

To: Prof. Persis Drell
Chair, Local Advisory Council
118 Newman Laboratory
Cornell University
Ithaca, NY 14853

cc: Prof. Robert C. Richardson
Vice Provost for Research
529 Clark Hall
Cornell University
Ithaca, NY 14853

CORNING

cc: Prof. J. Robert Cooke
Dean of Faculty
315 Day Hall
Cornell University
Ithaca, NY 14853

cc: Dr. Kenan Ünlü
Director
Ward Center for Nuclear Sciences
Cornell University
Ithaca, NY 14853

Date: October 23, 2000

Subject: In Support of Cornell's Ward Center for Nuclear Sciences & NAA

As an alumnus of Cornell University (Analytical Chemistry, 1973) I still remember the excitement of the first Apollo 11 lunar rocks arriving at Cornell under the auspices of Principal Investigator, Dr. George Morrison. These rocks were not only publicly displayed in Uris Library for a short time, but were trace-analyzed by Dr. Morrison's graduate group, of which I was a member. The trace analytical techniques employed were Spark Source Mass Spectrometry at Baker Laboratory and Neutron Activation Analysis (NAA) at Ward Center for Nuclear Sciences. This was the beginning of what later became a recurring relationship with Ward Lab, not only for myself but for Corning Incorporated, my employer for the last 26 years.

Over the past 20 years Corning has relied on NAA at Ward Lab to characterize high purity fused silica (HPFS), and raw materials used in its production, for critical contaminant elements at the parts-per-billion level. This has been especially important to our Canton, New York manufacturing facility which produces a large portion of the world's supply of HPFS for laser lenses (used in photolithography process in the chip industry). These analyses, and others like it, were often coordinated by another Cornell graduate and long-time employee of Corning, Dr. Stephen Tong (Analytical Chemistry, 1966).

Similar NAA analyses have also proved of recent importance in the research correlation of ultratrace contaminants and HPFS transmittance in the ultraviolet, defining the limits of HPFS at the ever shorter wavelengths of light used in writing ever finer photolithographic circuits on electronic substrates. Much of this work has been conducted by Corning's Dr. Paul Danielson, a research scientist in the field of glass and glass-ceramics.

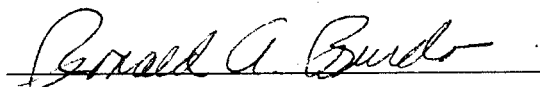
Another benefit of NAA at Ward Laboratory is in the area of analytical methods development for Corning, where data from NAA at Cornell is used to verify or support

the results of other analytical techniques employed or developed at Corning. This correlation work has been additionally important to Corning in the area of patent litigation. There were times in this process where the proximity of Cornell allowed direct onsite discussion of analytical requirements with Ward staff, hand delivery of chain-of-custody samples, and quicker turnaround times.

There is no question that Cornell's Ward Center for Nuclear Sciences and Corning Incorporated have developed a long and continuing relationship that has been scientifically and financially beneficial to both parties. It is perhaps no coincidence that this relationship has involved Cornell graduates who have settled in the Corning-Ithaca area and who have taken an active role in the utilization of a nearby Cornell capability that is not only unique in this part of the country, but increasingly unavailable anywhere. It is my hope that this relationship and capability will continue to be a resource for Corning, and for Cornell.

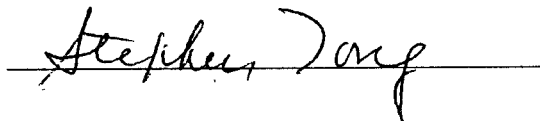
Sincerely,

Dr. Ronald Burdo *
Research Associate
Corning Incorporated
Ph.D., Analytical Chemistry
Cornell University (1973)

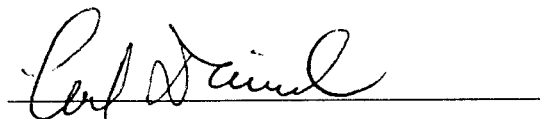


Reviewed and Endorsed by:

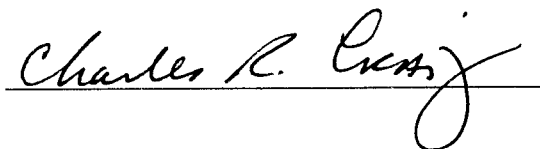
Dr. Stephen Tong
Retired Research Associate
Corning Incorporated
Ph.D., Analytical Chemistry,
Cornell University (1966)



Dr. Paul Danielson
Senior Research Associate
Corning Incorporated
Ph.D., Inorganic Chemistry,
University of Connecticut (1974)



Charles R. Craig
Division Vice President
Corning Incorporated
Strategic Planning and
Innovation Management



* Correspondence to: Dr. Ronald Burdo, SPFR-06, Corning Incorporated, Corning, NY 14831
Phone: 607-974-3172 Fax: 607-974-2383 e-mail: burdora@corning.com



GE Reuter-Stokes

Reuter-Stokes, Inc. 8499 Darrow Road, Twinsburg, OH 44087

JD-001204-1

December 4, 2000

Prof. Persis Drell
Chair, Local Advisory Council
118 Newman Laboratory
Cornell University
Ithaca, NY 14853

Subject: Review of The Ward Center for Nuclear Sciences

Professor Drell,

GE Reuter Stokes is a major manufacturer of radiation detection equipment for Boiling Water Reactors (BWR) and Pressurized Water Reactors (PWR) in the US, Mexico, Europe, and Asia. Critical parameters that must be measured for each of these detectors, is neutron and gamma sensitivity. We have used The Ward Center at Cornell as a prime provider of both sensitivity measurement services and R & D experiments for several years.

The quality and efficiency of these services has been excellent and has facilitated timely supply of radiation detectors to the nuclear power industry. For certain tests, The Ward Center is a sole supplier of the services. Cornell University's proximity to Northeast Ohio results in a short turnaround time and is yet another reason for the strong relationship that exists between the Ward Center and GE Reuter Stokes.

We look forward to a favorable review for the ward Center by the Local Advisory Council.

Best Regards,

A handwritten signature in cursive script that reads "Jack Doyle".

Jack Doyle
Principal Engineer BWR Products

Copies to:

Prof. Robert C Richardson
Vice Provost for Research
529 Clark Hall
Cornell University
Ithaca, NY 14853

Prof. J. Robert Cooke
Dean of Faculty
315 Day Hall
Cornell University
Ithaca, NY 14853

Dr Kenan Ünlü
Director
Ward Center for Nuclear Sciences
Cornell University
Ithaca, NY 14853

December 5, 2000

Ward Center for Nuclear Services
Cornell University
Ward Laboratory
Ithaca, NY 14853-7701
Dr. Kenan Unlu

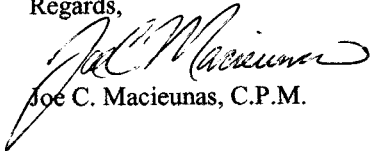
Dear Dr. Unlu:

Intersil Corporation manufactures discrete power semiconductor devices mostly for use in the commercial environment. These devices are very efficient handlers of electrical energy that are crucial parts in every day items such as automobiles, computers, and motor controllers. One type of semiconductor power switching device that is particularly advantageous for many applications because of its combination of high speed and low power loss is the IGBT (insulated gate bipolar transistor). Neutron irradiation as carried out through Cornell University is an important step in producing quality IGBT's. Intersil is considered a global leader in the manufacture of these devices, and we continuously strive for manufacturing and quality excellence. Our partners in this endeavor are our suppliers. And we value Cornell University as a critical supplier.

We started our relationship with Cornell approximately three years ago. Your staff has helped us tremendously in the research and development of our products which we cannot put a monetary value on. We have invested \$40,000 in the implementation of the fast neutron irradiation project, and we have paid over \$30,000 to date for radiation services that Cornell provides. We've invested \$7500 in additional fixtures for increased capacity. We need all of Cornell's capacity for the radiation process when our market is strong. We need you to continue to remain a consistent supplier of fast neutron services. The advantage of having a research reactor very close to us in Mountaintop, Pennsylvania is extremely valuable to us, and we look forward to continuing our relationship for many years to come.

Thank you for your continued support.

Regards,



Joe C. Macieunas, C.P.M.



Sensing Systems Group
300 IST Center
Horseheads, NY 14845 USA
Tel: (607) 562-4300
Fax: (607) 562-4482
www.istcorp.com

October 17, 2000

Professor Persis Drell
Chair, Local Advisory Council
118 Newman Laboratory
Cornell University
Ithaca, NY 14853

Dear Sir:

I am writing this letter on behalf of a request by Dr. Kenan Ünlü to indicate the importance of the Ward Center for Nuclear Sciences to the Nuclear Products Business of the Sensing Systems Group of the Imaging and Sensing Technology Corporation (IST).

IST is a small business located in Horseheads, NY approximately (30) miles from the campus of Cornell University and was formerly the Imaging and Sensing Technology Division of the Westinghouse Electric Corporation.

In my (38) years with Westinghouse and IST as a Product Development Engineer, Engineering Manager and Product Line Manager, I have had the pleasure of working closely with the staff at the Ward Center for Nuclear Sciences in the development and testing of nuclear products used in both commercial and military reactor nuclear instrumentation systems.

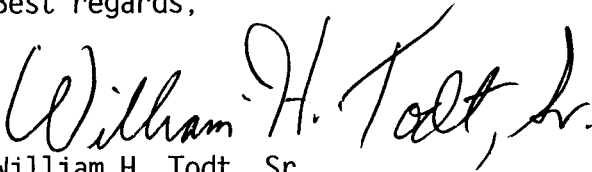
The versatility of the Cornell TRIGA Reactor and Gamma Cell facilities has proved invaluable in the special testing requirements Westinghouse and IST have needed in the development of various types of nuclear products including Ex-Core and In-Core Sensors, Nuclear Inspection Cameras and Containment Electrical Penetrations.

I was quite concerned when recently being contacted by management of the Penn State University TRIGA Reactor facilities suggesting the Cornell Ward Center

for Nuclear Sciences would be closing and offering their reactor and gamma cell services to replace Cornell. As you can see from the purchase order history of the Westinghouse and IST use of your facilities we have been a major local industrial user for over (30) years.

IST plans to continue to be a major local industrial user of the Ward Center for Nuclear Sciences for both commercial and military nuclear product development and production testing.

Best regards,



William H. Todt, Sr.
Engineering Support Manager
Sensing Systems Group
Imaging and Sensing Technology

cc: Prof. J. Robert Cooke
Dean of Faculty
315 Day Hall
Cornell University
Ithaca, NY 14853

Prof. Robert C. Richardson
Vice Provost for Research
529 Clark Hall
Cornell University
Ithaca, NY 14853

Dr. Kenan Ünü
Director
Ward Center for Nuclear Sciences
Cornell University
Ithaca, NY 14853



October 19, 2000

Commercial and Government Systems Division
Eastman Kodak Company
Rochester, NY 14650

Professor Persis Drell
Chair, Local Advisory Council
118 Newman Laboratory
Cornell University
Ithaca, NY 14853

Dear Professor Drell:

We are writing to communicate our strong support for the facilities, programs and services which are made available to our company, upstate New York and our country by the Ward Center for Nuclear Sciences at Cornell University.

Our division, Commercial and Government Systems (C&GS), is rightly defined to be the aerospace branch of Eastman Kodak Company. Our operations are located in Rochester, New York. We have a long and proud history of participation in programs supported by various branches of the United States government. Such branches specifically include the Department of Defense, the National Aeronautics and Space Administration and the National Oceanic and Atmospheric Administration.

The primary hardware produced by our division is electro-optical systems. We provide the optical telescopes for the front ends of such systems, the detectors for the middle and the signal processing electronics for the back. We also provide the necessary ancillary subsystems such as thermal control, focusing capability and environmental control. Among others, C&GS has participated in such programs as the Hubble Space Telescope and the LANDSAT series of spacecraft missions. We designed and built the Chandra X-Ray Telescope which was successfully launched over a year ago, and has so spectacularly performed since. (As we are sure you know, Hubble and Chandra are two of NASA's Great Observatories.) Such programs are an ongoing part of the work performed by C&GS personnel and we expect our role in such programs to continue and expand.

In recent years, C&GS has also ventured into commercial space programs, in concert with other large aerospace companies or organizations. A specific example of this is the IKONOS remote sensing satellite, launched for Space Imaging, Incorporated, a year ago last summer. The entire imaging payload for this system was built by C&GS, including the telescope, metering structure and thermal control system, panchromatic and multi-spectral detectors, and all of the signal processing electronics. Another example is the photo-electronic and image processing portions

All work of this type means that we must design, develop and deliver high quality, precision, spaceborne hardware which will survive and perform to requirements over a period of years. One of the primary concerns which we have to address for such systems is the radiation environment which we have to place these systems in. This requires both mission modeling on our part and a sometimes exhaustive radiation testing and corollary performance characterization effort, as well.

In that vein, we have conducted several such studies over the years. Some such studies are direct contracts with the government to study one or more of our commercial products for special applications. Others, in support of larger programs, are hardware radiation exposures and the corollary performance validation studies which are necessary to verify the performance of our deliverable precision hardware. We have accordingly identified several facilities which are necessary for the successful completion of such studies by providing us the means for irradiating our hardware, or portions of it.

Now we come to the point of this letter. One of the facilities which we have come to rely on for such tests is the Ward Center for Nuclear Sciences at Cornell. We are presently using the Gamma Cell Co60 source for exposures which, among other things, we use to mimic the effects of the Van Allen electron belts on earth-orbiting spacecraft and their components. We need ongoing and repetitive access to a facility which will permit us to span and exceed the range of exposures which we expect to see on our missions. Preferably such access should be available on relatively short notice. This provides a mandatory complement to our in-house modeling and design efforts. In this context, the Cornell facility has been used for the IKONOS program as well as some government related programs. Before we were fully aware of what was available to us we would conduct such tests at other institutions. The Ward Laboratory facilities are exceptionally well placed for us because of its proximity to us and the quality and level of support extended to our personnel.

The support provided by the Ward staff in the performance of these tests is exceptional. Ward Laboratory personnel have been willing to spend long hours, provide laboratory space, assist with setups and provide irradiation dosimetry reports. It is both our desire and need to be able to continue to rely on the use of this facility. In fact we have an ongoing effort which will require the availability of the Ward Laboratory facilities for the foreseeable future. It is possible that our use of this facility will increase in the future.

Finally, we wish to reiterate our support for the Ward Laboratory for Nuclear Sciences. It is a facility which is a credit to Cornell University and of high value to companies such as ours where the need to simulate a space environment is part of our ongoing programmatic efforts. It benefits us as an upstate New York company and that in turn benefits all of our customers. We take pride in producing quality hardware and the Ward Laboratory facilities help us to do that.

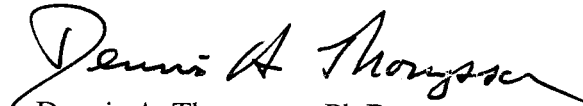
Thank you for your time and consideration and for considering our support for your Ward Laboratory for Nuclear Sciences. We hope that you will in turn continue to support its existence

and capabilities at Cornell University. If you wish further information from us, please do not hesitate to call or write.

Sincerely yours,



Carl A. Marchetto
President, Commercial and Government Systems
Vice President, Eastman Kodak Company
716-253-6992



Dennis A. Thompson, Ph.D.
Senior Systems Engineer
Radiation Effects Coordinator
Commercial and Government Systems Division
716-722-445

Cc: Professor Robert C. Richardson
Vice Provost for Research
529 Clark Hall
Cornell University
Ithaca, NY 14853

Professor J. Robert Cooke
Dean of Faculty
315 Day Hall
Cornell University
Ithaca, NY 14853

Dr. Kenan Ünlü
Director
Ward Center for Nuclear Sciences
Cornell University
Ithaca, NY 14853



November 2, 2000

Professor Persis Drell
Chair, Local Advisory Council
118 Newman Laboratory
Cornell University
Ithaca, NY 14853

Dear Professor Drell:

The Ward Laboratory Triga Nuclear Reactor provides valuable services for Kodak's Neutron Activation Analysis laboratory. These include irradiation of samples shipped to Cornell University and returned to Kodak for analysis, as well as in-person visits to the reactor facility.

Most of the irradiation currently done at Ward Lab pertains to ultra-trace level measurements of dopants in silver halide emulsions. Because these samples are in liquid form and the element being measured produces a relatively short half-life isotope, the proximity of the reactor to Kodak and its adaptable irradiation facilities makes it most applicable.

Our NAA personnel have also made several day trips to Ward Lab for experiments involving short half-life isotopes. These experiments are only possible because of the proximity of the Ward Laboratory facility.

We sincerely hope that the excellent personal and professional relationship that has developed between the staff of Kodak's NAA laboratory and the Ward Laboratory Triga reactor will continue.

Sincerely,

Dr. Nancy S. Ferris
Director, Analytical Technology Division
Research and Development

NSF/meg

cc: Professor J. Robert Cooke
Professor Robert C. Richardson
✓ Dr. Kenan Ünlü

Electronic Sensors & Systems Sector
Northrop Grumman Corporation
7301 Sykesville Road
Sykesville, Maryland 21784-5101

October 17, 2000

Professor. Persis Drell
Chair, Local Advisory Council
118 Newman Laboratory
Cornell University
Ithaca, NY 14853

Dear Professor Drell:

The purpose of this letter is inform you of our continued interest in doing nuclear instrumentation and detector qualification work at the TRIGA Reactor at the Ward Center for Nuclear Sciences. The Ward Center has been a significant resource to the Navy Nuclear Propulsion Program for over 30 years. We have had occasion to use the facility for a number of projects of interest to us and our Navy customer.

We have, in general, two types of projects for which we use the facility: Nuclear Instrumentation Qualification Tests and New Detector Development efforts. The first category generally has a well defined set of objectives and procedures. The latter usually involves a much less well defined test agenda, with each new test configuration predicated on the results of the last results.

The Generics Program involves the development of new electronics to interface neutron detectors, and it has been our hope and expectation to consider use of the facilities at the Ward Center in their development and testing. Ward Center would be selected based on responsiveness (cost and availability) of the facilities and services needed. Our very positive experience with the affordability and especially with the cooperation and help of the Ward personnel makes for a positive prediction that Ward would be selected supplier of these services.

Near term plans include engineering testing of Compensated Ion Chamber and BF_3 Detectors with newly designed electronics. This work is expected to be done in the first quarter of 2001. It is estimated to take approximately one week at Ward. More formal qualification testing is expected to be performed in the last quarter of 2001 or the first of 2002. These tests are more involved and will probably run two weeks.

NORTHROP GRUMMAN

While our vision of the future is not very clear after these tests, we are confident that this ongoing product of ours will result in similar levels of needed reactor work in the future. Furthermore, there are possible increased of work with Northrop Grumman, as new detector design development mentioned (above, or below), will be done in parallel with more traditional development activities mentioned here

We have used the Ward facility on two occasions in the past for Silicon Carbide Neutron Detector characterization tests and are scheduled for additional tests in the very near future. We anticipate additional tests to be conducted at least annually for the next several years. The duration of the anticipated tests is one to two weeks.

In all instances, we have found that the test facilities, personnel support and flexibility in accommodating our needs have been extraordinary. We hope that our anticipated needs and the needs of other users will be sufficient to justify the continued support for this important test facility.

Sincerely,



Dr. Stephen A. Lane
Project Director, Neutron Detector Development
MS 8955, 410-552-2651
Email: stephen_a_lane@mail.northgrum.com

Cc: Prof. J. Robert Cooke
Prof. Robert C. Richardson
Dr. Kenen Ünlü



Westinghouse
Electric Company, LLC

Science & Technology Department
Building 302
1330 Beulah Road
Pittsburgh, Pennsylvania 15235-5081
(412) 256 2140
e-mail: dullooar@westinghouse.com

October 17, 2000

Professor Persis Drell
Chair, Local Advisory Council
118 Newman Laboratory
Cornell University
Ithaca, NY 14853

Dear Professor Drell:

It is my understanding that Cornell University's Ward Center for Nuclear Sciences is under review by the Local Advisory Council of the Vice Provost for Research in order to assess the viability of the Center and to determine its future status. As a past user of the Center, I would like to comment on the value of this facility to the Science and Technology Department of the Westinghouse Electric Company.

In 1999, my colleagues and I tested three prototypes of a novel thermal neutron solid-state radiation detector at the Ward Center's research reactor. The testing campaign had two objectives: demonstrate that the prototypes would function properly in a mixed neutron/gamma radiation field and compare their performance relative to that of gas-filled detectors similar to those presently employed by Westinghouse to monitor thermal neutron levels at reactors. I am pleased to report that the testing went very well. We were able to meet our objectives and satisfy an important program milestone. Key to our success were the availability of diverse testing fixtures and instrumentation at the reactor as well as the expertise of the reactor staff. Since that was the first time that the detector prototypes were being deployed at a reactor, we required considerable flexibility and patience on the part of the staff in optimizing our experimental configuration. My colleagues and I found that the Ward Center personnel were well equipped and prepared to assist us in our experiments.

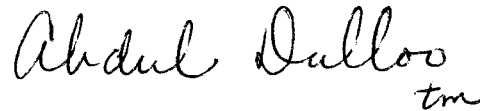
I would also like to mention that Westinghouse is presently exploring a collaborative effort with Cornell University to develop a field-deployable cold-neutron prompt gamma neutron activation analysis (PGNAA) system. We approached Cornell because of the unique cold neutron PGNAA experimental facilities available at the

October 17, 2000
Page 2

Ward Center. These facilities will be needed to demonstrate the proof-of-principle of the method.

I hope that the above comments will assist your council in the evaluation of the Ward Center. Please do not hesitate to contact me if you have any question.

Sincerely,

Handwritten signature of Abdul R. Dullo in cursive script, with a small "tm" trademark symbol at the end.

Abdul R. Dullo, PhD
Senior Scientist

cc: Professor Robert C. Richardson
Professor J. Robert Cooke
Dr. Kenan Ünlü