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**FINAL REPORT ON THE
UNIVERSITY OF FLORIDA
U.S. DEPARTMENT OF ENERGY
1994-1995 REACTOR SHARING PROGRAM**

Grant No. DE-FG05-92ER75806

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

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

GAINESVILLE, FLORIDA

June, 1996

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FINAL REPORT ON 1994-1995

UNIVERSITY OF FLORIDA REACTOR SHARING GRANT

Department of Energy Grant Number DE-FG05-92ER75806 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 April, 1994 requested \$73,710 to support various educational institutions using the UFTR facilities. The actual grant support was only in the amount of \$24,250, 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 serving over twelve million inhabitants throughout the State of Florida and still others throughout the nation.

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 twelve 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 about three 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 many groups of advanced and/or honors program students and faculty 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 the 1992-1993 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 that year's Reactor Sharing Grant, effectively doubling its dollar impact! We are hoping similar support can be justified in the next year.

The three tables that follow provide basic information about the 1994-1995 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 (1994-1995) saw a broad spectrum of users, with one of 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. This usage was despite a reduction in Reactor Sharing funds. The diversity and number of user institutions listed in Table 2 is easily the largest ever in the eleven years of reactor sharing with the University of Florida Training Reactor. The various groups of honors-type high school students from Talent Identification Program ceremony participants to SUCCEED Program participants to FFFS Science, Engineering and Humanities Symposium participants, among others, 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 and college students and educators are our best means of advertising the UFTR facilities and their availability. Indeed, the usage for the academic design JETS team participants in 1993-1994 resulted in two new substantive users in the 1994-1995 Reactor Sharing Program! Certainly the thirty-seven separate entries in Table 2 are 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 1994-1995 grant with costs of consumable supplies and NAA Laboratory usage (mostly cost shared at \$35/hour) not included in the charge for reactor usage.

To support the interest of various users in the University of Florida facilities, several anecdotal pieces of information are repeated 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. As a note, they now do this every year! The school has repeated this effort for four years now! The second item is a letter from Dr. Max Lombardi whose nuclear medicine technology students have been making the one-way, two-hour trip from Hillsborough County to the University of Florida Training Reactor a regular event for ten years. The next 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 again this year and by a group of teachers. Finally, the last page contains a copy of a card sent by one high school student who used our facility to support her science fair project which placed at the international level in Toronto. These communications are typical of our interactions with user groups, all of whom have expressed their appreciation for the services we have provided and for the special efforts made to tailor usages to meet needs whether related to education, training or research for students and faculty at all levels from secondary schools to four-year research universities.

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, though we continue to do so on a limited basis, 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 three or more times the Grant value of \$24,250 in 1994-1995. Similar results will apply in an even more diverse set of usages to justify three or more times the \$30,000 in the current 1995-1996 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. Tours of our facility by one NRC Commissioner and the Executive Director for Operations clearly had an impact. 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 from 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, last year's

graduating class in nuclear engineering at the University of Florida contained two students whose high school teacher (Mrs. Renae Allen) first brought them to our facility about seven years ago as high school students. One of these students has been a leading student in our graduate program supported by a DOE fellowship and has begun his doctoral work! 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, as have projects performed by students at Palatka High School, Pensacola Catholic High School and Wildwood High School, among others. 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 to attract as many bright students as possible to various programs in engineering, physics and chemistry.

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: (352) 392-1429/1408
Fax Number: (352) 392-3380
E-mail Address: vernet@server.nuceng.ufl.edu

Grant Number: DE-FG05-92ER75806

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, 1994 - September, 1995)

School	Usages*	Users	
		Faculty	Students
1. Alachua County High School (ACHS)	2	2	26
2. Branford Community School (BSC)	3	1	1
3. Central Florida Community College (CFCC)	29	2	29
4. Central Florida Community College - Lecanto Campus (CFCC-LC)	1	1	11
5. Christian Home School Association (CHSA)	2	8	40
6. College of Engineering High School Outreach Program	1	1	10
7. Crystal River High School (CRHS)	2	2	35
8. Dixie County High School (DCHS)	4	1	21
9. Embry-Riddle Aeronautical University (ERAU)	1	1	3
10. FFFS Science Engineering & Humanities Symposium (High School)	2	3	12
11. Florida A&M University (FAMU)	2	1	1
12. Florida State University (FSU)	4	2	2
13. Florida Technological University (FTU)	2	4	1
14. Fort Clarke Middle School (FCMS)	6	7	323
15. Health Physics Society Radiation Science Teachers Workshop	1	12	0
16. Hilliard High School (HHS)	5	2	1
17. Hillsborough Community College (HCC)	1	1	10
18. Hispanic Outreach Middle School Program Students	9	27	306
19. Lecanto High School (LHS)	5	2	15
20. Living Faith Christian School (LFCS)	1	4	22
21. McClay High School (MHS)	5	2	1
22. Mebane Middle School (MMS)	1	2	52
23. Newberry High School (NHS)	5	1	16
24. Palatka High School (PHS)	1	7	3
25. P.K. Yonge High School (PKYHS)	1	3	23
26. Precious People Preschool (PPP)	1	4	20
27. St. Augustine High School (SAHS)	2	3	17
28. St. Johns County Summer Gifted Students Program (High School)	4	6	47
29. St. Patrick's School (SPS)	1	1	29
30. Santa Fe Community College - Gainesville (SFCC-G)	1	3	12
31. Save the Environment through Education & Knowledge (SEEK)(HS)	2	4	67
32. Southeast Consortium for Minorities in Engng (SECME)(Col Tchrs)	3	60	0
33. Summer Science Research Training Program (High School)	8	4	70
34. Talent Identification Program Ceremony Participants (High School)	2	2	68
35. Teacher Research Update Experience (TRUE) Program (HS Tchrs)	2	26	0
36. West Miami Middle School (WMMS)	2	2	2
37. Westwood Christian Academy (WCA)	1	1	8
TOTAL	125	215	1,304

* 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 Branford Community School and Palatka High School, or the multiple usage training programs conducted for Central Florida Community College students and the attendees at the annual SECME Conference.

TABLE 3

SUMMARY OF FACILITY UTILIZATION

For Reactor Sharing
(September 1994 - August 1995)

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/OR USER	TYPE OF ACTIVITY	RUN TIME (hours)	EXPERIMENT TIME (hours)
**Central Florida Community College (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	10.67 (0.65)	193.00 (4.09)
**Newberry High School Science Research Class - Mrs. Cynthia Holland - Reactor Sharing	Lecture, Tour and Demonstration of Reactor and NAA Laboratory Operations Including Measurement of Half-Life and Demonstration of Trace Element Analysis of a Hair Sample Using the Rabbit System and PC-Based Analyzers Plus Waste Handling Exercise Demonstrating Use of Anti-Contamination Clothing and Robots Plus Discussion of Research Usage and Projects Using Research Reactors	1.38	6.33
**Branford Community School Student Training Project in NAA Techniques - Mrs. Christine Haile, Branford Community School - Reactor Sharing	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 to support a Science Fair Project to Determine Trace Element Content of Various Brands of Dry Breakfast Cereal	10.38 (0.35)	16.25 (0.83)

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(September 1994 - August 1995)

PROJECT AND/OR 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	16.97 (4.30)	20.75 (5.00)
**Gainesville Christian Home School Association High School Science Students - Mrs. Kathy Muni, et al. - Reactor Sharing	Lecture, Tours and Demonstrations of UFTR Operations with Radiation Surveys and NAA Training Exercises Demonstrating Trace Element Analysis of Hair Samples Using the Rabbit System and PC-Based Analyzers Plus Waste Handling Exercise Demonstrating Use of Anti-Contamination Clothing and Robots	1.68	8.25
**Lecanto High School Physics/Chemistry Students - Mr. Ron Worthington, Lecanto High School - 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 Exercise Using Robots and Anti-Contamination Clothing	1.70	6.42
Westwood Christian Academy Science Students - Mr. Dennis West - Reactor Sharing	Lecture, Tours and Demonstrations of UFTR Operations with Radiation Surveys and NAA Training Exercises Demonstrating Trace Element Analysis of Hair Samples Using the Rabbit System and PC-Based Analyzers Plus Waste Handling Exercise Demonstrating Use of Anti-Contamination Clothing and Robots	1.68 (1.68)	7.25 (7.25)

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For Reactor Sharing
(September 1994 - August 1995)

PROJECT AND/OR USER	TYPE OF ACTIVITY	RUN TIME (hours)	EXPERIMENT TIME (hours)
*NAA Research of Geological Quartz Samples, Dr. Roy Odom, Florida State University Geology Department - Reactor Sharing	NAA to Evaluate and Quantify Certain Rare Earth Element Content of Geological Quartz for EPR Dating Purposes	17.34 (0.63)	22.84 (1.77)
**Central Florida Community College - Lecanto Campus Earth Science Class - Mr. Ron Worthington - Reactor Sharing	Lecture, Tour and Demonstration 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	0.62	3.50
Exxon Engineering Outreach Program for At-Risk Hispanic Middle and High School Students - Dr. J. Earle - Reactor Sharing	Series of Outlook Broadening Lectures, Tours and Demonstrations of Trace Element Analysis and Use of Survey Meters and Anti-Contamination Clothing for Contamination Control Exercises	1.33 (0.38)	15.09 (1.17)
**Ft. Clarke Middle School Science Students - Mrs. Linda Hewlett, Mr. Clyde Graham, Mrs. Betty Brawn and Mrs. Ann Nichols, 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	4.03	10.25 (0.08)

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For Reactor Sharing
(September 1994 - August 1995)

PROJECT AND/OR USER	TYPE OF ACTIVITY	RUN TIME (hours)	EXPERIMENT TIME (hours)
*NAA Research to Study the Effects of Magnetic Fields on Short-Term Memory of Rats - Mrs. Nancy Thompson, Palatka High School - Reactor Sharing	NAA Evaluation of Calcium Content in the Brain Tissue of Laboratory Rats Exposed to Various Electromagnetic Fields to Evaluate the Effects of Such EMFs on Calcium Content and Short-Term Memory of Rats Along with Tours for Student Visits to Support Science Fair Project Invited to International Science Fair in Toronto, Canada	14.22 (4.22)	23.50 (5.92)
**Mebane Middle School Science Students - Ms. Yvette McIntyre and Ms. Tammy Pitts, Mebane 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	0.93	2.00
*NAA Research to Study Trace Elements in Fish, Sediments, Plants and Canal Water in the Miami Area to Support Four Science Fair Projects - Mr. Mark Margolis, West Miami Middle School - Reactor Sharing	NAA Evaluation of Trace Element Content in Various Matrices (Fish, Sediments, Water Turbidity, and Plants) to Support Four Science Fair Projects (Adrian Castillo, Manny Alvarez, Kella Sarmiento, Kenty Lopez, Carl Ruhland, Toni Diaz)	3.67 (1.50)	4.83 (1.75)

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For Reactor Sharing
(September 1994 - August 1995)

PROJECT AND/OR USER	TYPE OF ACTIVITY	RUN TIME (hours)	EXPERIMENT TIME (hours)
*NAA Research to Perform Trace Element Analysis of Various Brands and Types of Powdered Infant Formula - Mrs. Cynthia Holland, Newberry High School - Reactor Sharing	NAA Evaluation of Various Brands and Types of Powdered Infant Formula to Evaluate and Quantify Relative Calcium Content for Health Considerations for Science Fair Project (John Kleckner)	4.38 (1.92)	5.83 (2.17)
*NAA Research to Perform Trace Element Analysis on Small Segments of Long Male Hair - Mrs. Cynthia Holland, Newberry High School - Reactor Sharing	NAA Evaluation of Small Segments Taken From Lengthy Male Hair to Evaluate Variations in Trace Element Level of Aluminum Over Time (Chad Vanoster, Jeremiah Hart)	3.83 (1.92)	4.58 (2.42)
*NAA Research to Perform Trace Element Analysis of Copper Level in Crystal River Headwater Sediments - Mr. Ron Worthington, Lecanto High School - Reactor Sharing	NAA Evaluation for Trace Element Analysis of Crystal River Headwater Sediment Samples for Quantification of Copper Level Buildup from Continued Application of Herbicides to Control Hydrilla and Other Underwater Plant Growth to Support Science Fair Project (Tom Hunt)	9.07	15.17 (1.25)
**Dixie County High School Science Department - Dr. Gary Featherston, Dixie County High School - 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	0.42	14.50 (2.00)

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For Reactor Sharing
(September 1994 - August 1995)

PROJECT AND/OR USER	TYPE OF ACTIVITY	RUN TIME (hours)	EXPERIMENT TIME (hours)
***Florida Foundation of Future Scientists 32nd Annual Junior Science, Engineering and Humanities Symposium - Dr. M.J. Koroly, Mrs. D. Paulin - Reactor Sharing	Series of Lectures, Tours and Demonstrations of Reactor and NAA Laboratory Facility Operations, Capabilities and Applications for Honors Group of High School Junior Level Students and Teachers	0.00	2.08
** Embry - Riddle Aeronautical University Engineering Science Department Students - Dr. Suthya Gangadharan and Mr. Rafael Roman - Reactor Sharing	Lecture, Tour and Demonstration of UFTR Operations with Radiation Surveys and Measurement of Radioactivity of Half-Life Plus NAA Training Exercises Demonstrating the Trace Element Analysis Technique Using the Rabbit System and PC-Based Analyzers to Analyze Hair Samples Plus Contamination Control and Waste Handling Exercises Using Anti-Contamination Clothing and Robots with Radiograph Demonstrations	1.18	5.50
***Living Faith Christian Fellowship School - Mr. D. Simpkins - Reactor Sharing	Series of Lectures and Demonstrations on Radiation and Radioactivity as Well as Use of Anti-Contamination Clothing and Robots for Protection and Waste Handling	0.00	6.75
*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	14.25 (6.08)	17.17 (6.92)

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PROJECT AND/OR USER	TYPE OF ACTIVITY	RUN TIME (hours)	EXPERIMENT TIME (hours)
**Lecture, Tour and Demonstration for Dixie County High School Science Students - Dr. Gary Featherston - 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 with Discussions of Possible Science Fair Projects	0.62	6.17
*NAA Research to Perform Trace Element Analysis of Hair Samples - Dr. Gary Featherston, Dixie County High School - Reactor Sharing	NAA Evaluation of Various Hair Samples to Evaluate and Quantify Relative Aluminum Content for Science Fair Project (Nicole Castro)	2.00 (0.50)	2.50 (0.75)
*NAA Research to Perform Trace Element Analysis of Lake Sediment Samples - Dr. Gary Featherston, Dixie County High School - Reactor Sharing	NAA Evaluation of Various Sediments from a Dixie County Lake to Evaluate and Quantify the Elemental Variation in Samples from Different Locations for Science Fair Project (Tom McLaughlin)	8.43 (4.22)	9.58 (4.67)
***Florida Health Physics Society Radiation Science Teachers Workshop - Dr. D.E. Hintenlang, Dr. W.G. Vernetson and Mr. Steve Garry, Health Physics Society - Reactor Sharing	Lecture, Tour and Demonstration of Reactor and NAA Laboratory Facility Operational Capabilities Including Measurement of Half-Life and Trace Element Analysis of Hair Samples and Capabilities for Conducting Educational and Training Classes for High School and Middle School Students Including Support of Science Fair Projects	0.55	5.42 (0.67)

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PROJECT AND/OR USER	TYPE OF ACTIVITY	RUN TIME (hours)	EXPERIMENT TIME (hours)
**P.K. Yonge High School Chemistry and Advanced Chemistry Classes - Dr. Paul Becht, Mr. Griff Jones and Mr. Greg Dixon, P.K. Yonge High School - Reactor Sharing	Two Lectures, Tours and Demonstrations of Reactor and NAA Laboratory Capabilities with Radiation Surveys and Demonstrations of Trace Element Analysis Techniques on Standards Using the Rabbit System and PC-Based Analyzers	0.00	2.50 (0.25)
**Santa Fe Community College Nuclear Medicine Technology Program - Mr. S. Marchionno, Ms. Beth Shultzaberger and Mrs. Rochelle Sturm - Reactor Sharing	Lecture, Tour and Demonstration of UFTR Operations with Radiation Surveys and NAA Training Exercises Demonstrating Isotope Identification and Trace Element Analysis Technique Using the Rabbit System and PC-Based Analyzers Using Previously Irradiated Materials Plus Demonstration of Gas Flow Proportional Counter for Contamination Surveys	0.00	4.50 (0.17)
**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 Irradiated Hair Samples Using NAA Techniques and Demonstration of Neutron Radiographic Techniques and Protection of Radioisotopes	0.23	3.33
**St. Patrick's School Science Students - Mrs. Esther Branch - 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	1.30	4.50

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PROJECT AND/OR USER	TYPE OF ACTIVITY	RUN TIME (hours)	EXPERIMENT TIME (hours)
**St. Augustine High School AP and Honors Physics Students - Mr. Steve Buell, Mr. George Bergstrom and Ms. Clara Rogers, St. Augustine High School - 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	1.07	7.33 (1.50)
**Crystal River High School AP and Honors 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	2.28	7.50
***Talent Identification High School Program - Dr. M.J. Koroly, Mrs. D. Paulin, 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 for High School Program Participants	0.00	4.50
***Precious People Preschool - Mr. D. Simpkins, University of Florida - Reactor Sharing	Series of Demonstrations and Hands-On Activities to Explain Radiation and Radioactivity as Well as How to Use Robots, Survey Meters and Anti-Contamination Clothing in Handling Radioactive Materials	0.00	3.50

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For Reactor Sharing
(September 1994 - August 1995)

PROJECT AND/OR USER	TYPE OF ACTIVITY	RUN TIME (hours)	EXPERIMENT TIME (hours)
**St. Johns County Summer Gifted Program Students - Mr. Tom Costiera, St. Johns County School System - Reactor Sharing	Series of Lectures, Tours and Demonstrations 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	1.73	6.67
*NAA Research for St. Johns County Summer Gifted Program Students - Mr. Tom Costiera, St. Johns County School System - Reactor Sharing	NAA Research to Identify Significant Trace Metallic Elements in Oyster Tissues for Use by Students Studying Marine Science and Pollution Effects in a Summer Science Program	5.08	8.00 (0.17)
***Demonstration of Reactor Facility Operations for At-Risk Minority High School Science Students from Ocala as Part of College of Engineering Outreach Program - Dr. J. Earle, University of Florida, and Ms. Kathy McHugh, Ocala School System - Reactor Sharing	Lecture, Tour and Demonstration of Reactor Operations and Facility Capabilities Plus Radiation Surveys and Demonstrations of Contamination Control Using Anti-Contamination Clothing and Robotics for Minority Reachout Program to Encourage Students to Remain in School and Pursue a Career in Science	0.00	1.33

TABLE 3

SUMMARY OF FACILITY UTILIZATION

For Reactor Sharing
(September 1994 - August 1995)

PROJECT AND/OR USER	TYPE OF ACTIVITY	RUN TIME (hours)	EXPERIMENT TIME (hours)
**Save the Environment through Education and Knowledge (SEEK) High School Student Program Participants - Ms. Leslie Cannon, College of Agriculture and Dr. W.G. Vernetson, University of Florida - Reactor Sharing	Series of Lectures, Tours and Demonstrations 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	1.65	5.17
**Center for Precollegiate Education and Training (CPET) - Dr. M.J. Koroly/Dr. W.G. Vernetson, University of Florida - Reactor Sharing	Lectures, Tours and Demonstration of Reactor Facility Operations and Experimental Capabilities Along with Research Possibilities for Training and Familiarization in Utilization of Neutron Activation Analysis Plus Summer Research Project Selection for Two (2) CPET Summer Program High School Students (Mona McCullough of MacClay High School and Jeffrey Gilliam of Hilliard High School)	5.22 (0.77)	28.17 (7.42)
*Center for Precollegiate Education and Training Hilliard High School NAA Research on Vegetable Trace Element Content and Variability - Mr. Edward C. Turvey and Mrs. Janet Conner, Hilliard High School, Dr. W.G. Vernetson, University of Florida - Reactor Sharing	Summer 1995 Student Research Program - Evaluation and Quantification of the Trace Element Content of Different Sections of Various Routinely Consumed Vegetables (Jeffrey Gilliam)	14.75 (0.77)	16.67 (0.83)

TABLE 3

SUMMARY OF FACILITY UTILIZATION

For Reactor Sharing
(September 1994 - August 1995)

PROJECT AND/OR USER	TYPE OF ACTIVITY	RUN TIME (hours)	EXPERIMENT TIME (hours)
*Center for Precollegiate Education and Training MacClay High School NAA Research on Sensitivity - Mr. Robert C. Webster and Mr. Thomas C. Lewis, MacClay High School in Tallahassee, Dr. W.G. Vernetson, University of Florida - Reactor Sharing	Summer 1995 Student Research Program - Evaluation and Quantification of the Elemental Sensitivity of Neutron Activation Analysis in Various Matrices Utilizing Pure Materials (Mona McCullough)	12.68 (0.77)	15.16 (0.83)
***Florida Foundation of Future Scientists - Mrs. Sylvia Ingram/Dr. W.G. Vernetson - Reactor Sharing	Lecture and Demonstration on Reactor Operations and Usage for Assembled Summer Science Research Training Program Participants (High School Students) and Teacher Research Update Experience Participants (High School Science Teachers)	0.00	3.58
**Teacher Research Update Experience (TRUE) Program for Updating Science Teachers on Current Technology and Research - Mrs. S. Ingram, Mrs. D. Paulin, CPET - Reactor Sharing	Lecture, Tours and Demonstrations of Reactor and NAA Laboratory Capabilities to Produce Radioisotopes and PC-Based Analyzers for Trace Element Analysis of Hair Samples as Well as Half-Life Measurements for Science Teachers as Part of Teacher Research Update Experience (TRUE) Program, Especially Emphasizing UFTR Availability for Class Visits for Experiments and for Supporting Science Fair Projects by Students	0.83	2.92

TABLE 3

SUMMARY OF FACILITY UTILIZATION

For Reactor Sharing
(September 1994 - August 1995)

PROJECT AND/OR USER	TYPE OF ACTIVITY	RUN TIME (hours)	EXPERIMENT TIME (hours)
***Demonstration of Reactor Facility Capabilities and Usage for Teacher Participants in the Annual Institute for the South Eastern Consortium for Minorities in Engineering (SECME) - Dr. J. Earle, College of Engineering and Dr. T. Vernetson, College of Education, University of Florida - Reactor Sharing	Series of Lectures, Tours and Demonstrations of Reactor and NAA Laboratory Facility Operational Capabilities and Usages Including Measurements of Half Lives and Demonstration of Trace Element Analysis of Volunteer and Hair Samples for Participating Precollege Teachers	2.17	3.58 (0.33)
Alachua County High School Students Chemistry Workshop - Mrs. Anne Marie Heller, Eastside High School, Dr. Gardiner Myers, UF Chemistry Department, Dr. W.G. Vernetson, University of Florida - Reactor Sharing	Series of Lectures, Tours and Demonstrations of Reactor Operations with Radiation Surveys and NAA Training Exercises, with Measurement of Radioactive Half Lives and Demonstrations of Trace Element Analysis Techniques on Standards and Hair Samples Using the Rabbit System and PC-Based Analyzers as Well as Exercises in Using Anti-Contamination Clothing, Survey Meters and Robot in Contaminated Radiation Areas	2.73	6.92

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. Experiment 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. 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



W.G. Venable, Director
NUCLEAR REACTOR BUILDING
Gainesville, Florida 32611
Ph. • (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 the 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,



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

Thank you very much for your time to teach us about your lab. We enjoyed it. Love- Amanda McCallum I liked that cold stuff.

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 your time.
Thank you for everything.
Mr. Vernetson,

Thank you for everything. It was neat.

THANKS alot, I liked the arm to pick up things in the radiation room.
Austen

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
I had your time, Bethany T.

Thanks, it was very cool and very exciting
Maggie

I like that cold stuff that freezes things
Love Jen.

at the radiation in
the hair sample.
Thanks for spending
your time w/ us.
@ Brandi
K.

Thank You
Mr. Vernetson and
Associates
Nuclear Physics Lab

Thank you
KLAH

Thank you
for going to
all that trouble.

John
Valdez

Thank you
Alycia

THANK
YOU

~~KLAH~~

Mr. V
thanks
for all
your time
K A R M A
Hole
place
BYRON HARVEY

Mike
Carter
thank
you

Shana
Carter
Thank
you!!

Ft. Clarke Middle School
8th Grade

"Had a great time, thank you!"

Thank You Mr. Vernetson and Associates

Thank you
for taking
the time

Stephanie
Shachagrey

Nuclear Physics Lab

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

I had a great
time. Especially playing
with that hand in
the room to pick up
the foam. Thanks!
Suzanne G.

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

Thank you for letting
us come. I would
enjoy coming back
to visit the rest of
the university.
Jennifer
Lumkin

Michael
Munroe

Thanks,
we enjoyed it
more.

I enjoyed
the presion
tation.
Reanna
Candelas

Thanks,
for letting us
come.

Thanks,
Suzanne

Shab
Corstano

Thank
you
Amy

Thank You
from
Jesse
Jesse

Thank
you!
Bryn
Lind

Ft. Clarke Middle School
8th Grade

Thank you for
about the Geiger counter
during the time.

Thank
you

Thank you for the tour
I had a great time
I had fun in the lab
I had fun in the lab
I had fun in the lab

Thank You

Mr. Vernetson and Associates
Nuclear Physics Lab

Thank you
Chris
Stephanie

Thanks I had Fun
Adon in the lab
Gordon

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

Thanks Again Ge

Thank you for your time
Stephanie & Brian

It was a blast
Terry Gilbert

Thank you for your time
and efforts. I'm glad that
I didn't get to get radon,
I think that's now you
spell it. Thanks you
Dookie Dee that
Gordon

Your friend,
Joshua
Foster
(Fosh Foster)

It was great

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

Thanks
for your time!
MARY OUTSHALL

Thanks! I really
thought the liquid
nitrogen was easy!
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,
Nicole
Eiland

Thanks
Mekia Ancher

on

Ft. Clarke Middle School
8th Grade

Thank You
Mr. Vernetson and
Associates
Nuclear Physics Lab

Thank you for having us.
Dax Lautner

I really liked the
liquid nitrogen
@jmic

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

Justin Facotto

I liked the
robot arms.
Calin

Thanks for
letting us use
the robot arms
Slump

Thank you!!
Eric Clark

Thanks for waisting
your time for us.
Mara

Thank you
I enjoyed it.

Calin
Whit

Thanks. I
enjoyed everything
Kieran
Shaban

Thank you
I really
liked the
liquid nitrogen

Yana
Duffy

Thanks for
a great
time
Kelley
Addis

Thanks
for letting
us us the
sunday
stuff
Emily

Fort Clarke Middle School

9301 N. W. 23 AVENUE
GAINESVILLE, FLORIDA 32606

Dec. 10, 1994

Dear Bill Vernetson,

Thank you very much for allowing us to visit the Nuclear Physics Lab. We appreciate the fact that you were willing to accommodate all of our 400 8th grade students during a three day period. We realize this required a lot of time and preparation.

The students really enjoyed the opportunity to see a nuclear reactor. All were surprised by how much research could be done with nuclear power (it's not "just" for electricity). They really enjoyed having their hair samples read and the excellent presentation explaining nuclear fission.

Please thank all involved for their efforts and our sincere thanks to you for coordinating this excellent experience for our students.

Sincerely,

Linda Hewitt
Ann Stiefel
Big Ben
Clyde A. Hoke
Ed Sanders

Mrs Cynthia Holland
Newberry High School
P.O. Box 339
Newberry, FL 32069

For everything
you've done...
for being the special people
that you are...
thank you so very much.

Thank you,
Chad
Dawson

Thank you
for a enjoyable
time
Jennifer Hart

I learned
a lot of new
things. Thank-you.
Heather
Bump

Thank you for a great
experience!
Mrs. K...
we were so glad
to have you!

I really learned
a lot.
Thanks,
R.S.

Thank you!
Jennifer Dawson
Thank you for
everything!
Jennifer Dawson

Thank you,
Tommy
Hempill

Thank you for a wonderful
presentation. It's a joy to
be able to visit. J. Smith

It was a great
experience!
Thank you!
Matt...

Thank you!
Jennifer Dawson

Thank you
Chad Dawson
Thank you!
Heather Bump

Thank you!
Jennifer Dawson

THANKS



... A LOT!

DR. Vernetson,

Thank you for your time, and all of the information you provided us, during our visit to the nuclear power plant.

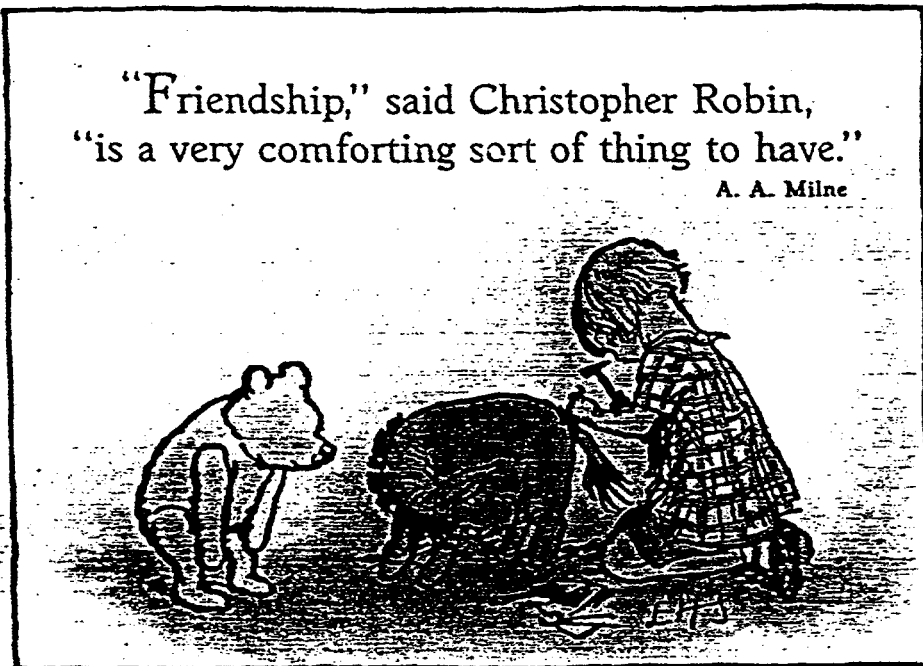
I enjoyed it and learned a lot!

Sincerely,

Aubrey M. Gieberg

"Friendship," said Christopher Robin,
"is a very comforting sort of thing to have."

A. A. Milne



Mr. Vernetson,

I would like to thank you and your associates for giving up some of your time to organize and present a wonderful field trip. I really enjoyed participating in the two experiments we performed at the end of the tour and was amazed by the facts given in your lecture. I sincerely hope that future Calculus & Physics students at CHS have the opportunity to take part in your interesting & informative presentation and tour.

Thanks once again,
Amy Fiersol

591-07-6937 (though ^{you might want} it, ^{SS of once again})

Mr. Verneboon,

I would like to thank you and everyone else who was involved in our visit to the training reactor. I enjoyed learning more about nuclear energy. I had never understood exactly how the energy was created. After this visit I gained a clearer understanding of how the atomic structure of uranium allows nuclear energy to be produced. I honestly enjoyed the learning experience you provided me with. Thank you!

Sincerely,

Lorell Kasey

RT 6 Box 300
Lake City

April 23, 1994

Dear Dr. Vernetson,

Thank you for allowing me and my fellow classmates to tour the University of Florida nuclear reactor facility. It was a very informative and interesting trip. I learned a great deal about the risks and the benefits of nuclear power. Thank you for allowing us to experience this very educational tour.

Thank you,
Rachel McClinton