We drove down to see the experiment running in San Antonio, where I had it at the time, just as I was pulling away from Charlie Becker, and more or less going more on my own, with Charlie's blessing. Dennis came down and kind of liked what he saw.

He said, "That is interesting. Stimulation to make it take off when you want it to, rather than when it wants to."

I said, "Yeah, that's kind of the idea."

That was '92, let's say, I believe it was September of '92. We remained conversive friends over the telephone and fax, or however we could. I believe our first collaboration was in 2003.

Tom Grimshaw: That much later?

Dennis Letts: A decade later, yeah. I had built my lab, and got it up in better condition. We started our collaboration with a single laser effect in 1998. That's getting somewhat ahead of our story. 1993, we did ICCF4. I did with Bockris, and had the conference paper. That paper got published in Fusion Technology with George [Miley 00:25:33] as the editor.

Dennis in that same year, same conference, he won the one and only Martin Fleischmann best paper in conference award, ICCF4. Now, that will never be repeated, obviously now. It never has been. He wrote, he did garage level experiments, but they were so well done that it caught Martin's attention, so much so that he told the conference.

He said, "Look, if you guys don't understand how to make this work, go see Dennis Cravens. He's got it figured out." So that gives you some idea of his worth as an experimentalist.

Tom Grimshaw: What was the nature of his experiments?

Dennis Letts: He did a lot of chemical additive stimulation. I don't recall the name of the paper is ... Let's see. Boy, it's ... I'm drawing a blank, but it's a famous paper, and it's in ICCF4 proceedings. He outlines magnets can trigger it. He even tried my RF stimulation and got it to go. He's a great chemist. That's his strong suit, I think, in what he likes. He was able to make chemical additives that would trigger the effect, along with pulsing the current. He realized early on that famous saying, you load the cathode cool, low temperature, and crank it up to run at a high temperature to get the effect to take off.

Tom Grimshaw: Okay, keep going. So even though you weren't doing experiments, you were kind of exchanging ideas and information, and mutual support, that sort of thing, through the years.

Dennis Letts: That's right, yeah. Actually, ... Oh yeah, together, we were experimenting together. I was experimenting pretty much daily.

Tom Grimshaw: [crosstalk 00:27:32] Okay. Tell us about D1 and D2. How did that come about?

Dennis Letts: Well, we had to ... people got us confused sometimes. I told dear Mary Anne Macy at a conference one time, and she wanted to know how to tell us apart. I'm the old cute one, he's the young smart one. She about hit the floor. She thought that was so funny. We elected early on that I would be D1 because I'm four years old, and he would be D2. When we collaborated, it's D3, of course.

Tom Grimshaw: A fusion. [crosstalk 00:28:14] D1 plus D2 equal D3. Okay. Good. All right, what's next? We're in '93 now, and you were on your own, done with Becker, collaborate ... or communicating with Dennis developing the relationship. What next?

Dennis Letts: Well, I more or less went even with the board for '94, five, six, seven, working, trying to get RF stimulation to work more reliability. I failed, really. I mean I never did get it to where it would really repeat easily, and where you could ... Because RF itself interferes with the instrumentation and provides heat, and all of that. So it's very difficult to sort it out. I can do it a little better now. I have RF in my lab now, and can do it more gracefully; but back then, it was a challenge.

One day, '98 comes along and I decide to build my lab, and provide a better housing for my experiments. I bought more equipment. I had a well that came in pretty strong with [Amico 00:29:29], and provided about, I guess close to half, about half a million dollars in net revenue over the next 10 years, from '98 to 2008. It afforded me the opportunity to buy equipment and not burden household budgets, which I did.

So from up to about ... When was it? About 2000, I struggled all the way from '92 to 2000 with RF. One day, I don't remember exactly. I think it was October, perhaps, of 2000. I had gotten so tired of paying big dollars for platinum anode wire, I decided I would try cheap gold. Gold was much cheaper then.

Tom Grimshaw: Okay, so we're at 30 minutes. It sounds like we're about to embark on another phase of the adventure, so this would be a good time for us to stop this particular recording. We'll start the other one here in just a few minutes.

Dennis Letts: Okay.

Tom Grimshaw: So this is Tom Grimshaw. I'm here with Dennis Letts talking about his cold fusion career over the years, going back to 1991, thereabouts. So we'll pick it up here in a few [inaudible 00:30:56].

Interview 3

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| Tom Grimshaw: | Tom Grimshaw here for session #3 with Dennis Letts talking about his cold fusion pathway. Dennis, I think at the end of our last session you were saying that you had alone many years of experience trying the radio frequency RF stimulation from basically 2003 through about 2008 or so- |
| Dennis Letts: | from 1992- |
| Tom Grimshaw: | I mean 1992. |
| Dennis Letts: | ...until 2000. Year 2000. Eight years of effort. |
| Tom Grimshaw: | Wow. Okay, so pick it up from there. You got tired of paying for expensive platinum, and then what? |
| Dennis Letts: | I decided, in my infinite wisdom and sketchy knowledge of electrochemistry, I decided that a gold anode might be okay. And it was as long as I kept the current kind of low and the temperature down to 25 to 40C. 30C. As you know, you've got to crank the current up, and the temperature goes up with it in order to see the cold fusion, Fleischmann and Pons heat effect. So everything went swimmingly well as long as I was doing loading at a low level. And the minute I turned the current up on the cell in my new laboratory that I built in 1998, fully equipped, nicely done for electrochemical experiments. As soon as I turned that current up, within a short while, I looked at the cathode, and it had covered with green looking goop for lack of a more descriptive term.<br><br>What it was, was gold ions that transferred into the electric light and then went over, transferred over to the cathode, which is normal electrochemistry. And so I realized quickly that I'd made an error in choice of materials. And for some reason, I opened the top drawer of my toolbox, and there was a laser pointer, one milliwatt laser pointer, that I found out later. I didn't even know its wavelength. I just thought, "Ah, what the hey. Let's not waste a perfectly good sell. I will shine that laser on that cathode, even though it's covered in hairy looking stuff." And I put it in a small pan of ice. I still have the laser, by the way, in the top drawer here, and off goes the temperature within a few minutes. I said, "Wow, this is unexpected. I know this little laser pointer is not powerful enough to do that in a hundred mils of water, heavy water."<br><br>So I turned it off, temperature goes down. Turned it back on, temperature goes up. And so I immediately called Dr. Cravens and reported what I saw and he said, "Wowee, that is unusual to have that quick a response." He said, "You must be at a very special wavelength." I said, "Evidently." And so we decided to pursue the single laser experiment as a trigger experiment. |
| Tom Grimshaw: | Question, were you using RF stimulation at that time? Or had you abandoned them by then? |
| Dennis Letts: | I had used it up until 15 minutes before I tried this because I I was planning to use RF stimulation, but it was not used at this time. It was turned off completely. So the effect was completely the single laser stimulation, which I later found out was only one milliwatt in power, one thousandth of a watt. Seemingly impossible to do. So Cravens and I decided to pursue this as a trigger mechanism, said, "Let's develop this and see if we can get anywhere with it." |

And I made another cathode, and I said, "Obviously gold layer is important on top, but maybe not that much." So I figured out a way to deposit a small, a little more controllable method of applying gold to the surface. And that became part of the protocol. To get to that point where I applied the first laser stimulation, I had a whole series of steps that I went through to make that cathode. I was fishing around for a cathode protocol that would make a cathode that would respond well to RF. And I wrote all those steps down. And I have them at my lab book March 21st. Well that's the dual laser. But I had written all these steps down anyway, and they worked for single and dual lasers both. It turned out to be a 17 step protocol, including plating gold at the very end of it.

So you make your cathode, and this is delineated in several papers according to a protocol, then you load it for five days, then you crank up the current to one and a quarter amps, bring the temperature up to 50 or 55C, then apply a small, a thin layer of gold over the top of the existing cathode, and then shut off the gold plating. And it's done in situ by the way, as the cell is running. And then apply the single laser. And I think my success rate was on the order of 87%, or some high number like that, when you followed all the steps. We tried to devise experiments that would tell us maybe, which steps shouldn't be left out and which should, but I never could get it to work very well when I even left one step out. So I tended to do all 17 steps as boring as they were.

I made hundreds of cathodes over period of time from 2000 to now. I probably didn't do hundreds. Certainly many, many dozens. Starting in 2000, I ran for until August of 2003. So I had three years of single laser stimulation, and then I ran out of palladium that I'd been using for that period of time. And I never could get the single laser stimulation to come back. However, during that three year period of time, a very important thing happened, and it is that Storms became interested in it and he made a Storms' replication, which means he didn't do it exactly like I did it, but he got results and was able to change a few things that he thought were not as important.

As we know Ed is extremely capable in those areas, so he was able to figure a few things out that I couldn't see. And it was like the [inaudible 00:07:45] influence that put me into the status of a made man, if you will. The mafia analogy. When Storms replicates your work, It gets worldwide attention.

Tom Grimshaw: How did you happen to make that arrangement with Storms? How did that come about?

Dennis Letts: Well, I don't remember in super detail. He heard about it. I'm trying to... I don't know what year even, but he had heard about it through the grapevine. Or I even maybe have called him myself and told him, I don't recall. But Ed said, "Look," he said, "I'd like to try that experiment." I think I even may have provided a cathode. "Could you make one of your cathodes?" And he said, "I don't have any laser equipment." I said, "I'll send you one of my laser controllers," because I had two at the time. And he said, "Okay, go ahead and send that stuff up," which I did. And then in a short period of time before the ICCF-10 in 2003, he had replicated it and sent me an email that said, "Dennis, this is really refreshing to find somebody's claim that actually works." So this was, I don't know how many other experiments actually traveled from lab to lab, but that one was one of the few probably.

Tom Grimshaw: Yeah. And you had said that the experiment that you took over to SRI was also a very early one. And that came later though, I guess, is that correct?

Dennis Letts: That was in 2002 so I think Ed probably did get his experimentation in 2001 maybe. And my trip to SRI was 2002.

Tom Grimshaw: So it came after the Storm's verification.

Dennis Letts: Well, don't get me for lying on memory, but possibly so. Yeah, I'm a little fuzzy on the years and the timing of which came first, but I do know it was April or so of 2002 is when I went to SRI.

Tom Grimshaw: Okay. And tell us about that. How did that happen?

Dennis Letts: I was in the lab one day experimenting with the magnetic effect, and I discovered that if you carefully place magnets around the cells so that you could rotate them and change the magnetic field orientation, it would also act as a trigger. But you had to do it carefully so you didn't have a thermal conductivity issue that caused it to change its temperature because if you could picture small horseshoe magnets around each side of this glass on my desk here, if you arranged it so that you could have the magnets going this way and maintain perfect thermal contact, and then rotate them 90 degrees, maintaining the same contact, then you could have a good experiment.

What I did was I cut, I had this on a plastic base, and I cut a hole slightly larger than the diameter of the cell. And the difference in diameters was the accommodation distance required for the magnets. They were small magnets, so they could sit inside that circle and be moved around and maintain perfect thermal contact with the cell. So when I rotated those 90 degrees, I saw a half a watt increase in thermal output from the cell as-

Tom Grimshaw: This was a single laser stimulated cell?

Dennis Letts: No, it was a magnet only.

Tom Grimshaw: Magnet only?

Dennis Letts: Magnet only. That's what made it so strange. So for some reason, I was in touch with Mike McKubre. And I called Fred and Mike up, and I think they were both online, maybe just Mike. And Mike said, "Dennis, you're a swell guy. You work hard, do good work." But he said, "I cannot believe what you're telling me."

I said, my immediate response was, "Have cell, will travel." And he said, "You mean you're bringing it out here?" And I said, "I'll bring the whole experiment out if you want me to." He said, "Okay, bring it on." So Kathy and I drove out later in the week, stopped at the Grand Canyon South Rim. I had a cell running in the back of her expedition, the one I was taking out there, the same one that was doing all this and all the magnet tricks. And so I became the first and probably only cold fusion researcher to run us an active cell on the South Rim of the Grand Canyon. We stayed there a few hours. The cell was running on battery power, steady converter battery power. And I drove onto SRI, arrived Sunday afternoon. And Mike was there, and maybe Fran too. At least-

Tom Grimshaw: Fran being Fran Tanzella.

| | |
|---|---|
| Dennis Letts: | Fran Tanzella, yeah. His collaborator partner. We loaded the equipment, carried the equipment from the expedition up to their laboratory in SRI, set it all up, and came back Monday morning ready to test. |
| Tom Grimshaw: | Okay, I'm going to jump in again. So this was a cell, not for single laser, but just for the rotating magnetic fields. Is that correct? |
| Dennis Letts: | It is, but I took everything. I demonstrated the laser. I wanted to demonstrate the laser and the magnetic magnetic field effect. |
| Tom Grimshaw: | Both, okay. |
| Dennis Letts: | At SRI. Yeah. And so Monday morning comes around, and I don't know what I tried first, probably the magnets, get nothing. Of course, we had shut the cell off a couple of times. It had been running for a long time, and it had kind of gotten excessively gunked up, as we call it. Tried it all day Monday and maybe Tuesday, all day Tuesday. Nothing. So Tuesday night, everybody goes home and Mike and I stay in the lab. I said, "I'm going to go ahead and do a maintenance on the cathode," which I do on long runs. And I shut the cell down and took it apart.<br><br>I rubbed the cathode with my bare fingers with deuterium, with lithium deuteroxide, I should say, cleaned it all off good, dried it, looked at, examined it. Nice and shiny again. Reloaded it overnight at low current, I think. Not low, low, but a quarter of an amp roughly. Came back in Wednesday morning, I believe it was, at nine o'clock or thereabouts. The cell was stable and ready to be stimulated. I turned the current up to the required amount. We waited. It didn't take terribly long, an hour or two. We did other things. Came back in, and the temperature had flatlined nicely.<br><br>It was ready to go, and I don't recall what I did first, but I could look at the notes, I've got the notes on it. But let's just say I did the lasers first. We've got 400 milliwatts of power from a single laser stimulation after having loaded all night. And nothing had changed calorimetry-wise, except that the condition of the cathode had improved, and it was ready to go. We let it calm down, get back to near baseline. Then I demonstrated the magnetic effect and we got something on the order of a half a watt or so out of it just by twisting the magnets 90 degrees. |
| Tom Grimshaw: | So you're doing the laser and then the magnetic? |
| Dennis Letts: | Not together. |
| Tom Grimshaw: | Not together, but in sequence. |
| Dennis Letts: | That's right. |
| Tom Grimshaw: | And this is the experiment that you prepared the large, oversized notebook in preparation for the trip. |
| Dennis Letts: | That's correct. |
| Tom Grimshaw: | And tell us about what was in the notebook in relation to what you just described, as to what you actually did when you got there. |
| Dennis Letts: | Pretty much the same pattern. We found that the single laser stimulation by itself worked at various wavelengths. 682 was a favorite that worked. 662 nanometers. These are how you measure lasers in that when you buy one or order one, "Send me a 660 nanometer, Joe." And then the second thing you worry about is |

ordering the power level. Well, by this time I had more sophisticated lasers. They were 25 or 30 milliwatts, but I didn't get any stronger effect from the increase in power. What seemed to be determining is the wavelength of the frequency of the single laser. So I got similar results from a 30 milliwatt laser that I got from my one milliwatt laser, oddly enough.

Tom Grimshaw: So your black notebook was anticipating both laser and-

Dennis Letts: Magnetic field.

Tom Grimshaw: ...magnetic field tests. Okay.

Dennis Letts: Plus a third that we discovered. And this involves a good Cravens story. Typically how we work, I had made a small box at the time, not a formal calorimeter yet, and I had a plastic window... And I'm sorry, what was it? A glass window. Sorry. I had a glass window in front of it. Well, for reasons I don't recall, I changed from glass, and it was working fine. You put the laser on, and it would take off. For reasons I don't recall now, I changed from that glass window to a plastic window, and it was dead as Aunt Sally's duck. Nothing, no excess power or anything. And nothing had changed except that window. I called Cravens up, and I whined a bit and complained. And he said, "You know, I remember something from my physics classes. You said plastic sometimes can change the orientation of the E-field polarization, if you will, of the laser and polarized sunglasses, that's kind of part of it."

And I said, "Yeah, that is familiar." And he said, "I'll tell you what you do, put that glass window back in, and I bet it'll take off." So I did, and up it goes. So we were on to another mechanism that if you... I bought a small rotating angular device that had angles marked off on it, and I put that little, it's called a half wave plate, I put that in front of the laser and shined the single laser through that little gadget, the filter, and I could turn it like so and turn it off and on just by touching nothing else except rotating that filter.

Tom Grimshaw: The altering the polarization of the light going in-

Dennis Letts: Right.

Tom Grimshaw: ...or blocking.

Dennis Letts: No, it wasn't blocking anything. If you didn't have the right polarization, you'd get zero. And you turn the polarization a little bit halfway to the right to full power, temperature would go up. And turn it back, it would go down. And I have graphs of this, I showed it in our paper in 2003. And we thought it was the orientation between the E-field of the laser and the magnetic field lines. Magnetic field lines ran from nine o'clock to three o'clock on the clock face. And if you ran parallel, if the E-field was parallel with those field lines, you've got zero. But if you raise the angle of the E-field of the laser beam by some angle, it would start getting power. Maximum was when it was at at 90 degrees and had a sign relationship. So we thought that's what it was. Violante was able to show, in more careful work, the same year, 2003, that it was more likely related to the p and s polarization, showing how it actually relates to the cathode's surface rather than the external magnetic field.

I like the external magnetic field as a better explanation for me. But Violante is first-class scientist, so he probably has got the right answer. We didn't pursue it or dispute it. But so you can believe what you want. A polarization change influenced excess power. Terrifically shut it off completely or put it on full power. And that was the about the end of 2003, summer-fall. And we did a demo at ICCF-10 in the middle of the conference from the podium. We were able to to launch excess power from the podium using a single laser stimulation. That worked very well. That was experiment #602P. And after that experiment was done, I got no more magic out of the single laser experiments I had. I ran out of palladium at that point. My supply, I had a big chunk from years past that lasted me from 2000, before 2000 even, up to 2003. I used the last of it. I think I kept one bag for analysis, a little piece. So that ended the single laser adventure and led to four years of no results.

Just keep going? Okay. Then through the years of 2004, 5, 6, and after March 21st, 2007, I attempted to do single laser stimulation with no success. After I gave up, I called Cravens and said, "Do you remember when that crazy Hagelstein was down here in 2002 thereabouts and mentioned the fact that I had used dual lasers before and it worked rather well, but I didn't pay any attention to it." He said, "Dennis, if you guys would produce an eight terahertz or a 15 terahertz beat frequency between those two lasers, it might produce something." So after four years of no results, I finally listened to Peter, and I got out. By that time I'd recovered my spare laser controller from Ed, and I had two laser controllers that could set up the dual laser experiments. So I did. First thing I tried on March 21st, 2007 was eight and a half terahertz, approximately, beat frequency difference between the two.

And I got an immediate positive result. Not huge, but a couple of hundred milliwatts took off. It was really noticeable. First time in four years. So I gave Cravens a call and said, "We've got something again, we're back in the game." So at that time we again decided that we would collaborate, and involve Peter Hagelstein in the collaboration. So I took off immediately and began a series of experiments that encompassed about 53, I think, 53 experiments with dual laser stimulation. We found that Peter's two designated frequencies worked repeatedly. Eight and a half terahertz and fifteen, and Peter designated those as the optical resident frequencies between D and PD.

On a Lark, I tried to do a third frequency. Hydrogen has a known trigger spot, trigger point, around 20 terahertz. So I thought, "Let's give it a try." See if deuterium operates in a similar way for some reason, and it did. And we still don't have, I don't think, a great explanation, Peter, for that success. So 20 terahertz triggered excess power and we typically got three to 500 milliwatts of return on about a 50 milliwatt stimulation. My greatest return was 1,300 or so milliwatts from a 50 milliwatt stimulation. And that was at, that I recall, 15 terahertz. 14.8 or thereabouts. So all of these measured frequencies worked. At the end of of two years about, all of '07, all of '08, I terminated the experiments, and we started to analyze the data, put them all together. And I sent the work up to Peter, and I found also that there was a spectrum that came out, a thermal spectrum related to optical phonon stimulation.

You can see it very clearly at three peaks, eight, 15 and 20 from our heat data. And I had not looked at this experimental data at all during the collection phase. I just ran experiment to experiment to experiment. I didn't know what I had. So we put it all together. I started collecting these data points,and plotting them, and plotting them all together, and then you start to see the pattern emerge. So Peter was very excited. He based a lot of his theoretical work on these experiments, taught the course in MIT up there with Dr Schwartz based on this phonon frequency stimulation. So several years that made us a household word, a name I guess you would say, in the the cold fusion field.

Tom Grimshaw: Tell us about the, the Hagelstein involvement. How did that get started? You said that he had made a suggestion very early, even in 2002. How did that happen? And then how did it continue when you went to dual laser?

Dennis Letts: Well, a colleague, not known well to the field, but another brilliant mind, guy named Bill Harrington, was sort of like a pollinating bee. He would talk to one group over here, and we would tell him what we were up to, and he would tell it to this other group. And it would cause some cross pollinization, which I thought was a great thing. So I talked to Bill one day on the phone, and I told him what we'd done. He said, "What?" And he said, Hagelstein's got to hear about this. I said, "Okay, fine." So Bill told Peter, and in a day or two, Peter called me up and said, "Dennis, what Bill says, is that true?" I said, "Yes, you have this. So this is single laser stimulation," on about 2002-ish in that range. And so I said, "If you're interested, you're welcome to come down."

So that's how it started. He came down, he called Mike McKubre, and Fran couldn't come, but Mike came with Matt Trevithick, and Dennis Cravens showed up, and Peter. And I have the photo in my lab from that day, a very nice photo. But when Peter was here, that's when he mentioned, because I had purchased a second laser and had it on, and he said, "You know, if you've got the right laser combinations, you might really do some good here." So between then and 2007 I had purchased the laser controllers and two of them so I could do dual laser stimulation if I wanted to. And I didn't want to because I was having such splendid results with single, until I ran out of the magic palladium.

Tom Grimshaw: As is so often the case in the skill, very material dependent.

Dennis Letts: It is, but the dual laser stimulation seemed to, to a large degree, override that. If you followed the protocol, the dual laser stimulation would work no matter what piece of palladium you used, as long as you processed it the same way. So Peter's involvement began in 2002 with suggesting that we should use dual lasers with specific beat frequencies of eight, 15, and 20 terahertz. I ignored that advice until 2007. And that's how we picked Peter up again.

Tom Grimshaw: Okay. Got It. All right, so we're at 30 minutes, so it's time to take a break and see how we're doing. So this is Tom Grimshaw, I'm here with [inaudible 00:31:00]

Interview 4

Tom Grimshaw: Tom Grimshaw again here with Dennis Letts. I believe this is session number four of our interview of Dennis and his cold fusion activities going back to the early days. And Dennis I think in there, as we were wrapping up the previous session, you were still talking about the dual laser experiments that you were doing and having success with working with Dennis Cravens and Peter Hagelstein. Can you pick it up from there please?

Dennis Letts: Cravens and Hagelstein and I wrote, I guess you could say many papers on the topic of dual laser stimulation, phonon stimulation. And that became a pretty much a staple of the lunar field, particularly how it applies to Hegel Steen's theory. We contributed material to several conferences. Peter was usually our presenter, we didn't go to too awful many of them back in those days. The dual laser experiments ended effectively probably the spring or summer of 2008, after two years. And we wrote papers all the way through probably to 2010 and some beyond. But 2009, I got a contact from Mike Milage, recently passed on. A very brilliant chap and good friend and colleague and collaborator. Michael wanted to reproduce a very old and important experiment promoted by Stan Spock and Pamela Boss, out at a star wars, I guess you would say.

Tom Grimshaw: Spay war.

Dennis Letts: Spay wars. Yeah, that's it. Spay wars.

Tom Grimshaw: Space and warrior for-

Dennis Letts: Yes.

Tom Grimshaw: ... air warfare systems in San Diego.

Dennis Letts: Yeah. Anyways, the west coast NRL if you will, the east coast NRL wanted to find four or five people who had experience with co-deposition and Cravings and I fit that requirement, and Michael found some funding and provided about 20,000 for each laboratory to replicate the Spock-Boss experiments, which in a summary capsule, was, you prepare a cathode which was basically copper and then you co-deposit a palladium on top of that particular cathode, and if you do everything correctly, with a very slow loading phase, if you will, or a slow co-deposition phase, low current, then step it up over about a week period. They claim to have seen evidence for trans mutations and some unexpected heat temperature rises in the cathode.

Tom Grimshaw: And jump in and say co-deposition, as I understand it, means that the deposition of the palladium on the copper happens at the same time as the loading of the palladium with deuterium takes place.

Dennis Letts: Yes, I visualize it as building a room at the same time you put the furniture in, and so you don't have the stress problems that you have with conventional loading, Where you build a room then try to get the grand piano through the door. That's kind of a simple analogy.

Tom Grimshaw: Oh, and sorry to interrupt. We're going to pick this up in a minute. I recall that you would work with Ed Storms ... and we're going back to the dual laser for just a moment. Sorry to backtrack. You had worked with Ed Storms for him to replicate or reproduce the dual laser experiment as well as the single laser head? Did you not?

Dennis Letts: No, I never did work directly with Ed. Ed may have done some on his own and couldn't get it to work, is what I heard, but I wasn't aware of it. The only other involvement with Ed dual lasers occurred in 2012, which is three years down the road from where we are now. Ed challenged me to, can you reproduce that after all these years? You haven't done it in four years, can you still do it? And he said, can you prove that it's that one laser by itself doesn't work, second laser by itself doesn't work, but the two together will. I said, I think so. And he sent me the palladium, and the ... I processed it, and loaded according to protocol, and sure enough that thing worked as advertised. I was able to not get anything with one laser, laser one, turned it off for an hour, then turned on laser two for another hour, nothing. Turned both on at the difference frequency of probably 15 or 20, one of those, and power ... excess power takes off and makes a quarter walk.

So it was satisfying that it-

Tom Grimshaw: Okay.

Dennis Letts: That it did do that.

Tom Grimshaw: Sorry to interrupt, I had to backtrack there.

Dennis Letts: Oh, that's okay. Going back to 2009, which is where we were, we wanted to do this co-deposition. Mike got funding for like five labs, and the instructions were to me personally, try to do it the conventional way first, if that doesn't work, and to quote Michael, throw everything at it including your grandmother's girdle. So, I did what he asked and I didn't see any effect following the convention, nor did Dr. Cravens, and since I had special instructions for Mike to break out of the mold, I chose to change things a bit. But keep this the basic idea of co-deposition alive. As you put it, the palladium and the deuterium go down at the same time so you don't have that loading issue, problem and stress.

So, I kept that, kept true to that. But what I did differently was recognizing that in our dual laser work, we found that rough course surfaces work best for us. And that meant kinda high current deposition. So instead of going through the slow, low current phase that the navy people went through, I cranked it on up to half an amp or so right away. They'd start at a 10th or 20 milliamps or something, very low current, and ran it very slow, and it made a nice beautiful surface, but it wasn't crusty and nasty.

Tom Grimshaw: So had you run it their conventional way first, and then when that did not work, then you went on to try this second method.

Dennis Letts: That is correct. Yes, and Dr. Craven's had the same result. He had a no result. So I felt confident that, you know, that was a null that I had, it wasn't just a fluke. So-

Tom Grimshaw: Excuse me, what was the signature? Was an access heat?

Dennis Letts: For me or for them?

Tom Grimshaw: For you, and Cravens, and them.

Dennis Letts: It was excess heat for Cravens and I, temperature rise, that you could not explain otherwise. And they had, I believe, trans mutations and heat occasionally. Not necessarily at the same time, but they measured the cathode temperature with, I believe directly at the cathode. And, so, sharp rises in temperature during co-deposition.

Tom Grimshaw: So the CR-39 and particle detection work must have come later then.

Dennis Letts: It did, but it was the same basic idea. I believe they did a little bit of the, that I think they had some analysis, some analysis work done that led them to believe that there were some transmutation going on, and that's what motivated the CR-39 later.

Tom Grimshaw: Okay.

Dennis Letts: But-

Tom Grimshaw: But it was sticking with where we are now?

Dennis Letts: Yeah, sticking with where we are now, it was strictly a co-deposition game, looking for temperature rise that shouldn't be there.

And I saw it immediately, as soon as we turned on the co-deposition, under the right conditions with the right kind of cathode, I put some gold plating under the, you know, we put a, had the copper cathode then I flashed a layer of gold down on top of the copper, and then I co-dept'd on ... co-depositioned on top of the gold. Gold always seems to be important to have it nearby. So in this case, instead of on top of the active surface, it's underneath. So as soon as co-dep started I saw evidence of excess heat or excess power, and it was significant to 2-300 milliwatts. And no stimulation, no lasers, nothing. Just just get a good baseline, and then [inaudible 00:00:10:01], the trick would be you would add the palladium chloride. That was my trick anyway. You add the palladium chloride after you've got everything in balance, thermal balance. Then you add just a drop, literally a drop or two of palladium chloride, and wham off it would go. Very ... and hydrogen would not, did not work for me, and, in this setting. But deuterium did. If you had a deuterium based electrolyte, you would see the result.

Tom Grimshaw: Good. And so you were contacted, I guess by Milage, to be one of the collaborators for this five-part experiment that he was funding in the tune of 20,000 each, more or less. And you were a collaborator and so was Cravens and you were using different or similar approaches in your, in your two labs, you and Cravens.

Dennis Letts: We were independent of each other. Didn't overlap at all. He followed the navy protocol the best he could and did not go outside the boundaries.

Tom Grimshaw: Okay, and he saw the thing and-

Dennis Letts: Yeah, and I was told by Mike to go outside the boundary.

Tom Grimshaw: Right. Who? Do you recall who the other collaborators were?

Dennis Letts: Not with clarity, I'm thinking Mill Miles and Dave Nagel. I think Mill got some results too with his changed recipe a little bit. But Nagel, I don't think Dave got any, any results? I may be wrong in that. Don't [inaudible 00:11:39].

Tom Grimshaw: [inaudible 00:11:41] not so much who has success as who participated.

Dennis Letts: Yeah, I think it was ... there may have been five of us. I can't remember who all ... who that maybe the fifth one was, but [inaudible 00:11:51], Cravens, Miles, and Nagel were four, and there that may have been it. I don't recall.

Tom Grimshaw: Okay, that's all right.

Dennis Letts: But it could have been one more.

Tom Grimshaw: Good. All right. And so you wrote this up and we're getting a copy of that paper presentation to the include in the report, I think, so we'll, we'll attend to that. In fact, maybe what I'll do is pause here for a moment.

Dennis Letts: Okay. Play back.

Tom Grimshaw: Okay, so we had a brief break there, Dennis in the sequence for this session. Please pick it up.

Dennis Letts: Well, the co-deposition in my co-deposition experimental project was a success. I was able to show that the co-deposition, in my opinion, actually worked and it was a nuclear in origin. It wasn't chemical. Experimentally demonstrated by changing the isotope from heavy water based electrolyte to light, and the excess power signal went away when done seamlessly. So, sending reports to the navy, there was a, I think Peter made the presentation to one of the conferences, the ACS conference or somewhere, and then John Paul printed the results, published results in the journal. So it got some play, but not nearly as much as it might've because co-deposition seem to be a very important item. In fact, I still use some elements of it today when I create a cathode. All right? Even for gas systems, it seems to be effective. The coarse cathodic surface seems to be important and enabling. So time marches on, as they say. After the co-deposition experiment, I went through kind of what I would consider a dry spell. I still did experiments, electro chemical, but the field, as you know, was influenced greatly for the good or the bad, you can choose, by Mr Rossi and-

Tom Grimshaw: Andrea Rossi?

Dennis Letts: Andrea Rossi, quite an Italian showman. Some would say of Charlotten and others would say a brilliant engineer. At any rate, Rossi entered our field and attracted the attention of National Instruments. Industrial heat, perhaps Google and Gates Foundation.

Tom Grimshaw: Yes. His entry into the field was really I think in 2011 with those series of demonstrations, really starting in January. Then he had the, the last one, which was the bank of reactors, each module containing three reactors as I recall. That was the November, October-November demonstration. And so that was in 2011. So when Rossi came in then that was kind of coincident with your co-deposition work then.

Dennis Letts: Yes, co-deposition ramped up, an experimental part of it wrapped up in 2009 perhaps early 2010, 2011, and then 12, 2012 was a fateful time for me because I was contacted by National Instruments to help cohost the Celani experiments for NI week in 2012. I believe you were involved that

Tom Grimshaw: Subsequently, yes.

Dennis Letts: My job basically was to help host Francesco Celani, a great experimentalists from Rome, and help him set up his experiment. I have a place to work on it and so on and so forth. So we did all the work in my little lab. NI engineers came over and invaded for a week or so and the, it was hard work. It was hot. The plus side was I got to meet some very good people. All the NI people were great. Dr T, one of the co founders of NI, came over to the lab quite a few times and we got to do some experimental work together later. But during this 2012 meeting, I ran into some good folks from Industrial Heat. So that was my first encounter with Industrial Heat. First quality, top quality people. The first person I met was Dewey Weaver at 2012

Tom Grimshaw: So, before we leave the Celani endeavor. Let's talk about who were collaborating with during that time. Cause that was an interesting time, I thought, but before we go there, when was it that Earth Technology entered the picture, was at during the co-deposition work or was that-

Dennis Letts: Actually it involved co-deposition work, but it was around 2013, after we recall we'd all we'd already met and got comfortable with Lothar and those people.

Tom Grimshaw: Okay. Okay, so earth technology. I thought you were doing work with them before National Instruments.

Dennis Letts: Long before 95.

Tom Grimshaw: Yeah. So let's talk about that. Just take a little departure here for a Earth Technologies.

Dennis Letts: In 2000, I'm sorry. Somewhere in 1995 I first encountered Scott Little and Earth Tech, approximately. I didn't do much work with them at that time because they were, Scott was working on his own system and I was working on mine. I think the link was Charlie Becker. Charlie introduced me to Howe and-

Tom Grimshaw: Helped put off.

Dennis Letts: Helped put off in Scott Little, and when they were over in Breaker. We became pretty good friends overall on in the years. When I discovered the laser trigger, single laser trigger, they became very interested and Scott wanted to help try to vet it and see if it could be brought into focus as either real or, prove it or disprove it. And this sort of overlaps the time of ICCF-10 because, about 2000 2001 or two, somewhere in there, I spent all of 2002 and most of 2003 with Scott over at their lab trying to find the mistake that makes it look like a small laser can produce large signals.

So we went, you know, side by side in the lab and he would suggest things and then I would make those changes, with his help sometimes, and then we would do another test. We did this for a year or two, I mean dozens of experiments, and the signal persisted. We could not find what was causing it. Now Scott finally, he never admitted that it was real, but how he put it, how put off, how I've done everything I know how to do to find the error here, the mistake and fix it. So it would make zero. But every time we make a fix and Dennis acts on my suggestions, signal comes back. Every time. So he said, I don't know, I cannot find the mistake. So Howell said, okay, this was right before ICCF-10 in 2003 Howell said, in that case, let's go forward and build MOAC. Which was their big calorimeter that-

Tom Grimshaw: Mother of all calorimeters. Acronym, MOAC.

Dennis Letts: Yes, I was the one who named that MOAC.

Anyway, it was a wonderful device. Very accurate. I thought, sadly I was never able to make excess power appear in that because I had ... the last excess power event that I had was 602P that I took up to the conference. MOAC wasn't built til the next year into 2004, so by that time I had run out of magic on single blade [inaudible 00:20:59].

Tom Grimshaw: You had run out of your palladium samples [inaudible 00:21:00]

Dennis Letts: Yes, I had run out of palladium samples.

Tom Grimshaw: Yeah. Okay.

Dennis Letts: And I never could reproduce it, single laser again. There wasn't adequate room, really, to do dual laser experiments in the system. I couldn't make that work very well. So we kind of got off the beaten path for a while.

Tom Grimshaw: Yeah. Well just as a side note about, you know, at the same time they were working with you, they were also working with other people trying to do their verification. I think a lot of their, what I heard or what I understand, is a lot of their verifications that really involve variations on the various people's experiments that they were trying, and they were never successful in verifying anybody. I don't believe.

Dennis Letts: Well, that is correct. In, in my case, they could not find the mistake. And most of the other cases they found the error and said, there's your mistake, and if you fix that it won't work. And they fixed it and it didn't work. So I see now that's, that's kind of a rough estimate on, on how things were.

Tom Grimshaw: Okay. Yeah, because, well, we gave a presentation to NI at one time that I was at, and they stepped through all of the ones that they had, they had tried to verify and could not.

Dennis Letts: Right.

Tom Grimshaw: Okay. So-

Dennis Letts: Well, there's a fine point difference between not being able to make it work, and finding a mistake.

Tom Grimshaw: Okay.

Dennis Letts: You know,

Tom Grimshaw: Good point.

Dennis Letts: Or make it make it go away. What the favorite trick is, is to make it work and then identify the thing that's making it work. They could never do that with mine, whether that's good or bad or otherwise, but they never could find the enabling thing that they could fix and do it the right way and make it stop producing XX [inaudible 00:22:57]. They did that for John Daysha's experiment, you recall. He would put a whole lot of pellets in in his cell. By pellets, I mean the recombiner pellets, and about a hundred mils of them or something, like a whole bunch by, I put in 20 he put in 200. So there'd be a lot of these pellets and he would see excess power.

And Marissa Scott's daughter figured this out. She said, okay, there's a thing called the heat of wetting. When a catalyst gets wet it produces heat. So what was ... they showed without any ambiguity, that when John Daysha's pellets got wet, they produced heat, and they can see it in MOAC, and she put the pellets in and wetted them remotely by pouring water on them inside the calorimeter without messing anything up. She had a little handle, and produced this heat of wetting effect and that explained his effect. They were looking to do the same thing with mine, but they couldn't do it. It never did show up is as to why the mistake would be occurring.

Tom Grimshaw: So you collaborated with them ... well they were involved in the National Instruments. I think that's where we were when we went on the diversion for Earth Technologies. So maybe we can pick up the thread at this point, that Celani experiment ,and you had gotten through what he had done at NI week here in August of 2012. Pick it up from there if you would.

Dennis Letts: Well, the Celani experiment was successful in one way, in that it caused a great stir of interest, in NI itself, as well as in cold fusion. There was a, the level of interest in NI week and Dr T's talk on during his time at NI week he had gotten, he normally got two or 300 responses to his Facebook page or whatever it is. He got 3,300 or something like that. Just like over the top. Don't hold me to the numbers, but it's like six, eight or 10 times more, buzz they called it, than they'd ever gotten before, after the cold fusion thing. So it was a demonstration, not a replication, or it was, calibration was not possible. It was just all we could do is make it run and appear to do what it did. And then he had would have to go in and put Argon and to take it away and make it show zero and and bring it back.

We were not allowed to do that because he couldn't bring any hydrogen bottles into the arena, to the conference center, downtown, so it was just a demonstration experiment, and it was very successful for that. There was lots of interest. It, like the Rossi experiment, it brought a lot of outsiders for the first time into the field of cold fusion. And even though Rossi was in the background at this time, Celani was in the foreground. Dr T could not make any kind of a deal or arrangement with Mr Rossi, he realized that, so they thought they could get perhaps in other smart Italian experimentalists, which they did, and a have him do a good demo.

Tom Grimshaw: Yes, I've never really understood exactly how it came about that they picked Celani and had him come over. Stefano Concezzi was Italian, and I think he was over in Italy having conversations, perhaps because of doctor Truchard's interest in the field, he was talking to various people, and I suspect never really heard this, that when they knew they couldn't work with Rossi, that they might have made this arrangements with Celani, at that time.

Dennis Letts: I suspect that's true. Celani and his instrument was highly portable.

Tom Grimshaw: Right.

Dennis Letts: He is an affable guy. Easy to work with. Doesn't demand big payments. Is a very good experimentalists. Well thought of in the field. He had all the good credentials. So, if you were in a room and want to have another Italian, he would be your go to guy.

Tom Grimshaw: Yeah.

Dennis Letts: Violante couldn't go probably, because he was tied up perhaps with NDAs and other people, that Celani was pretty much a free agent.

Tom Grimshaw: Right. Right. Yeah. So kind of continue the story a little bit, Celani gave a demonstration again, later that same month, August, at ICCF-17 in Korea. Yeah. And then NI did some subsequent work in which I was involved in, and it was interesting to see without, you know, my mission working with National Instruments was to survey people who had received Celani samples to see who had had success, and one of the receivers of samples that may have had success was Challey Energy, and it was interesting to see Mark Saswell on the phone the other day, coincidentally.

Dennis Letts: Small world.

Tom Grimshaw: Small world. Well of course it's not a very big world in cold fusion to begin with, but-

Dennis Letts: Right.

Tom Grimshaw: Okay. So, I think that that was the end of your involvement with National Instruments with respect to Celani. But then we did some additional work with the other players on the National Instrument side beside Stefano or Little [inaudible 00:29:09] and Brian Glass. Those were the other two people that were kind of carrying out Dr Truchard's wishes and marching orders in the cold fusion field, because of a lot of this, most of this work was done in Truchard's expense rather than company expense. So at least my funding was, or at least most of it was so. So anyway, let's ... that pretty well ended your ... well we worked with Lothar on a few things.

Dennis Letts: Yeah. That there was some momentum in that relationship that carried over for a year, till 2013 about, and in that year's time, you and I and Lothar and Scott Little, as you recall, did some co-deposition experiments at Earth Tech. The idea of which was that we would do them in ... and they were my co-deposition experiments, the same ones I had done for the navy basically, and we would start them out in my calorimeter, doing them the way I did, and in keeping with the Earth Tech mentality, you show me how it works over here, then we do super good calorimetry over here and see if it stays the course, in count, you know, survived. Well it didn't, we didn't, I never did get a good carry over. I got some good signals, good clear signals from my experiment, but by the time we got it into MOAC, it would never run and show excess power except one run. It went to a hundred milliwatts plus, and then died on one run. And what had happened, contamination had occurred. I never could figure out why, but it did. Instead of having copper, gold, palladium, I had copper, gold, palladium, copper back on top. Copper contamination came from somewhere. I don't know exactly how.

Perhaps there was some kind of over voltage condition in MOAC that caused that to occur and I never could spend time and figure out where that was coming from, but it killed the effect. I crossed the line in MOAC only once with anything, and it was that co-deposition experiment. I have the data here, I could at some point show it, but break even is here, drawing with my finger a horizontal line, and I went ... this experiment went above that by a noticeable amount, looked like it was really taken off, and then turned back around and went back to break even zero. And then when I took that thing apart, it, when I took the cathode out and looked at it under microscope, you could clearly see the copper contamination that killed the effect. So.

Tom Grimshaw: Okay.

Dennis Letts: That was 2013. we were never conclusive on those reports that we both contributed to on whether gradients caused the issue or to appear or not. So we left it lying there. At about that point in time, 2013 ,there was another NI conference.

Tom Grimshaw: Okay, we're at 32 minutes, now. Time for another break. And this sounds like this would be a good break in the action, as far as the sequence of events. So we'll stop at here, as Tom Grimshaw with Dennis Letts on July 6th. I believe this is the end of session number four. Thank you.

Interview 5

Tom Grimshaw: Tom Grimshaw again for session number five with Dennis Letts talking about the sequence of activities and the events in his cold fusion career. Dennis, I think we were wrapping up your involvement with the Celani demonstration with National Instruments and the subsequent work using codeposition also with National Instruments. And at that time, there was involvement of Earth Tech, Scott Little as I recall. I have one question. Let's see. When you were working with Celani, how did you become involved in that? In other words, how did National Instruments contact you? How do they know that your lab was available for reconstructing the Celani device?

Dennis Letts: Dr. T and either [Lothar 00:00:57] or Stefano went to see Peter, two guys, Dr. T and one of the others. And they were asking about Celani and how could they go forward and get all this to work out. And Peter said, "Dennis Letts is right there in Austin. I've collaborated with him on many projects. He's always been very helpful and why don't you call him?" So they went back to the office here at Austin and a guy named Mike [Chairna 00:01:33], CEO [inaudible 00:01:35] was also involved around the edges. And Dr. T and Lothar were fretting on how in the world do we get in touch with this guy? And Mike looked me up through a paper or something and Mike said, "If you just look out the window, you can probably see his lab. He's just down the street."

Which is true, you look up, you can see ... So they reached out, Peter gave my phone number and Lothar called and proposed the idea of helping host Celani and do all of that. And I realized early on that they were, by themselves, were pretty much above their heads in water because a lot of stuff you have to know and do that you just can't know unless you're in the field. So I told him, I said, "Sure, I'll step in and whatever you don't know, I'll supplement and Celani and I are good friends so it should work well." So I offered my lab, cleaned everything out and it became Celani's laboratory for a week. And everything was very cordial and positive.

Tom Grimshaw: Okay, good. And I think it might be worthwhile to mention that Celani's device involved the use of let's see, palladium, nickel-

Dennis Letts: I think it was nickel constantan and basically light hydrogen.

Tom Grimshaw: Constantan which is nickel-

Dennis Letts: Coppery.

Tom Grimshaw: Copper and a small amount of manganese.

Dennis Letts: Yeah, I believe so.

Tom Grimshaw: And he was using, I think, both hydrogen and deuterium gas.

Dennis Letts: He would add D also to the H.

Tom Grimshaw: Right. And he was measuring excess heat using radiation, infrared radiation.

Dennis Letts: Stefan-Boltzmann equation.

Tom Grimshaw: Stefan-Boltzmann equation.

Dennis Letts: Which is fourth degree and no one in the field, including me, was comfortable with the calorimetry. He had a way to make the calorimetry better and more credible if he was at home where he could use his techniques of gas changing, swapping out the gas isotope and swapping out to putting in argon instead of hydrogen and show a good zero. You put in hydrogen and a little deuterium, whatever it was and off it goes. So that was more credible than what he was doing here. This was just mechanical demonstration.

Tom Grimshaw: Right, right. Okay, probably enough on that. What came next? You said there was another NI conference. I think you were going down that path.

Dennis Letts: Right. Every summer, August of every summer, NI puts on a conference, invite their clients over to look at their latest and greatest innovations and methods of controlling processes and this, that and the other. Cold fusion was a popular one in 2012 so they didn't centerpiece it like they did in 2012, but they offered booths for people who were in the field. Dennis Cravens and Rod Gimpel took them up on it and then co-opted a booth. Cravens demonstrated his spheres, his brass spheres that could run side by side under same conditions and one had special catalyst in it. The other did not and it would run significantly hotter in temperature than the control, so that provided a nice demonstration. Not too many people were wild about it necessarily. They should have been, it's a pretty solid demonstration.

But the second opportunity for me came along because I helped Cravens, since I had experience, I helped him set up his booth and helped him navigate the conference mechanics. And at that time, Dewey Weaver came back. And at that particular time he said, "Dennis, since we met last, I read all your papers and found as many as I could and see that you have this dual laser experiment, single laser codeposition, all of these things and Dr. Craven's got this going." He said, "Would you guys be interested in working with Industrial Heat on some of these projects?" And I said, "I don't really have anything new." I said, "I just got the chemical-based stuff." And he said ... and by that time everybody was going to gas because of Rossi's influence, high temperatures. And I said, "I just don't have anything in the planning stages."

He said, "If that changes, please call me. Industrial Heat would like to partner with you on some of these projects." And just a very likable chap. Few weeks later, I'm not sure how long, but some time later, I was in my lab and I had picked up my neutron detector, which is about a foot and a half long or so, stainless steel tube, high voltage connection at the end with a slender rod down the center for high voltage connections that would allow you to spark and see neutrons incoming inside the helium-3 environment. I looked at that and I said, "Wow, that might make a gas reactor that you could ... It sort of looks like a fuel rod if you could scale it up, make it bigger.

So I made some drawings, contacted Dewey and said, "I do have something." And I sent the plans for what has come to be known as the LENR tube reactor or the LT reactor. And to make everything condensed, we hit it off very well. They agreed to fund my lab and all my projects and they're very generous people with their resources, very kind people and very smart in many ways. So I started with them and I guess ... but it took me a while to get all my ducks in a row, but late 2014, I began working with them, with Industrial Heat. Dewey Weaver, JT

Vaughn and Tom Darden are the principals, the ... let's see, T. Barker ... What is T. Barker's last name? I'm drawing a blank now, Thomas Barker.

Well, I don't know why I'm drawing a blank, but their chief experimentalist back in that day was T. Barker and I'll pull in his last name as soon as I stop drawing blanks. Great guy, southern Christian gentleman all in the finest tradition. They do what they say. Most pleasurable people I've had to work with for many years. Equal quality to Charlie Becker, in the business world, their word is their bond. They tell you they're going to do something, they do it and no funny business, no cheating, no squabbling and this, that and the other, can't say enough good about them, so I'll stop. We started with the idea of making a gas reactor and I started out with a modest form of calorimetry using ISO parabolic or differential calorimetry. But I quickly, after a little success there, we quickly moved into the gas phase, high temperature [inaudible 00:10:13], which was shown at ICCF-21, which you know about. Seeing the paper.

What we're doing now, I can't discuss in great detail, but it's a continuation of gas loading and some proprietary information they own that I can't discuss in detail, but we are making some progress. It's painstakingly slow, takes forever to get a good result and then verify that you've actually gotten it and that's kind of where we are now. We're not taking any grandiose claims for granted without significant rigorous proof. That's what they require. That's what I require. Cravens and I are collaborating once again. There was a period of time when we were eclipsed from each other. You know what I mean, he was over here with another group and I was with IH and now we're all together again so we can collaborate and that's always a positive thing. So that's where we are as of today. Experiment number 810 F prime is running right now. The prime means that I've gone through the alphabet once on this series of experiments and I'm down to the letter F on the second time through. So 30 or 35 experiments on this number 810, reactor 810.

Tom Grimshaw: Okay, very good. So a couple things to back up on, National Instruments is pretty much out of the field now. Truchard retired out of the company and their level of interest is zero or below. And so I think it's ... I first met Dewey Weaver, I think before I knew you. And then I met him at MIT at one of the Swartz conferences and introduced him to Tom Claytor. And that has resulted in a nice ... or ultimately resulted in a nice collaboration as well there. So I think we'll go ahead and put this on pause just for a moment, see if there's anything-

Dennis Letts: One moment, let me give you T. Barker's full name now that it's come to me. His name is T. Barker Dameron, D-A-M-E-R-O-N. Engineer type fellow, good background, very smart guy, very diligent. He has got what it takes to stay with these cold fusion experiments, LENR experiments. He is relentless in the laboratory. So T. Barker Dameron is a name that ... He is mentioned in the Rossi litigation proceeding because he worked with Rossi to some degree or the other.

Tom Grimshaw: Yeah. So that's a question that's naturally going to come up so might as well ask it. What, if any, was your involvement in that journey that Industrial Heat went through with Andrea Rossi and the ensuing lawsuit?

Dennis Letts: Yeah, virtually zero involvement. They had met Mr. Rossi and contracted with him before I came into the picture a year or two or more. And they asked my opinion and I rendered it in the negative side. I said, "Anyone who refuses to show you exactly what he's got and you're providing the funding, there's something wrong and I would exercise caution." However, I said, "He's got the right idea. He's operating at a high temperature 300 C or so." At the early on back when I was asked this question, he was using lots of metal, kilograms of nickel and he was putting in hydrogen gas at high temperature in nickel with some kind of a protocol that made the nickel more amenable to soaking up the gas. So I said, "All of those things indicate that he could have something, so you can't throw the baby out with the bath water. You've got to really examine the baby closely."

And I said, "If he is not letting you in with all of your engineers and researchers, anybody in our field, then there's something wrong. There's a problem there and you should be careful." And that's all I said and all I needed to say. I was never brought into any confidence or anything else. I did make one recommendation. I said, "Why don't you get infrared satellite imaging and look at the Rossi laboratory when power is not present, when power is present, and again, when power is gone?" He says, "Oh, I'm making power on Wednesday, July 3rd." Well, you get your satellite data, it comes over every 90 minutes or whatever it is. You get your satellite imaging done for each one of those periods and if there's a megawatt coming out of that little laboratory, it's going to show up in that building heat signature.

So Dewey said that they got the imaging done. He couldn't tell me what it revealed, but he said that Rossi's attorneys had it thrown out for whatever reason so they could never use it. So it must have been of some interest. When you think about it for a minute, if you put a million watts of power in a building, a commercial building of any size, it's going to light up compared to the ones around it, especially in the cooler periods of the day.

Tom Grimshaw: Of course. As we wrap it up here Dennis, what are the times, one time or two or three or whatever, that you feel the most confident that you achieved and observed LENR cold fusion?

Dennis Letts: That's a real good question, very telling, if you give a good honest answer.

Tom Grimshaw: I would expect exactly that.

Dennis Letts: Yeah. It would have to be, my current experiments are not far enough along yet to where I feel like I've beaten them into submission. They're beating me into submission sometimes, so it would have to be one of the dual laser experiments or the codeposition experiments. They seem to have the smaller signals, yes, that I'm getting now, but the ratio of disturbance and noise to the actual signal's very large where you can turn it off. Let me give you maybe three examples that I would consider hard to explain away. One being the ability to turn this off, single laser, by moving a filter outside the cell, outside their surroundings.

Picture this ... Well, you saw the picture of this thing, the large oversized book. It's here somewhere. Hold on, I will run into it. Here it is. Okay. Oops. Well there is the setup where you rotate this thing, the picture that you've got an enclosure, thermal enclosure, which you can say you've got your laser here. You got your filter in front of it, and you have a glass door in front of this gizmo and you're shining it through without touching anything. And you sit here and you rotate this and you cause a thing to change inside that cell just by changing that. That to me is one of the strongest, the polarization effect.

Tom Grimshaw: And I should mention, you're looking at that 2002 oversized volume that you carried with you when you went to SRI.

Dennis Letts: Correct.

Tom Grimshaw: Okay, that's when you rotated the magnets to the ... or was-

Dennis Letts: The magnets too. This is a polarization trick is probably even better than the magnets because there's no physical contact.

Tom Grimshaw: The single laser polarization.

Dennis Letts: Single laser polarization. You rotate the electric field of the laser beam changes direction with respect to the cathode surface or the magnetic field lines, whichever and you cause excess power to turn on and off. Two, three, 400 milliwatts of excess power that you're getting from the laser, which is only in this case, 30 milliwatts, 25, not a lot. That's probably the best. The next best probably, the magnetic field angle where you rotate that. You-

Tom Grimshaw: As described in the same reference then?

Dennis Letts: Yes.

Tom Grimshaw: Okay.

Dennis Letts: You see the little magnets right there?

Tom Grimshaw: Mm-hmm (affirmative).

Dennis Letts: Now when I did the magnetic field line changes, I advanced that a little bit. I had a thicker platform to put it on and I cut a bigger diameter hole out here so those would fit between the outside of this thing, hole I cut and the cell. The cell would fit.

Tom Grimshaw: There's an annulus in there for the magnets.

Dennis Letts: Yes, yes, exactly, well said. The platform look like that and the larger diameter hole here. We had the cell sitting inside of that and the magnets exactly filled up this space right here like this so that they would maintain contact. If you rolled them around 90 degrees, they would have the same thermal contact and I was able to do that in light water and show that there's no difference at all. Then you put in heavy water and you move them, they do it, so that's-

Tom Grimshaw: So number one and number two go back to this 2002 work. That's very interesting.

Dennis Letts: Yes. The others, any of the other dual laser effects I guess ... and even a codeposition, I could do a codeposition and I think I showed it to you before, but 2007 and eight, any of those where we just turned on two 25 or 30 milliwatt lasers at a certain frequency and we would get an effect. If you're all frequency, you wouldn't get it at all or if you use one laser.

Tom Grimshaw: In order to get the beat frequency.

Dennis Letts: Right.

Tom Grimshaw: Now, what about the single laser? Did you feel that that falls in your ... any of those experiments fall in your say, top 10 or in terms-

Dennis Letts: Well yeah, this is a single laser here.

Tom Grimshaw: Okay.

Dennis Letts: Yeah, that one [crosstalk 00:22:34] filter is a single laser experiment.

Tom Grimshaw: Right, okay.

Dennis Letts: You can see ... whoops, see the single laser right there.

Tom Grimshaw: Yeah, yeah, okay. And then the dual laser with a beat frequency, which came later. There were any number of those that you would say would be in the top group, okay.

Dennis Letts: And the codeposition experiment that I tend to favor is 584, 684. Let's see what it is ... I'm trying to remember, 584 D like I showed this to you maybe last time, test my memory ... 4 D. No. NRL ... I know it can't be 684, type that anyway, but I don't think it is. No. NRL five. Well, NRL project, at any rate, it was one where I pumped out the electrolyte. Why am I drawing a blank? That is so funny how human mind works. Well it is 685, 684, NRL 684, 684 D. Here we go. It's this one. This is one of my best experiments as far as showing what I intended to show.

I wanted to show that you have near perfect calorimetry at the beginning when you have either faulty electrolyte or a nonproductive electrolyte or a nonproductive cathode in place. As soon as you get the productive cathode in place by codepping onto the right cathode, you get a big signal, 250 milliwatts here and then you pump out the heavy water electrolyte and pump in the light water-based electrolyte identically made and you go to zero. To me there are more moving parts in that than the ... and more ways you can explain it away. I don't even know how you would go about explaining away a filter change where you rotate that filter outside a foot away from the cell and you make the temperature at the cathode inside that cell change by two, three, four degrees.

How do you explain that? This you could say, something was different about your concentration or your chemistry, whatever. But in descending order, number one is the 2002 rotating filter. Number two would be any of the, I'm guessing, again, not missing anything, your magnet experiment, rotate the magnets. Number three would be any single or dual laser experiment where it switches on with all you're doing is turning on a laser beam outside and it goes up a huge amount. It's probably even better, the single laser, when those were to take off. My God, they'd go up a half a watt and you're putting in one watt of power to get them to do it. What's that about? So single lasers-

Tom Grimshaw: [inaudible 00:26:24].

Dennis Letts: Yeah. Number one, polarizing filter. Number two, rotating magnets. Number three, single laser ... well probably ... number one, rotating this with a single laser filter. Number two, the single laser experiment itself. Number three, dual laser experiment itself. One, two, three, four I guess it would be rotating the magnets and five codeposition like that.

Tom Grimshaw: With the exchange of the electrolytic fluid.

Dennis Letts: Yeah, that changes that. And I've done them even different ways. I have ... What did I do? And having had light water-based and I drop in the palladium, the codeposition stuff-

Tom Grimshaw: Chloride.

Dennis Letts: Couple of drops palladium chloride into light water, nothing. Do the same thing into heavy water, off it goes and the only thing's changing is the isotope in that little ... inside the stuff you put it in. You put the same stuff in, but the base is different. Your electrolytic base is D instead of H and it goes. Okay, so now if you want one, it's the changing of the little filter, rotating-

Tom Grimshaw: Polarization.

Dennis Letts: Rotating the polarization by 90 degrees. You go from zero to two, three, 400 milliwatts from a one milliwatt or a 25 milliwatt stimulation, if you will. If you're using the [inaudible 00:28:08], which is what we did. So it's a 25 milliwatt stimulation. You get 500 milliwatts out. If you do this, just rotate that.

Tom Grimshaw: 2000 cop through cohesion and performance.

Dennis Letts: Yeah.

Tom Grimshaw: All right. Let's look to the future.

Dennis Letts: Can't talk too much about the future because it is my involvement in IH, but it's rather obvious where I'd like to see this go is to scale up.

Tom Grimshaw: When you graduated from electrolytic to gas systems with your affiliation with IH, that was a big change.

Dennis Letts: The power went from a typical one to what we reported. We've got higher now, but I won't say how high, but what we reported at ICCF-21 is the factor of 10. We went from one watt typically to 10 watts or six or seven in a gas system, which is woefully small, but it's likely [crosstalk 00:29:15]-

Tom Grimshaw: Well [inaudible 00:29:15] performance of six or seven is not to be sneezed at.

Dennis Letts: Well no, it's not that. This is putting in 60 or so watts of power into the LT to drive the discharge. And we got about 10, 15% gain on top of that.

Tom Grimshaw: Okay, okay.

Dennis Letts: Yeah.

Tom Grimshaw: Okay.

Dennis Letts: So that's not bad. And we've done better than that since, but not enough to be real haughty. You might have to pay me for your next appointment if [crosstalk 00:29:55].

Tom Grimshaw: Or maybe you'll pay me.

Dennis Letts: Maybe so, we have to [crosstalk 00:30:00] good. I'll be begging you. Come on, I want some time, come over.

Tom Grimshaw: All right, sir. I think we'll call this good.

Dennis Letts: All right. Thank you.

Tom Grimshaw: We've had excellent sessions in this round of interviews. I'm sure they'll complement very nicely with the earlier session that we did. So Tom Grimshaw here with Dennis Letts. Let me say thanks and we'll sign off. Take care.

Dennis Letts: Farewell Tom.

## *Volume 2. Copies of Publicly-Available Documents*

The documents listed in Section 2 are included in Volume 2 in the order of Table 2-1. Where a document has not yet been found, a placeholder sheet is included.