

DOE/NE/38127-T1

FINAL REPORT ON THE

UNIVERSITY OF FLORIDA

U.S. DEPARTMENT OF ENERGY

1995-96 REACTOR SHARING PROGRAM

Grant No. DE-FG05-95NE38127

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

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

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GAINESVILLE, FLORIDA

November 1996

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**FINAL REPORT ON THE
UNIVERSITY OF FLORIDA
U.S. DEPARTMENT OF ENERGY
1995-96 REACTOR SHARING PROGRAM**

Grant No. DE-FG05-95NE38127

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Director of Nuclear Facilities**

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FINAL REPORT ON 1995-96

UNIVERSITY OF FLORIDA REACTOR SHARING GRANT

Department of Energy Grant Number DE-FG05-95NE38127 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 March 1995 requested \$74,710 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 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 thirteen 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 concerning Crystal River High School documents just one example from about four 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. The Crystal River High School students continue to make annual visits, always paying their own way! 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 1992-93 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 this next year.

The three tables that follow provide basic information about the 1995-96 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 (1995-96) saw a broad spectrum of users, with one of the largest numbers of participants ever as we continue to deliver

expanded services, especially for secondary school students and classes which is a personnel intensive but rewarding area of endeavor. This usage was supported by last year's increase in Reactor Sharing funds, though still below the historically high level of the previous year. The diversity and number of user institutions listed in Table 2 is one of the largest ever in the thirteen 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 1993-94 resulted in two new substantive users in the 1994-95 Reactor Sharing Program! This year again saw several new users. Certainly the thirty-six 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 1995-96 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 at Crystal River High School 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 five 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 eleven years! The next eleven 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 visits over the last two years and by a group of teachers. The next two pages contain copies of cards—one sent by a high school student who used our facility to support her science fair project which placed at the international level in Toronto in 1995 and another sent by a high school student who visited the facility to obtain information and support for a school project several months ago. The final two pages were sent as a humorous thank you from an honors physics class that spent most of a day at the facility doing exercises and learning about nuclear energy. 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 two-to-three-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 \$30,000 in 1995-96. Similar results will apply in an even more diverse set of usages to justify three or more times the \$24,000 in the current 1996-97 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 a pivotal impact on the regulators' perspectives of such facilities. 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, the graduating class in nuclear engineering in 1995 at the University of Florida contained two students whose high school teacher (Mrs. Renae Allen) first brought them to our facility about eight 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 West Miami Middle School, 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.

This year we further expanded educational activities by supporting a training program to let students at a local community college participate in facility research projects. The objective here is to familiarize such students with nuclear engineering-oriented research and thereby attract such students into the nuclear or other technology-oriented fields of engineering.

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-FG05-95NE38127
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 1995 - September 1996)

School	Usages*	Faculty	Students
1. Buchholz High School (BHS)	2	2	36
2. Central Florida Community College (CFCC)	29	3	5
3. Crystal River High School (CRHS)	2	2	63
4. Deltona Christian High School (DCHS)	1	2	2
5. Eastside High School (EHS)	1	1	4
6. FFFS Science Engineering & Humanities Symposium (High School)	3	5	49
7. Florida A&M University (FAMU)	1	1	1
8. Florida Community College at Jacksonville (FCCJ)	3	1	7
9. Florida State University (FSU)	1	1	1
10. Gadsden County High Schools	2	1	39
11. Gator Engineering Minority Outreach (GEMO)	1	3	46
12. Health Physics Society Radiation Science Teachers Workshop	1	12	0
13. Hillsborough Community College (HCC)	1	1	12
14. Hillsborough High School (HHS)	9	2	1
15. Hilliard High School	1	2	1
16. Lincoln Middle School (LMS)	1	1	22
17. North Florida High School Guidance Counselors	2	15	1
18. Oak View Elementary School (OVES)	1	1	15
19. Pensacola Junior College (PJC)	1	1	18
20. P.K. Yonge High School (PKYHS)	1	2	17
21. Pine Ridge High School (PRHS)	9	2	1
22. Punta Gorda High School (PGHS)	1	1	2
23. Raines High School (RHS)	1	1	8
24. St. Augustine Schools Scout Troop	1	3	9
25. St. Johns County Country Day School (SJCCDS)	1	1	4
26. St. Patricks School (SPS)	2	2	28
27. Santa Fe Community College (SFCC)	17	5	33
28. Summer Science Research Training Program (High School)	8	3	72
29. Talent Identification Program Ceremony Participants (High School)	1	4	49
30. Teacher Research Update Experience (TRUE) Program (HS Tchrs)	2	13	67
31. Trilogy School	2	3	18
32. Union County High School (UCHS)	9	1	5
33. University of Miami (UM)	2	1	1
34. University of Tennessee (UT)	1	1	7
35. Valencia Community College (VCC)	1	12	11
36. West Miami Middle School (WMMS)	2	1	2
TOTAL	124	113	647

* 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 Union County High School and Hillsborough High School, or the multiple usage training programs conducted for Central Florida Community College students.

TABLE 3

REACTOR SHARING PROGRAM
SUMMARY OF FACILITY UTILIZATION
(September 1995 - August 1996)

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
**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	15.85 (0.70)	144.51 (8.17)
**Union High School Science Research Class - Mrs. Renae Allen - 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	1.02	7.25

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Project and User	Type of Activity	Run Time	Experiment Time
		Hours	Hours
**Santa Fe Community College SUCCEED Program Student Training Project in NAA Research Techniques - Dr. Angelo Ferrari, Santa Fe Community College - Reactor Sharing	Series of Practical Training Exercises in Trace Element Analysis and Other Techniques Using Neutron Activation Analysis Including Radiation Concepts, Sample Preparation and Use of PC-Based Analyzers for Element Identification to Support Delineation of Nuclear Research Techniques for Students Expressing Potential Interest in Engineering and Research in the Nuclear Area (Mike Barfield; Ben Killian, Bryson Hopkins)	12.47 (3.18)	38.59 (7.08)
*NAA Research on South Florida Canal and Ground Water - Dr. Helena Solo-Gabriele, University of Miami Civil Engineering - Reactor Sharing	Suspended Sediment Multielement Analysis of South Florida Canal and Ground Water Using Neutron Activation Analysis	1.25	2.50
**Eastside High School Junior Engineering Society IB Students - Mrs. Ann Marie Heller, Eastside High School - 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 and Half-Life Measurements Plus Waste Handling Exercise Demonstrating Use of Anti-Contamination Clothing and Robots	1.00 (0.50)	4.33 (0.50)

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Project and User	Type of Activity	Run Time	Experiment Time
		Hours	Hours
**Valencia Community College Philosophy of Science Students - Dr. Deborah Green, Valencia Community College - 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 for Science Teachers	0.67	3.25
***St. Johns County Country Day School College of Engineering-Oriented Students - LaVay Lauter/W.G. Vernetson, University of Florida - Reactor Sharing	Walk-through Tour of Reactor and NAA Laboratory Facilities with Demonstration of Operations Including Reactor Startup, Trace Element Analysis Techniques and Half-Life Measurement with Discussion of Typical Activities as Part of Career Shadowing Day for College of Engineering-Oriented High School Students	1.12	5.08
***St. Augustine Schools Science-Directed Cub Scouts - Mrs. Julie Bringger, Jacksonville FDA Office - 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, Measurement of Half-Life Plus Waste Handling Exercise Demonstrating Use of Anti-Contamination Clothing and Robots	0.80	3.67
**Santa Fe Community College Principles of Physical Science Class - Dr. Angelo Ferrari - 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, Half-Life Measurements Plus Contamination Control Exercises Using Anti-Contamination Clothing and Robots	0.97	3.50

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Project and User	Type of Activity	Run Time Hours	Experiment Time Hours
Gator Engineering Outreach Program for At-Risk Minority Alachua County and Dade County 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	0.00	2.42
**Gainesville Trilogy School Science Students - Mrs. Erika Kisvarsanyi and Mr. Patrick Barry, Gainesville Trilogy School and Dr. R. DeSerio, University of Florida Physics Dept. - 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 and Use of Robots for Demonstration Purposes	0.95 (0.57)	6.50 (3.75)
**P.K. Yonge Laboratory School Science Students - Mr. Greg Dixon, P.K. Yonge High 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 and Use of Robots for Demonstration Purposes	0.57	3.50

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REACTOR SHARING PROGRAM
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(September 1995 - August 1996)

Project and User	Type of Activity	Run Time Hours	Experiment Time Hours
**Lincoln Middle School Science Students - Mrs. A. Smith, Lincoln Middle School - Reactor Sharing	Lecture, Tour and Demonstration 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 and Use of Robots for Demonstration Purposes	0.57	1.83
**Oak View Elementary School Science Students - Mrs. A. Smith, Lincoln Middle School - Reactor Sharing	Lecture, Tour and Demonstration 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 and Use of Robots for Demonstration Purposes	0.57 (0.57)	1.83 (1.83)
*NAA Research to Study Trace Elements in Canal Water Sediments in the Miami Area to Support Science Fair Project for Five Students - Mr. Mark Margolis, West Miami Middle School - Reactor Sharing	NAA Evaluation of Trace Element Content in Various Canal Water Sediments to Support Science Fair Project (M. Alvarez, N. Ronda, K. Lopez, et al.)	8.35 (0.50)	9.17 (0.58)

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Project and User	Type of Activity	Run Time	Experiment Time
		Hours	Hours
*NAA Research to Perform Trace Element Analysis of Various Brands and Types of Bread - Mrs. Renae Allen, Union County High School - Reactor Sharing	NAA Evaluation of Various Brands and Types of Commercial Bread Products to Evaluate and Quantify Trace Element Content for Health Considerations for Science Fair Project (Paul McMillan and Will Dukes)	8.00	12.67
*NAA Research to Perform Trace Element Analysis on Various Meat Samples - Mrs. Renae Allen, Union County High School - Reactor Sharing	NAA Evaluation of Trace Element Content of Various Kinds of Fresh Meat to Evaluate Variations in Trace Element Level for Health Purposes for Science Fair Project (Joel Cerdan and Chris Polhill)	7.73	16.25 (1.50)
***Nuclear Energy Project Support for Santa Fe Community College Student - W.G. Vernetson - Reactor Sharing	Walk-through Tour and Demonstration of Reactor and NAA Laboratory Facility Operations to Explain Capabilities and Usage for a Project on Uses of Nuclear Energy (Linda Means)	0.00	1.00
***Florida Foundation of Future Scientists 33rd 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	1.03	6.17

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Project and User	Type of Activity	Run Time Hours	Experiment Time Hours
**Deltona Christian School Science Students - Dr. Ralph Douglas and Mrs. Carolyn Johnson, Deltona Christian School - Reactor Sharing	Lecture, Tour and Demonstration of UFTR Operations with Radiation Surveys and Measurement of Radioactivity Plus NAA Exercise Demonstrating the Trace Element Analysis Technique Using the Rabbit System and PC-Based Analyzers to Analyze Hair Samples	0.58	2.83
***North Florida Counties High School Guidance Counselors - LaVay Lauter/Dr. W.G. Vernetson - Reactor Sharing	Two Lectures, Tours and Demonstrations of Reactor Facility Usage and Facility Capabilities for Guidance Counselors from North Florida High Schools	0.00	3.00
*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	4.05	5.59
***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	0.83	2.50

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Project and User	Type of Activity	Run Time Hours	Experiment Time Hours
** 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 Production of Radioisotopes	0.83	3.75
**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	1.17	4.33 (0.17)
**St. Patrick's School Science Students - Mrs. Esther Branch/Mrs. Jennie Jordan - 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	1.28	1.75 (0.17)
**Buchholz High School Physics Students - Ms. Marilyn Booher, Mr. John Hunt - 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	1.20	4.75

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Project and User	Type of Activity	Run Time Hours	Experiment Time Hours
**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 Previously Irradiated Hair Samples Using NAA Techniques Plus Contamination Control Exercises Using Anti-Contamination Clothing and Robots	0.00	9.33 (0.42)
***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	0.45	2.17
***Talent Identification High School Program - Dr. Bruce Smith, Punta Gorda High School - Reactor Sharing	Special Discussions of Reactor Operations, Use of Nuclear Fuel and Weapons to Support Class Project on Proliferation Control for Two Students	0.00	1.00
**ANS/HPS Student Conference - University of Tennessee - Mr. Glenn Litzenberger, Dr. W.G. Vernetson - 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 for University of Tennessee Attendees at Student Conference	0.65	1.92

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Project and User	Type of Activity	Run Time Hours	Experiment Time Hours
**Pensacola Junior College - Prof. Joseph M. Zayal, Physics Dept., Pensacola Junior College - Reactor Sharing	Lecture and Detailed Walk-through Tour of Reactor and NAA Laboratory Facilities to Discuss Usage and Capabilities Especially Multidisciplinary Applications	0.00	1.33
***Demonstration of Reactor Facility Operations for At-Risk Minority High School Science Students from Raines High School as Part of College of Engineering Outreach Program - Dr. J. Earle, University of Florida and Mrs. P. Mitchell, Raines High School - Reactor Sharing	Lecture, Tour and Demonstration of Reactor Operations and Facility Capabilities with Trace Element Analysis of Hair Sample 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	0.48	1.75
***Demonstration of Reactor Facility Operations for At-Risk Minority High School Science Students from Gadsden County High School as Part of College of Engineering Outreach Program - Dr. J. Earle, University of Florida and Mrs. P. Mitchell, Raines High School - Reactor Sharing	Lecture, Tour and Demonstration of Reactor Operations and Facility Capabilities with Trace Element Analysis of Hair Sample 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	0.83	2.92

TABLE 3

REACTOR SHARING PROGRAM
SUMMARY OF FACILITY UTILIZATION
(September 1995 - August 1996)

Project and User	Type of Activity	Run Time Hours	Experiment Time Hours
** 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 (Stuart Hoelle of Hillsborough High School and Chris Ramsey of Pine Ridge High School)	6.12 1.82	154.25 (72.58)
* 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	Extension of Summer 1995 Student Research Program - Evaluation and Quantification of the Trace Element Content of Different Sections of Various Routinely Consumed Vegetables for Use in Regional Science Fair (Jeffrey Gilliam)	8.50	10.33

TABLE 3
REACTOR SHARING PROGRAM
SUMMARY OF FACILITY UTILIZATION
(September 1995 - August 1996)

Project and 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 1996 Student Research Program - Evaluation and Quantification of the Elemental Changes in Various Types of Rice Following Cooking (Stuart Hoelle)	13.05 (5.50)	25.92 (12.50)
* Center for Precollegiate Education and Training Pine Ridge High School NAA Research on Trace Element Content of Treated Wood Products - Mrs. A. Rowe and Mrs. C. Coccia, Pine Ridge High School in Deltona, Dr. W.G. Vernetson, University of Florida - Reactor Sharing	Summer 1996 Student Research Program - Evaluation of Detectability and Quantification of Trace Elements in Treated Wood Products Due to Chemical Additives to Limit Insect Attack (Chris Ramsey)	10.50 (5.51)	17.67 (8.33)
***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) with Subsequent Facility Tours for a Number of Participants	0.00	6.58

TABLE 3
REACTOR SHARING PROGRAM
SUMMARY OF FACILITY UTILIZATION
(September 1995 - August 1996)

Project and User	Type of Activity	Run Time Hours	Experiment Time Hours
**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	2.75
***Demonstration of Reactor Facility Capabilities and Usage for Florida Community College at Jacksonville Science Students - Dr. R. Lee, Florida Community College at Jacksonville - Reactor Sharing	Series of 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 Hair Samples	0.33 (0.17)	3.50 (0.83)
TOTAL		531.01 (128.82)	3038.50 (782.92)
TOTAL ACTUAL		402.19	2255.58

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. Varnesone, Director
NUCLEAR REACTOR BUILDING
1 Ingraham, Florida 32611
Phone (904) 392-1429 - Telex 54330

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,

Max
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. I enjoyed it. I liked that color stuff.
Amanda McCallum

de
lum 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!

100
Sarah
Corbaugh

Thanks
for letting us
come to your
lab. I had
fun! Megan
111,

xxi
Thank You! " "
for Everything
Rosa Alston

for Thanks
fun had your time
Bethany T. a lot on

Mr. VERNETSON
Thank you for
showing us around
the Nuclear
Physics Lab. *Carla Magee* *Thank you*

**Ft. Clarke Middle School
8th Grade**

Very
thank you for
showing us around
the Nuclear
Physics Lab.
Carrie

maggie Ft. Clarke Middle School
8th Grade

thanks, it
was very
cool, and
very exciting
maggie I like that
cold stuff that
freeszes things
Love
Jen.

Dear Physics Lab

I had a lot of fun there. I liked the radiation detector the hair thing, and the arm. I liked that you could control the arm to pick up things in the radiation room. Thanks a lot, Mr. Mclennan, for everything. It was neat. Marianne

Mr. Venetow, (3)
Thanks for answering all
my weird questions and
letting me hold your things
that looked like a pen that you
held up to the light. From: (3)
Thanks for letting
us come to the
nuclear physics lab.
That liquid nitrogen
stuff was really
neat! (3)
the (3)
so! (3)

at the radiations
the hair sample.
Thanks for spending
your time w us.
© Brandi
K.

Thank You Mr. Vernetson and Associates Nuclear Physics Lab

Thank you
for going to
all that trouble.

John
Valdez

Mr. V
Thanks
for all
your time
K. HOLT
A
E
m
place

Thank you
Alyssa

THANK
YOU

~~STUDENT~~

Mike
Carter
thank
you

Shana
Carter
thank you!!!

Ft. Clarke Middle School
8th Grade

Thank You
Mr. Vernetson and
Associates
Nuclear Physics Lab

Thank you
for taking
the time

Stephanie
Shachorow

thanks for
taking us
to
the nuclear physics lab
and letting us see all
the cool stuff

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

I enjoyed it
so much

Thanks
for letting
us come

I enjoyed
the pression
station.
Reanna
Cardenas

I had a great
time. Especially playing
with that hard in
the room to pick up
the foam. Thanks

Sumantha G.

Thanks for letting
us come. I would
never coming back
to UG. The rest of
the class going.
Jennifer
Lumpkin



Thanks,
Sumantha

Thank you
for letting
us come

Thank you
for letting
us come

Ft. Clarke Middle School
8th Grade

Thanks for
about the game
playing the



7
Thank You
Mr. Vernetson and Associates
Nuclear Physics Lab

Thanks I had fun
Adam in the lab
Chelsie
Gordon

Thank you for your time
Stephanie O'Han

If was a blast

Terry Gabbert

It was great

Thanks
for your time!
MARY CUTSHALL
for your

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

robotic
@ 5+1 = Thanks,
unity Nicole
Elland
⑥ on ⑦

peace on Earth

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

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

Thanks! I really
like the liquid
nitrogen. Anna
Sine

Thanks!
Suzanne
Martin

**Ft. Clarke Middle School
8th Grade**

Thanks
Mckia Anchors

Thank You
Mr. Vernetson and
Associates
Nuclear Physics Lab

Thank you for having us.

Dax Lautner

I really liked the
liquid nitrogen

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

Justin Faccio

I liked the
robot arms.

Calm

Thank you
I enjoyed it.

Caren
Winn

Thanks for
a great
time
Kelley
Addis

Thanks for
letting us use
the robot arms

Thank You!!
Eric Clark

Thanks for working
with us.

Thank you
I really
liked the
liquid nitrogen

Yong
Duffy

Thanks
for letting
us use the
smokes

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 Hecht
Mr. Slick M.
Bob Barr
Clyde Afric
Oll Sanders*

I would like to thank you
for your invitation
to speak at your mother's
service.

I accept
with thanks.

Yours sincerely
Howard Dawson

Thank you
Howard Dawson

Thank you,
Tommy
Hempfield

Thank you
Howard Dawson

Thank you
Howard Dawson

Thank you,
Carol
Dawson

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

Thank you
for a enjoyable
time Janice Hart

I learned
a lot of new
things. Thank you.

Heather
Bump

Thank you for a wonderful
presentation. I look forward
to another visit. See you next!

Thank you, Janice
Hart

Mrs Cynthia Holloman
Newberry High School
P.O. Box 339
Newberry, SC 29108

THANKS



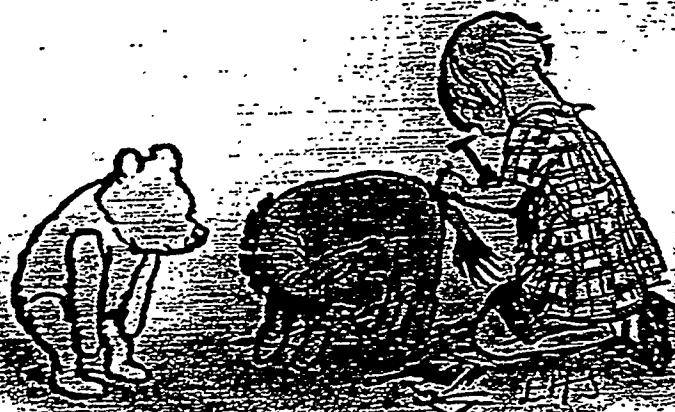
... A LOT!

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 sincerely,
a lot !

"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 fieldtrip. 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 Pierol
591-01-6937 (thought you might want to use it once again)

Mr. Vennetook,

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,
Dorell Kasey

RT 6 Box 300
Lake City

April 23, 1994

Dear Dr. Vernetson,

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

Thank you,

Rachel McCallon

Niagara Falls

Dr. Vernetson,

We made it safely to Canada! I toured the Niagara Falls and the botanical gardens Sunday. Both were breathtaking! Yesterday I went to the toronto Blue Jays vs Yankees baseball game. Toronto won 9-6. Today was judging day and I think I did fairly well. There are 120 projects in my division! Wish me

Good luck for

tomorrow's Awards night. Talk to you when I get home!

Teri
Thompson

June
1995



Dr. W. Vernetson
Dept. of Nuclear Eng. Sciences
202 Nuclear Sciences Center

University of Florida

Gainesville, FL

32611

Scenic over Horseshoe Fall

Published by R.C. Jain
44 Takwa Court
Niagara Falls, NY 14201

The Postcard Factory

Jan 18, 1957

Dear Dr. Vernetson,

I really appreciate you taking the time to talk to me. Seeing the reactor and learning how it worked was very helpful. Also, all the pamphlets and books you lent me helped me immensely.

Yours truly,

Julia Johnson



Buchholz

High School

5510 N.W. 27th Avenue, Gainesville, Florida 32606, Telephone (904) 336-2702

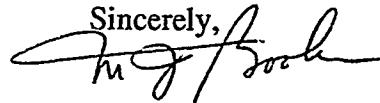
William G. Vernetson
Director of Nuclear Facilities
Department of Nuclear Engineering Sciences
University of Florida
Gainesville, Florida 32611

Dear Dr. Vernetson:

I hope you enjoyed having us as much as we enjoyed your hospitality. It's an invaluable opportunity for students to see that the real world is actually similar to the things they read about and hear in class. Your lecture and tour was very informative..

Please be assured it is my intent to take you up on your offer to return. Thanks again.

Sincerely,



Marilyn Booher
Buchholz High School

radioactive I had a horrible
nightmare. Thanks for letting
me be the banana lady. Alice Pharies. *By the way, I got TOXIC POISONING.*
THANK YOU
FROM
MS BOOHERS PHYSICS CLASS
PHYSICS IS PHUN...ESPECIALLY NUCLEAR PHYSICS



Thanks guys!
It was
BLAST
Michael

Thank you for that
"Radioactive" tour

Britt
Pearson

Thanks for the tour with
for the tour with

Bob
Brookins

Thank
it was GREAT.

Thanks!
Rose Riordan

Thank you
Brynn

Thanks
Candy

Thank you,
Ci-Bi

Thanks,

Mrs. Wren

Monica Courtney

Amanda Hoffer

Thank you

Shaynon

Baldwin

Thanks

Patrick

Stik

Thanks
Cynthia
Cinque
Ann

Thanks
Debra

Thanks
Angie Fairchild

Brian Fairchild

Thanks
Jen Fairchild

Thank you,

Lana

Bastwick

Michelle Harman
#7

Thanks!
Elizabeth Edwards

Adam
Brown

Thanks
Debra

Thanks
Angie Fairchild

Brian Fairchild

Thanks
Jen Fairchild

Thank you,

Lana

Bastwick

Thanks
Cynthia
Cinque
Ann

Thanks
Cynthia
Cinque
Ann