**FINAL REPORT ON THE
UNIVERSITY OF FLORIDA
U.S. DEPARTMENT OF ENERGY
1992-1993 REACTOR SHARING PROGRAM**

Grant No. DE-FG07-83ER75103

**Dr. William G. Vernetson
Director of Nuclear Facilities**

**NUCLEAR REACTOR FACILITY
NUCLEAR ENGINEERING SCIENCES DEPARTMENT
COLLEGE OF ENGINEERING**

GAINESVILLE, FLORIDA

April, 1994

FINAL REPORT ON 1992-1993

UNIVERSITY OF FLORIDA REACTOR SHARING GRANT

Department of Energy Grant Number DE-FG07-83ER75103 was supplied to the University of Florida Training Reactor (UFTR) facility through the U.S. Department of Energy's University Reactor Sharing Program. The original renewal proposal submitted in May, 1992 requested \$64,750 to support various educational institutions using the UFTR facilities. The actual grant support was only in the amount of \$30,000, all of which has been well-used by the University of Florida as host institution to support various educational institutions in the use of our reactor and associated facilities as indicated in the proposal. These various educational institutions are located primarily within the State of Florida. However, when the 600 mile distance from Pensacola to Miami is considered, it is obvious that this Grant provides access to reactor utilization for a broad geographical region and a diverse set of user institutions.

All users and uses were carefully screened to assure the usage was for educational institutions eligible for participation in the Reactor Sharing Program; where research activities were involved, care was taken to assure the research activities were not funded by grants for contract funding from outside sources. In some cases external grant funding is limited or is used up, in which case the Reactor Sharing Grant and frequent cost sharing by the UFTR facility and the

University of Florida provide the necessary support to complete a project or to provide more results to make a complete project even better. In some cases this latter usage has aided renewal of external funding.

Over its nearly ten years implementation at the University of Florida, the DOE University Reactor Sharing Program has been a key catalyst for renewing utilization of the UFTR both by external users around the State of Florida and the Southeast and by various faculty members within the University of Florida to support the educational mission of dozens of different courses in over twenty departments and to support a number of unfunded as well as funded research projects. With a decline in usage in the early 1980s, the UFTR was in danger of going the way of so many university reactor facilities. Fortunately, the Reactor Sharing Program advertisements resulted in significant external use of the UFTR. Subsequently, potential internal users for courses and research noted that there was value in using the facility and their usage has grown synergistically. In the latter case of funded research, charges allow the UFTR to expand various programs still further. Therefore, the role of the Reactor Sharing Program, though relatively small in dollars, has been the single most important occurrence in assuring the rebirth and continued high utilization of the UFTR in a time when many better equipped and better placed facilities have ceased operations. Through dedicated and effective advertising efforts, the UFTR has seen nearly every four-year college and university in the State of Florida make substantive use of the facility under the Reactor Sharing Program with many now regular users.

Some have even been able to support usage from outside grants where the Reactor Sharing Grant has served as seed money; still others have been assisted when external grants were depleted.

Though much more funding could be easily justified, much has been accomplished with the Grant received. In these times of concern about effective delivery of educational programs, the UFTR Reactor Sharing Program is a leader in this area. Only by having excellent programs and effective learning tools could one have schools bring classes of students from their campuses to the University of Florida, sometimes over 100 miles for one-way travel. With every good experience by a user, we are assured not only of a return by that user group, but through communication with other schools at meetings to interchange ideas, we are assured of a continued increase in new users. The letter to Mr. Harold Young in Appendix I documents just one example from two years ago of how well regarded our program is and how much it is valued by the components of the educational community we have been able to reach. It clearly indicates the efficiency of our program at the grass roots level. Indeed, the fact that several groups of advanced and/or honors program students collected from various high schools visited our facility for substantive usage during the past year again shows the high regard the facility enjoys among secondary school educators throughout the State of Florida.

One key result of the many reactor sharing uses has been a concurrent rebirth of interest in our facility from those within the University of Florida. In a

case directly attributable to the observed frequent use of our facility, the University of Florida College of Engineering supplied our analytical laboratory with a new complete PC-based analyzer system during this past year. This system included all components from an HPGe detector and integral shield to a computer for performing the gamma ray energy spectrums analysis. This system as installed actually cost about the same amount as this year's Reactor Sharing Grant, effectively doubling its dollar impact!

The three tables that follow provide basic information about the 1992-1993 program and utilization of reactor facilities by user institutions under the Reactor Sharing Grant. Table 1 (Summary Information/Data for the University of Florida University Reactor Sharing Program) delineates the basic information and data about the UFTR facility and the Reactor Sharing Grant needed to document its implementation through the University of Florida Training Reactor at the University of Florida as the host institution. Table 2 (Reactor Sharing Program Summary of Usage of UFTR Facilities) lists users, numbers of usages and numbers of student and faculty participants. As shown in Table 2, last year's grant (1992-1993) saw a broad spectrum of users, with the largest numbers of participants ever as we continue to expand delivery of services, especially for secondary school students and classes which is a personnel intensive but rewarding area of endeavor. The three different groups of honors-type high school students that made substantive use of the facility during this year are particularly encouraging for expanding the user community in the future. This expectation is

based on past experience where first time visiting high school students and educators are our best means of advertising the UFTR facilities and their availability. Certainly the twenty-seven separate entries in Table 2 is a tribute to the far reaching influence of the UFTR on education and research in Florida. Finally, Table 3 (Summary of Facility Utilization) summarizes the activities supported under the 1992-1993 grant with costs of consumable supplies and NAA Laboratory usage (mostly cost shared at \$35/hour) not included in the \$85/hour charge for reactor usage.

To support the interest of various users in the University of Florida facilities, several anecdotal pieces of information are contained in Appendix I. The first is a two-page letter from Dr. W. G. Vernetson to Mr. Harold Young describing how one group of honors chemistry students assured their field trip to the University by gathering support (including finances) from other students. The second item is a letter from Dr. Max Lombardi whose nuclear medicine technology students have been making the two-hour trip from Hillsborough County to the University of Florida Training Reactor a regular event for nearly ten years. Finally, the last four pages in Appendix I are simply copies of the thank you's sent to our facility by the Ft. Clarke Middle School science students following their visit this year. These communications are typical of our interactions with user groups, all of whom have expressed their appreciation for the services we have provided.

Because of the success of this program, the limitations in funding are really the only factor limiting a 2-3 fold increase in reactor sharing usage. Indeed, it is no longer necessary for the UFTR to advertise reactor sharing. Even with minimal advertising, the facility provided usage and other services easily valued at 3 or more times the Grant value of \$30,000 in 1992-1993. Similar results will apply in an even more diverse set of usages to justify 3 or more times the \$32,000 in the current 1993-1994 Grant.

In conclusion, the DOE Reactor Sharing Program is a rousing success and should be continued as one of the most cost effective and best returns on invested dollars that are possible in assisting the United States in meeting the technological challenges of the twenty-first century. Indeed, it was because of educational and research usages like those supported by Reactor Sharing that the proposed NRC license fee was finally rescinded for University Reactors. The ability to show such widespread support for education and research at all academic levels enabled reactor facilities such as the UFTR to make a strong and valid case for externalized benefits to assure availability of facilities such as the UFTR for future academic support.

The only request for the UFTR facility is to expand the Reactor Sharing support so that facilities such as the UFTR can further advertise and expand delivery of reactor usage and related services. Those reached still represent only a small but ever-increasing fraction of all the students and faculty who could reasonably be expected to make valuable use of reactor facilities for their

educational programs, though again this year several new schools are included among the users. This is particularly true for pre-college institutions and users--the source of our nuclear-trained leaders in the next century. Once they become a user, they continue to return; now we are beginning to see students majoring in Nuclear Engineering and Health Physics as well as other branches of engineering, whose first contact with the subject was at the UFTR. Indeed, this year's graduating class in nuclear engineering contains two students whose high school teacher (Mrs. Renae Allen) first brought them to our facility about five years ago. One of these students is the leading student in the senior class! Mrs. Allen uses our facility every year despite being located in Lake Butler, some 40 miles from Gainesville. She has also encouraged her students to do research for science fair projects at the UFTR. Several of these projects have won regional and statewide honors. Needless to say, this is a strong statement on behalf of continuing and expanding the educational and research activities supported by the University Reactor Sharing Program.

TABLE 1

SUMMARY INFORMATION/DATA FOR THE UNIVERSITY OF FLORIDA UNIVERSITY REACTOR SHARING PROGRAM

Host Institution:	University of Florida
Location:	Gainesville, Florida
Program Director:	Dr. William G. Vernetson Director of Nuclear Facilities and Associate Engineer Nuclear Engineering Sciences Department University of Florida
Contact Numbers:	Telephone Number: (904) 392-1429/1408 Fax Number: (904) 392-3380
Grant Number:	DE-FG07-83ER75103
Reactor Description:	University of Florida Training Reactor (UFTR) License Number: R-56 Docket Number: 50-83
Reactor Type:	Modified Argonaut Two-Slab Flux Trap Light Water Cooled Graphite/Light Water Moderated
Special Features:	Pneumatic Sample Delivery (Rabbit) System Neutron Radiography Capability

TABLE 2
REACTOR SHARING PROGRAM
SUMMARY OF USAGE OF UFTR FACILITIES
(September, 1992 - September, 1993)

School ¹	Usages ²	Users	
		Faculty	Students
1. Buchholz High School (BHS)	7	1	1
2. Chamberlain High School (CHS)	1	2	25
3. Central Florida Community College (CFCC)	31	4	42
4. Crystal River High School (CRHS)	2	1	41
5. Eastside High School (EHS)	7	3	31
6. Embry-Riddle Aeronautical University (ERAU)	1	2	8
7. FFFS Science Engineering & Humanities Symp. (High School)	1	6	30
8. Florida Institute of Technology (FIT)	5	4	6
9. Florida A&M University (FAMU)	10	1	1
10. Florida State University (FSU)	14	3	1
11. Fort Clarke Middle School (FCMS)	3	9	78
12. Heritage Christian High School (HCHS)	3	5	75
13. Hillsborough Community College (HCC)	1	1	19
14. Hispanic Outreach High School Program Students	2	10	88
15. Lakeview Middle School (LMS)	3	12	86
16. Mainland High School (MHS)	1	1	2
17. P.K. Yonge High School (PKYHS)	2	3	26
18. St. Augustine High School (SAHS)	1	2	15
19. Santa Fe Community College - Gainesville (SFCC-G)	6	5	81
20. Santa Fe High School (SFHS)	1	1	18
21. Southeast Missouri State University (SEMSU)	6	1	1
22. SUCCEED Honors Symposium for Community College Students	2	2	30
23. Summer Science Research Training Program (High School)	1	1	6
24. Talent Identification Program Ceremony Participants (High Sch.)	1	3	86
25. Union County High School (UCHS)	5	1	7
26. University of South Florida at Tampa (USF-TA)	1	3	1
27. University of Wisconsin, Eau Claire (UWEC)	6	1	1
TOTAL	124	88	806

1. School abbreviations in parenthesis can be used elsewhere in this report to determine appropriate user designations in the details of usage delineated in Table 3.
2. Usage is defined as utilization of the University of Florida Training Reactor facilities for all or any part of a day with the average being over four (4) hours. In many cases, a school can have multiple usages but all related to the same research project or training program such as one project for Florida State University that involved long term irradiations as did others such as for the Union County High School or the multiple usage training programs conducted for Central Florida Community College students and Union County High School students.

TABLE 3

SUMMARY OF FACILITY UTILIZATION

For Reactor Sharing
(September 1992 - August 1993)

NOTE: The projects marked with one asterisk (*) indicate irradiations or neutron activations. The projects marked with two asterisks (**) indicate training/educational use. The projects marked with three asterisks (***) indicate demonstrations of reactor operations and other uses. "Experiment Time" is total time that the facility dedicates to a particular use; it includes "Run Time". "Run Time" is inclusive time commencing with reactor startup and ending with shutdown and securing of the reactor.

PROJECT AND USER	TYPE OF ACTIVITY	RUN TIME (hours)	EXPERIMENT TIME (hours)
**CFCC Radiation Protection Technology Co-op Work Program - Mrs. R. Rawls/Mr. S. MacKenzie - Reactor Sharing	Two Semester Long Reactor Operations-Based Radiological Control and Protection Training Programs of Cooperative Work Exercises	18.68 (1.15)	162.58 (13.83)
*NAA Research for Biogeochemical Assessment of Pollard, AL Oil Field - Dr. Gary Cwick, S.E. Missouri State University and Dr. Michael Bishop, University of Wisconsin, Eau Claire - Reactor Sharing	NAA to Evaluate and Identify Elemental Constituents in Second Large Set of Vegetation and Soil Samples Taken from the Pollard, Alabama Oil Field for Geochemical Analysis and Correlation with Satellite Imaging for Geochemical Analysis and Hydrocarbon Exploration Systematics	67.42 (24.42)	80.93 (30.67)
**Santa Fe High School Science Class - Mrs. A. Smith - Reactor Sharing	Lecture, Tour and Demonstration of Reactor and NAA Laboratory Operations Plus Discussion of Research Usage and Projects Using Research Reactors	0.42 (0.17)	1.67 (1.33)

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PROJECT AND USER	TYPE OF ACTIVITY	RUN TIME (hours)	EXPERIMENT TIME (hours)
*NAA Research on Gulf of Mexico Sediment Samples - Dr. John Trefry, Florida Institute of Technology - Reactor Sharing	NAA to Evaluate and Quantify Various Gulf of Mexico Sediment Samples for Certain Key Elemental Content to Include Barium, Iron, Chromium and Zinc	17.03 (7.90)	23.08 (9.30)
**Santa Fe Community College, College Success in Science Class - Dr. Bruce Tucker - Reactor Sharing	Lecture, Tour and Demonstration of UFTR Operations Including Radiation Surveys of Everyday Objects and NAA Training Exercises Demonstrating the Trace Element Analysis Technique Using the Rabbit System and PC-Based Analyzers Emphasizing Research and Teaching Usage and Capabilities of the Facility	0.43	2.83
*NAA Research of Sedimentary Mineral Deposits, Dr. A. Dabous, Florida State University Chemistry Department - Reactor Sharing	NAA to Evaluate and Quantify Rare Earth Elemental Content of Egyptian Sedimentary Mineral Deposits	6.38 (4.10)	12.17 (7.58)
** Hillsborough Community College Nuclear Medicine and Radiation Therapy Technology Program - Dr. M. Lombardi - Reactor Sharing	Lecture, Tour and Demonstration of Facility Operations with Radiation Surveys and Exercise in Use of Rabbit System for Trace Element Analysis of Previously Irradiated Hair Samples Using NAA Techniques and Demonstration of Neutron Radiographic Techniques	0.00	3.33

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PROJECT AND USER	TYPE OF ACTIVITY	RUN TIME (hours)	EXPERIMENT TIME (hours)
**Union County High School Physics Class - Mrs. Renae Allen Reactor Sharing	Lecture, Tour and Demonstration of UFTR Operations with Radiation Surveys and NAA Training Exercises Demonstrating Trace Element Analysis Technique Using the Rabbit System and PC-Based Analyzers Plus Waste Handling Exercise Demonstrating Use of Anti-Contamination Clothing and Robots	0.85	7.00
*Florida Foundation of Future Scientists Mainland High School NAA Research on Mercury Content of Canned Tuna - Mr. C. Coldwell, L. Chapman and E. Leonard, Mainland High School, Dr. W. G. Vernetson, University of Florida - Reactor Sharing	Continuation of Summer 1992 Student Research Program: Evaluation and Quantification of the Elemental Mercury Content in Canned Tuna Fish	0.00	0.50 (0.50)
*Ft. Clarke Middle School Science Fair Project - Mrs. P. Daniels, Ft. Clarke Middle School - Reactor Sharing	Seed Irradiation Project Using the Co-60 Irradiation Facility to Study Effects of Various Doses on Seed Germination Characteristics for a Science Fair Project	0.00	1.50

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PROJECT AND USER	TYPE OF ACTIVITY	RUN TIME (hours)	EXPERIMENT TIME (hours)
**Santa Fe Community College Medical Radiological Technology Program - Mr. S. Marchionno/ Ms. Rochelle Sturm - Reactor Sharing	Lecture, Tour and Demonstration of UFTR Operations with Radiation Surveys and NAA Training Exercises Demonstrating Trace Element Analysis Technique Using the Rabbit System and PC-Based Analyzers Plus Demonstration of Gas Flow Proportional Counter for Contamination Surveys	1.42 (0.33)	5.83 (1.50)
**Crystal River High School Chemistry Classes - Mrs. A. Butler - Reactor Sharing	Lectures, Tours and Demonstrations of UFTR Operations with Radiation Surveys and Exercises in Using the Rabbit System and PC-Based Analyzers for Trace Element Analysis of Hair Samples Using NAA Techniques Plus Contamination Control Exercises Using Anti-Contamination Clothing and Robots	2.03	11.17 (3.75)
**Florida Institute of Technology Physics Students - T. Czarniak, Florida Institute of Technology - Reactor Sharing	Lecture, Tour and Demonstration of Reactor and NAA Laboratory Facility Operations Including Use of the Rabbit System and PC-Based Analyzers to Conduct Half-Life Measurements and Trace Element Analysis of Hair Samples Plus Contamination Control Exercises Using Robots and Anti-Contamination Clothing	0.80	6.00

TABLE 3

SUMMARY OF FACILITY UTILIZATION

For Reactor Sharing
(September 1992 - August 1993)

PROJECT AND USER	TYPE OF ACTIVITY	RUN TIME (hours)	EXPERIMENT TIME (hours)
**Chamberlain High School (Tampa) AP Advanced Physics and Chemistry Classes - Mr. T. Jordan - Reactor Sharing	Lecture, Tour and Demonstration of UFTR Operations with Radiation Surveys and NAA Training Exercises Demonstrating the Trace Element Analysis Technique Using the Rabbit System and PC-Based Analyzers to Analyze Hair Samples Plus Contamination Control Exercises Using Anti-Contamination Clothing and Robots	0.80	4.42
***Florida Foundation of Future Scientists Junior Science, Engineering and Humanities Symposium - Dr. B. Abbott - Reactor Sharing	Lecture, Tour and Demonstration of Reactor and NAA Laboratory Facility Operations, Capabilities and Applications for Honors Group of High School Junior Level Students and Teachers	0.35	5.75
*NAA Research to Perform Trace Element Analysis of Fertilizer Samples - Mrs. Renae Allen, Union County High School - Reactor Sharing	NAA Evaluation for Trace Element Analysis of Fertilizer Samples for Quantification of Heavy Metal Content and Buildup from Continued Application of Synthetic Fertilizers to Crop and Pasture Lands for Science Fair Project	2.48	7.75 (1.58)

TABLE 3**SUMMARY OF FACILITY UTILIZATION**

For Reactor Sharing
(September 1992 - August 1993)

PROJECT AND USER	TYPE OF ACTIVITY	RUN TIME (hours)	EXPERIMENT TIME (hours)
***SUCCEED Symposium for Community College Students Expressing Interest in Engineering - Dr. John Abbitt, Aerospace Engineering Dept., University of Florida - Reactor Sharing	Lecture, Tour and Demonstrations of Reactor Facility Operations and NAA Laboratory Operations Including Performing Radiation Surveys and Using the Rabbit System and PC-Based Analyzers for Trace Element Analysis of Standards and Volunteer Hair Samples	2.43	7.50
**Central Florida Community Radiation Protection Technology Program - Mr. S. MacKenzie - Reactor Sharing	Lecture, Tour and Demonstration of UFTR Operations with Radiation Surveys, Half-Life Measurements and NAA Training Exercises Demonstrating Trace Element Analysis Technique on Hair Samples Using the Rabbit System and PC-Based Analyzers	0.53	4.33
**Heritage Christian High School Science Department (Gainesville) - Dr. G. Featherston, Dr. B. Tuchen, Mr. B. Jones, Ms. Juanita DeLott - Reactor Sharing	Various Lectures, Tours and Demonstrations of UFTR Operations with Radiation Surveys and NAA Training Exercises Demonstrating Methodology of Trace Element Analysis Technique Using the Rabbit System and PC-Based Analyzers as Well As Radiation Survey and Contamination Control Exercises Using Anti-Contamination Clothing, Chemicals and Robots	0.47	19.83 (6.00)

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PROJECT AND USER	TYPE OF ACTIVITY	RUN TIME (hours)	EXPERIMENT TIME (hours)
***Demonstration of Reactor Facility Capabilities and Usage for Industrial Arts Program - Mr. Jim McMullen, Mrs. Ann Marie Heller, Eastside High School - Reactor Sharing	Lecture, Tours and Demonstration of Reactor and NAA Laboratory Facility Operational Capabilities for Industrial Arts Industry - Oriented Technology Program	0.00	1.25
**St. Augustine High School Physics and Chemistry Departments - Mr. Steve Buell and Mr. Roger Gueron, St. Augustine High School - Reactor Sharing	Lecture, Tour and Demonstration of UFTR Operations with Radiation Surveys and NAA Laboratory Facility Operations Using Rabbit System and PC-Based Analyzers for Trace Element Analysis of Several Samples Including Volunteer Hair Samples and Demonstration of Basic Radiation Detection and Mitigation Techniques Including Use of Anti-Contamination Clothing, Shielding and Robots	1.02	5.50
*Physics of Materials Properties Research - Dr. Hans Plendl, Physics Dept., Florida State University and Dr. Peter Gielisse, Mechanical Engineering Dept., FAMU/FSU - Reactor Sharing	Fast and Thermal Neutron Irradiations of Dielectric Materials Including Topaz and Beryl to Determine Optical Effects of Trace Elements on Rate and Types of Color Center Development for Basic Physics Understanding	0.00	0.50 (0.50)

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PROJECT AND USER	TYPE OF ACTIVITY	RUN TIME (hours)	EXPERIMENT TIME (hours)
***Hispanic Outreach High School Program - Dr. W. G. Vernetson/ Mr. R. McNealy/ Reactor Staff - Reactor Sharing	Series of Lectures and Tours of Reactor and NAA Laboratory Facilities with Demonstration of Trace Element Analysis for Hispanic High School Students and Teachers Visiting the UF College of Engineering	0.00	4.75
***Talent Identification High School Program - Dr. B. Abbott, University of Florida - Reactor Sharing	Series of Lectures, Tours and Demonstration Exercises on Reactor Operations, Trace Element Analysis Using the Rabbit System, Robotics and Contamination Control Using Anti-Contamination Clothing	0.00	2.00
***Florida Foundation of Future Scientists - Dr. W. G. Vernetson, M. Herring and E. Kisversaryi (Eastside High School), R. Napier and N. Skiles (Gainesville High School) - Reactor Sharing	Lectures, Tours and Demonstration of Reactor Facility Operations and Experimental Capabilities Along with Research Possibilities for Eight (8) Honors High School Students Plus Summer Research Project Selection for Two (2) FFFS High School Students (Suniti Moudgil of Eastside High School and Omjoy Ganesh of Gainesville High School)	2.53	20.25 (0.50)
**Santa Fe Community College (Gainesville) General Physics with Calculus Students (PHY-2054/2054L) - Dr. A. Ferrari - Reactor Sharing	Lecture, Tour and Demonstration of Reactor Operations with Radiation Surveys and NAA Training Exercises, with Demonstrations of Trace Element Analysis Techniques on Standards and Hair Samples Using the Rabbit System and PC-Based Analyzers	0.60	3.30

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PROJECT AND USER	TYPE OF ACTIVITY	RUN TIME (hours)	EXPERIMENT TIME (hours)
**Santa Fe Community College (Gainesville) General Physics for Science Majors Class (PHY-2049/2049L) - Dr. A. Ferrari - Reactor Sharing	Lecture, Tour and Demonstration of Reactor Operations with Radiation Surveys and NAA Training Exercises, with Demonstrations of Trace Element Analysis Techniques on Standards and Hair Samples Using the Rabbit System and PC-Based Analyzers	0.83	4.00
**Eastside High School Student Training Project in NAA Techniques - Mrs. Ann Marie Heller and Ali Bebihani, Eastside High School - Reactor Sharing	Lecture and Practical Training Exercises in Trace Element Analysis Using Neutron Activation Analysis Including Radiation Concepts, Sample Preparation and Use of PC-Based Analyzers for Element Identification in Previously Irradiated Samples	0.00	4.25 (1.50)
**Santa Fe Community College (Gainesville) General Physical Science Students (PSC-2121) - Mr. L. Iselin, Santa Fe Community College - Reactor Sharing	Lecture, Tour and Demonstration of Reactor Operations with Radiation Surveys and NAA Training Exercises, with Demonstrations of Trace Element Analysis Techniques on Standards and Hair Samples Using the Rabbit System and PC-Based Analyzers	0.90	3.75
**Embry-Riddle Aeronautical University Engineering Students - Dr. S. N. Gangadharan, Embry-Riddle Aeronautical University - Reactor Sharing	Lecture, Tour and Demonstration of Reactor and NAA Laboratory Operations Including Use of the Rabbit System and PC-Based Analyzers for Trace Element Analysis of Hair Samples and Standards Plus Neutron Radiographic Demonstrations	1.22	4.17

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PROJECT AND USER	TYPE OF ACTIVITY	RUN TIME (hours)	EXPERIMENT TIME (hours)
***P.K. Yonge High School Science Class - Mr. Griff Jones, P.K. Yonge High School - Reactor Sharing	Consultations with Visiting Science Students to Provide Technical Information on the Reactor Facility and Nuclear Engineering to Support a Class Debate on High Tech Issues and Society	0.00	1.42 (0.75)
**Lakeview Middle School Science Students - Mrs. Cathy Restivo, Mr. Bob Short, Lakeview Middle School - Reactor Sharing	Series of Lectures, Tours and Demonstrations of Reactor and NAA Laboratory Operations Including Radiation Surveys of Everyday Objects and Use of the Rabbit System and PC-Based Analyzers to Determine Trace Element Content of Volunteer Hair Samples Plus Contamination Control Exercises Involving Dress Out in Anti-Contamination Clothing, Use of Chemicals and Use of Robots for Demonstration Purposes	1.75	18.00 (12.00)
**Ft. Clarke Middle School Science Students - Mrs. Joan Lundgren and Mr. Ken Zeoli, Ft. Clarke Middle School - Reactor Sharing	Series of Lectures, Tours and Demonstrations of Reactor and NAA Laboratory Operations Including Radiation Surveys of Everyday Objects and Use of the Rabbit System and PC-Based Analyzers to Determine Trace Element Content of Volunteer Hair Samples Plus Contamination Control Exercises Involving Dress Out in Anti-Contamination Clothing, Use of Chemicals and Use of Robots for Demonstration Purposes	1.42	4.75

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PROJECT AND USER	TYPE OF ACTIVITY	RUN TIME (hours)	EXPERIMENT TIME (hours)
*Physics of Superconducting Materials Properties Research - Dr. Halinea Niculescu, Physics Dept., Florida State University and Dr. Peter Gielisse Mechanical Engineering Dept., FAMU/FSU - Reactor Sharing	Neutron Irradiation of Polycrystalline High Temperature Superconductor Material (YBaCuO: 1:2:3;7) to Increase Pinning Site Density of Fluxoids to Increase Critical Current Density Which Influences Shielding Characteristics of the Superconducting Material	97.47 (58.58)	110.17 (65.50)
*Florida Foundation of Future Scientists - NAA Research On Dependence of Elemental Aluminum Content in Canned Carbonated Beverages on Shelf Life - R. Napier and N. Skiles, Gainesville High School, Dr. W. G. Vernetson, University of Florida - Reactor Sharing	Summer 1993 Student (Omjoy Ganesh) Research Program: Evaluation of Carbonated Beverages for Aluminum Content Under Different Storage Conditions Following Completion of Manufacture	6.23	9.42

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PROJECT AND USER	TYPE OF ACTIVITY	RUN TIME (hours)	EXPERIMENT TIME (hours)
*Florida Foundation of Future Scientists - NAA Research on Evaluation of Trace Element Content of Orange Juice for Source Certification - M. Herring and E. Kisversaryi, Eastside High School, Dr. W. G. Vernetson, University of Florida - Reactor Sharing	Summer 1993 Student (Suniti Moudgil) Research Program: Evaluation of Orange Juice Trace Element Content for Source Certification	8.55 (3.33)	12.50 (3.33)
***Third Annual Florida Accelerated Initiatives Student Seminar On Energy Issues for Outstanding High School Students - Mr. David Murray, Cocoa Beach High School - Reactor Sharing	Lecture, Tour and Demonstration of Reactor and NAA Laboratory Facility Capabilities and Applications for Group of Outstanding High School Students Examining Energy and Other Political Issues	0.98	2.75
*** Demonstration of Reactor Facility Operations for Science Students - Mr. Bill Steffens and Mrs. Ellen Miller, P.K. Yonge High School - Reactor Sharing	Series of Lectures, Tours and Demonstrations of Reactor Operations and Facility Capabilities Including Trace Element Analysis of Hair Samples Using the Rabbit System and PC-Based Analyzers, Plus Radiation Surveys and Demonstrations of Contamination Control Using Anti-Contamination Clothing and Robotics	0.43	4.00

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PROJECT AND USER	TYPE OF ACTIVITY	RUN TIME (hours)	EXPERIMENT TIME (hours)
*Irradiation of Sapphire Fibers with High Energy Neutrons - Dr. N. Djeu, Dr. Brandon Shaw and Dr. Bob Chang - University of South Florida (Tampa) - Reactor Sharing	Experimental Measurements and Design of Minimum Reactivity Worth Cadmium Sheath Holder for Irradiation of Sapphire Fibers with High Energy Neutrons for Materials Effects Studies	0.00	5.75

1. Values in parentheses represent multiple or concurrent facility utilization (Run or Experiment time); that is the reactor was already being utilized in a primary run or activity for a project so a reactor training or demonstration utilization could be conducted concurrently with a scheduled NAA irradiation, course experiment, or other reactor run.
2. Exp. Time is run time (total key on time minus checkout time) plus set-up time for experiments or other reactor or facility usage including checkouts, tests and maintenance involving the reactor facility.
3. In general, charges are made only for time used and not for preparation time.
4. These hours do not reflect the hundreds of hours of NAA Laboratory usage for analysis of irradiated samples, only a small part of which is charged to the Reactor Sharing Grant.

APPENDIX I

NUCLEAR ENGINEERING SCIENCES DEPARTMENT
Nuclear Reactor Facility
University of Florida

Venables, Director
REACTOR BUILDING
Gainesville, Florida 32611
Phone (904) 392-1429 - Telex 64330

May 7, 1992

Mr. Harold E. Young
555 Quince Orchard Road
Gaithersburg, MD 20878

Dear Harry:

Per your request, here is an interesting anecdote that you may use for your communication to Nuclear News. To set the stage, Florida education system like many others has received massive budget cuts over the past 18 months with more very possible in FY93.

As part of our Reactor Sharing Program I arranged with Mrs. Anne Butler of the Crystal River High School Science Department that they would visit our facility on February 20, 1992. They were expected about 9:00 a.m. so they would have to leave early to make the 70 mile trip from the gulf coast; they would stay until late afternoon as they do every year under the Reactor Sharing Grant. They would get a lecture, tours, operations demonstrations, use of the Rabbit System to irradiate and do trace analysis on hair samples, use radiation detectors on various materials, learn and conduct exercises about contamination control, etc.

On the day before their arrival, Anne called to say they would be bringing a "few" more than the usual 15-20 students - 37 to be exact. Apparently Citrus County canceled all school buses/drivers for extra field trips so the students opened up the trip to another class and all chipped in to pay the one day cost of the bus (~ \$100) to assure being able to have the trip. Only later I learned from a student as they were leaving that the students apparently initiated this action without Anne's knowledge and then she agreed to go along when they were clearly so interested.

These are excellent students generally and their chemistry course matches much of what we can do for them in exercises and demonstrations. They really do participate. Apparently the previous year's students were so impressed/pleased with our efforts to make their field trip a success that the word spread and they paid for the their own bus by getting more students to come. The least we could do for them was to give them a rousing visit and we did, though having 37 versus 17 was a challenge especially in our 25 seat lecture room! Certainly the Assistant Principal who accompanied them was pleased with how things went for the day. I told them we'd have juice and donuts the next time for them in appreciation of paying for the bus. My conclusion is that our younger generation is not all bad - we older folks just have to give them half a chance. This occurrence certainly contrasts with much of what we see and hear in the media about the younger generation!

Mr. Harold E. Young
May 7, 1992
Page 2

I hope this meets your needs. If you need another anecdote sometime, I may be able to remember enough to recount the time the fellow from South America showed up with two huge black suitcases of topaz for me to irradiate - the law or someone was apparently not far behind as he left in a nervous flutter.

Thanks for your interest and feel free to contact me if you need more information.

Sincerely,

A handwritten signature in cursive script that reads "Bill Vernetson". The signature is fluid and extends to the right with a long horizontal stroke.

W.G. Vernetson
Director of Nuclear Facilities

WGV:p

P.S. Give my best to your wife. Will we see you both in Missouri for TRTR this fall?

HILLSBOROUGH COMMUNITY COLLEGE
Nuclear Medicine Technology Program
P. O. Box 30030, Tampa, FL 33630
Telephone: (813) 253-7418

April 7, 1994

Dr. William G. Vernetson, Director
UF Research Reactor Facility
202 Nuclear Science Center
Gainesville, FL 32611-2055

Dear Dr. Vernetson:

With this letter goes our appreciation for the fine reception and excellent Lecture-Demonstrations you and your staff provided our NMT students during our recent visit to your Facilities in Gainesville.

We appreciate your interest in the education of our students and wish you another successful year.

Sincerely,

Dr. Max H. Lombardi, ABSNM
Professor of Nuclear Medicine
Director, NMT Program

cc: Mr. Robert Chunn, Director of Allied Health
Dr. Ian Tyson, MD, Medical Director
Clinical Instructors

Mr. Vernetson
Thank You very much for your time. to
teach us about your lab. we enjoyed
it. Love-
Amanda
McCollum

Thank You Mr. Vernetson and Associates Nuclear Physics Lab

Mr. Vernetson,
Thanks for letting
us come to your
lab. It was cool
holding that little
radiation measure
thing!

Sarah
Corbaugh

I had a lot of fun
there. I liked the
Radiation detector
the hair thing, and
Thank you for
your time.
Zoe Vernetson

Mr. Vernetson,

Thank you
for
everything. It
was neat.

Marionne

Thanks alot,
I liked the arm
that you could control
to pick up things in
the radiation room.
Jawren

Thanks
for letting us
come to your
lab. I had
fun Megan

Thank You!
for Everything
Rosa Alston

Mr. Vernetson,
Thanks for answering all
my weird questions and
letting me hold your thing
that looked like a pen that you
hold up to the light. From
Josie

Thanks for letting
us come to the
nuclear physics lab.
That liquid nitrogen
stuff was really
neat!

Beth
Hudson

Mr. Vernetson,
Thank you for
showing us around
the Nuclear
Physics Lab.
Carlie Magee

Ft. Clarke Middle School
8th Grade

for Thanks
for your time.
Bethany T.

Thanks, it
was very
cool and
very exciting
Maggie

I like that
cold stuff that
freezes things
Love
Jen.

enjoyed looking at the radiation in the new sample. Thanks for spending your time w/ us. @ Brandi L.

Thank You

Mr. Vernetson and

Associates

Nuclear Physics Lab

Thinks Mat.

Handwritten signature: *James*

THANK
YOU

STANLEY

with

2004

Area
MA

Mr. V
thanks
for all
your time
K. Holt

BYRON HARVEY

Thank you
for going to
all that trouble.

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Ft. Clarke Middle School
8th Grade

Thank you
dude Peace, Sean M. H

Thank You Mr. Vernetson and Associates

Thank you
for taking
the time

Stephanie
Shackagruely

Nuclear Physics Lab

Thanks for
letting us
come to
the Nuclear Physics Lab
and letting us see all
the cool stuff
Ryan H

I had a great
time, especially playing
with that hand in
the room to pick up
the foam. Thanks
S. Martina G.

Thank you
for having us.
I enjoyed breathing
into the liquid
nitrogen. Ryan H

Thank you for letting
us come in would
enjoy coming back
to visit the rest of
the university
Jennifer
Lumpkin

Mind
Mende

Thanks
I enjoyed it
a lot
No. 10

I enjoyed
the presion
station.

Reanna
Candelas

Thanks,
for letting our
come

Shala
Constantino

Thank
you
Jenny

Thank You
from
Jarene
Cales

Thank
you
151
Blin

Thank,
Susan

Ft. Clarke Middle School
8th Grade

Thank for showing us
about the Gas
relating the time for 100

Thank
you

Thank you for your time
 I had fun in the lab
 Chris Bryant

Thank You Mr. Vernetson and Associates Nuclear Physics Lab

Thanks I had Fun
 in the lab
 Adam Swenson
 Christina Gombour

It was cool holding your little
 radiation thingy daddle. I like
 George he is hip & groovy! He
 has a cool job sitting at
 a desk pushing buttons.

Thank you for your time
 Stephanie & Lain

It was a blast
 Terry Gabbard

Thank you for your time,
 and effort. I'm glad that
 I didn't get to get radon,
 I think that's how you
 spell it. Thank you
 Dookie Dee Thae
 Gabon.

Thanks Again Gog
 your friend,
 Joshmundo
 Fosterman
 (Josh Foster)

It was great

Thank you for
 a good time it was
 a blast from the past.
 Brann C
 Covington

Thanks
 for your time!
 MARY OUTSHALL

Thanks! I really
 thought the liquid
 nitrogen was cool!
 Anna
 Stine

Thanks for your
 time. I really
 enjoyed the tour.
 I liked blowing in
 the liquid nitrogen
 and playing with the
 robotic arms.

Thanks!
 Suzanne
 Martin

♥+!! = Thanks,
 unity Nicole
 Eiland

Thanks
 McKia Anchor

☺ on ☺

Thank You
Mr. Vernetson and
Associates
Nuclear Physics Lab

Thank you for having us.
Dax Lautner

I really liked the
liquid nitrogen
@mimic

THANK YOU FOR
TAKING YOUR TIME TO SHOW
US THE NUCLEAR PHYSICS LAB
Justin Lagorio

I liked the
robot arms.
Calvin

Thanks for
letting us use
the robot arms
Gloria

Thank you!!
Eric Clark

Thanks for waisting
your time for us.
Mara

Thank you
I enjoyed it.

Calvin
Winters

Thanks. I
enjoyed everything
Kiauan
Strawan

Thank you
I really
liked the
liquid nitrogen
Dana
Duffy

Thanks for
a great
time
Kelley
Addis

Thanks
for letting
us use the
smiley
stuff
Emily

DATE

FILMED

6 / 2 / 94

END