



OVERHOFF  
TECHNOLOGY  
CORPORATION

US Nuclear Regulatory Commission  
Division of Fuel Cycle and Material Safety  
Washington, DC 20555

May 5, 1997

Subject: Licensing Needs

Dear Madam or Sir:

The Department of Energy, through Los Alamos National Laboratories (LANL) of the University of California and our company, Overhoff Technology Corporation (OTC) are about to enter into a cooperative agreement to develop and produce a variety of neutron detecting instrumentation to promote improved safety to personnel potentially exposed to neutron irradiation.

A need for better dosimeters, survey monitors and other monitors for neutrons has become quite acute because it is now beginning to be known that current methods and devices are seriously inadequate due to substantial performance shortcomings.

Without going into detail, it appears that the only really good way to build small accurate neutron dosimeters and survey instruments is to use detector techniques that may involve the use of microscopic quantities of "special" nuclear materials.

Together with your assistance and cooperation it is our plan and expectation to be able to build a couple of prototypes by about September 1997, and commence production at the beginning of next year.

We plan to do this work together with the scientific staff of Los Alamos National Laboratory, and the LANL will, itself, be one of the first beneficiaries of this effort since they need this equipment badly.

I am writing you at this time because I would like to keep you informed as we go along; also because, at some point in time I assume that one or more NRC (or Agreement State Licenses) will be required for us to proceed down the road.

I hope that our work will also benefit your own agency, because this will support your own efforts for better radiation surveillance capabilities.

Please let me know how we can best work together to get this most important program off to a good start.

Your sincerely,

M.W. Overhoff, Ph.D.  
President

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## APPENDIX A

### A. PURPOSE

#### Purpose, Background, and Reason for Cooperation

The purpose of the work is to design and develop a new family of neutron sensitive detecting, monitoring and measuring equipment including dosimeters, area monitors and survey instruments.

Dosimeters and instrumentation for neutrons are essential equipment for use by national defense agencies, the military and civilian agencies associated with nuclear weapons as well as high energy research establishments, not to mention sophisticated nuclear medical facilities.

The new neutron dosimeters are expected to be far more cost effective, both to purchase, as well as in use from the point of view of data acquisition and processing. These devices will pay for themselves rapidly while saving the government a lot of money.

In particular, TLD dosimeters "of record" currently in use at LANL and elsewhere provide data with gross errors, some with an energy response with errors of almost 100 to 1. The proposed new dosimeters will exhibit flat energy response.

Currently used personnel electronic dosimeters have poor response, some of the units available currently are not much more than well engineered but fragile laboratory curiosities.

There is ample scientific evidence to show the way to develop a new type of detector technology and the associated instrumentation without such shortcomings.

These detectors will use so called fission foils, including materials such as uranium, thorium, plutonium and similar isotopes.

Scientific knowledge dating back almost half a century, indicate that this approach will lead to an accurate and cost effective solution. Today's technology, available hardware and software has reached the point where this new approach is fully feasible, and it is only a matter of time, probably less than two years before someone will offer the technology to the world.

In fact, we know that some government laboratories as well as some commercial entities in cooperation with their respective government or university agencies are actively pursuing similar, or possibly even identical approaches in Japan, the UK, Germany and perhaps in France.

It is therefore felt that both in the national interest as well as for merely patriotic reasons it is important for us to take the lead and be the first with this work.

#### REASON FOR COOPERATION

There are two fundamental reasons for cooperation.

Firstly, the staff and facilities of the Los Alamos National Laboratory are the foremost leaders in the fundamental science associated with the detector technology to be used. LANL, more than almost anyone else, have access to the full essential scientific know how and even the actual material to be used for testing and fabrication.

On the other hand, our company, OTC, has twenty-five years experience in commercializing, designing, fabricating and marketing nuclear instrumentation, much of it to our own national laboratories.

LANL, along with all our national laboratories, are not in the business of commercial production.

It is therefore seen that there is an excellent if not almost unique fit in the capabilities of the parties to support cooperation.

## B. SCOPE OF WORK

### Technical Objective

It is intended to develop and design a family of neutron detection devices based on known but currently neglected technology in order to produce instrumentation which is both better in performance than currently available units, as well as being more cost effective in acquisition and use.

Three lines of instruments are proposed, they share the same basic technology.

#### i.) Neutron Dosimeters

These are small pocket sized electronic instruments for the real time detection of neutron flux. They are used to determine wearer dose, as well as providing alarming capabilities for dose and dose rate limits.

The neutron dosimeters will be designed for ease of operation, they will withstand rough use, and will be economical in acquisition as well as in use.

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#### ii.) Area Monitors

Similar in many respects to the pocket dosimeters, these units will be a.c. powered devices that are linked to central system computers for automatic data analysis and alarms.

#### iii.) Survey Instruments

These units are intended to replace large bulky instruments currently in use.

The new smart neutron survey monitors will not only be smaller, more accurate and sensitive, but may incorporate new features such as chronological data acquisition or other "smart" features.

## TASKS OF THE PROJECT

### Duration and Responsible Parties

The project can be broken down into a number of distinct phases, with overlapping time frames. All three lines of neutron instrumentation will be developed concurrently.

The entire project is intended to commence in May 1997 and is expected to terminate with onset of commercial production at the end of this year or early 1998.

The following steps will be taken.

#### B-1 Determination of instrumentation specifications and features.

This work defines what the instruments will do, and how they do it.

Specifications will, to a large degree, adhere to and evolve from ANSI standards already developed by W. Casson at LANL.

This work will be performed jointly by W. Casson, T. Buhl, M.W. Overhoff and will be based largely on published information as well as LANL on site testing.

Features, on the other hand, are characteristics which make the instruments user friendly. Desirable features for each of the three instrument lines will be studied and selected principally by R. Nolen, F.M. Cox and M.W. Overhoff, with others in assistance.

#### B-2 Sensor Technology

The heart and soul of these new neutron instruments rests with the development of "old but new" sensor technology. It is proposed to use fission foil detectors, coupled to semiconductor diodes in order to provide detection capabilities with flat (or tailored) energy response.

Current devices show seriously impaired energy response, and are bulky.

This work will be carried out by W. Casson, T. Buhl and M.W. Overhoff.

B-3 Interface and Support Electronics

Signal processing electronics (amplification) and power supplies for the instruments, both battery as well as a.c. supply will be developed at Overhoff Technology Corporation under the direction of M.W. Overhoff.

B-4 Microprocessor, Interface, Data and Analysis Acquisition Systems

Data acquisition and display directly associated with each of the instruments, as well as data transmission to external recipient systems is performed by microprocessor electronics.

Hardware and software for both the instrument microprocessors as well as the p.c. based data acquisition and analysis systems will be developed primarily in Cincinnati, work being done possibly by staff and students of the University of Cincinnati under the direction of Dean Joseph Nevin and M.W. Overhoff.

B-5 System Integration and Configuration

The breadboard equipment, once developed, has to be converted into a production prototype which embodies all features and cosmetics for each specific instrument line. Each of the prototypes has to undergo type testing to ensure they meet technical specifications.

This work will be done principally at Overhoff Technology Corporation, but with close cooperation with the University of Cincinnati School of Design as well as T. Buhl and F.M. Cox.

Both DOELAP and NAVLAP testing will be sought.

B-6 Customer Relations and Marketing

Indispensable to the success of this project is early communication with all potential users of these devices, within DOE, DOD, the medical fraternity and elsewhere.

This work is spearheaded by R. Nolen and F.M. Cox together with T. Buhl and M.W. Overhoff.

B-7     Production

Equipment will be manufactured by Overhoff Technology Corporation, but essential components (the detectors) will be, at least initially, provided by LANL.

Detectors, (fission foils mated to diodes), will be fabricated at LANL under the direction of T. Buhl and W. Casson.

The instrumentation will be fabricated and assembled at OTC, but, for the early future final assembly, testing and calibration may need to be performed at LANL, until OTC has obtained approval from the NRC.

B-8     Distribution and Sales

Finished products will be distributed within the DOE and DOD until NRC approval is granted for commercial distribution.

Programming this work will be performed jointly by LANL and F.M. Cox.

B-9     Administration

The entire work will be performed under the joint administration and guidance of LANL and OTC.





Robert L. Nolen, Ph.D.  
Project Leader Tritium Technology  
Los Alamos National Laboratory  
Mail Stop F660  
Los Alamos, NM 87545

May 5, 1997

Dear Bob,

Thanks so much for your most valuable support and leadership on our proposed program. With your help it cannot fail.

I am enclosing a draft of a CRADA proposal. I threw it together hastily since I am leaving for Europe for 10 days tonight, and I wanted to get the process rolling.

Please review it, change it anyway you wish, and I will call you when I return.

Thanks a million,

*Mario —*

M.W. Overhoff, Ph.D.  
President

Encl.





OVERHOFF  
TECHNOLOGY  
CORPORATION

Thomas E. Buh, PhD, CHP  
Team Leader, Health Physicist  
Health Physics Measurements Group (ESH-4)  
P.O. Box 1663, MS G761  
Los Alamos, NM 87545

May 5, 1997

Dear Tom,

It was great to meet you. The draft of the proposal outline is coming to you by mail, and, by all means, make all improvements and comments that spring to mind.

See you soon and best regards,

*Mario*

M.W. Overhoff, Ph.D.  
President

Encl.



OVERHOFF  
TECHNOLOGY  
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Mr. Morgan Cox  
2501 West Zia Road  
Suite 3-102  
Santa Fe, NM 87505

May 5, 1997

Dear Morgan,

The draft of the material is too long to fax so I am sending it by mail.  
Please review and initiate whatever you can. See you in two or three weeks.

All the best,

M.W. Overhoff, Ph.D.  
President

Encl.



OVERHOFF  
TECHNOLOGY  
CORPORATION

Mr. Bob Murray  
Institute of Advanced Manufacturing  
Sciences, Inc.  
1111 Edison Drive  
Cincinnati, OH 45216

May 5, 1997

Dear Bob,

I hope the enclosed will give you something to work with.

Thanks for all your help, and I'll see you on or after the 15<sup>th</sup>.

Best regards,

*Mario*

M.W. Overhoff, Ph.D.  
President

Encl.



OVERHOFF  
TECHNOLOGY  
CORPORATION

Joseph H. Nevin, PhD  
Dean of the College of Engineering  
University of Cincinnati  
PO Box 210018  
Cincinnati, OH 45221-0018

May 5, 1997

Dear Joe,

It will be great to work together on this project.

Enclosed you will find copies of all salient material.

See you soon and all the best.

M.W. Overhoff, Ph.D.  
President

Encl.



Ms. Andrea Pistone  
Los Alamos, NM 87545

May 5, 1997

Dear Andrea,

Andrea, it was nice to see you again, and I hope to see you again in about two to three weeks from now.

I can't thank you enough for your enthusiasm and support, without which this work would be very difficult, if not downright impossible.

A draft of Appendix A for the CRADA is coming to you by mail. I hope that you could give us your comments and suggestions, but keep in touch with Bob Nolen and Tom Buhl.

See you soon and best regards,

M.W. Overhoff, Ph.D.  
President

Encl.



OVERHOFF  
TECHNOLOGY  
CORPORATION

Ms. Irene E. Gabel  
Technical Assistance Facilitator  
Industrial Partnership Office  
Mail Stop C334  
Los Alamos, NM 87545

May 5, 1997

Dear Ms. Gabel,

It was nice to see you, I hope to see you again in about two to three weeks from now.

I can't thank you enough for your enthusiasm and support, without which this work would be very difficult, if not down right impossible.

A draft of Appendix A for the CRADA is coming to you via mail. I hope that you could give us your comments and suggestions, but keep in touch with Bob Nolen and Tom Buhl.

See you soon and best regards,

M.W. Overhoff, Ph.D.  
President

Encl.