LAUR-15-24834

A Career At A National Laboratory

August L. Keksis

July 15, 2015

TAMU REU Career Day

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Overview

- Undergrad
- Grad
- Post-Doc
- Staff
- University vs National Laboratory Environments

- Overarching Themes
  - Networking (Co-workers, Meetings, Seminars …)
  - Documentation (CV, Reports, Presentations …)

Northern Arizona University (1995-2000)

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Undergraduate Education

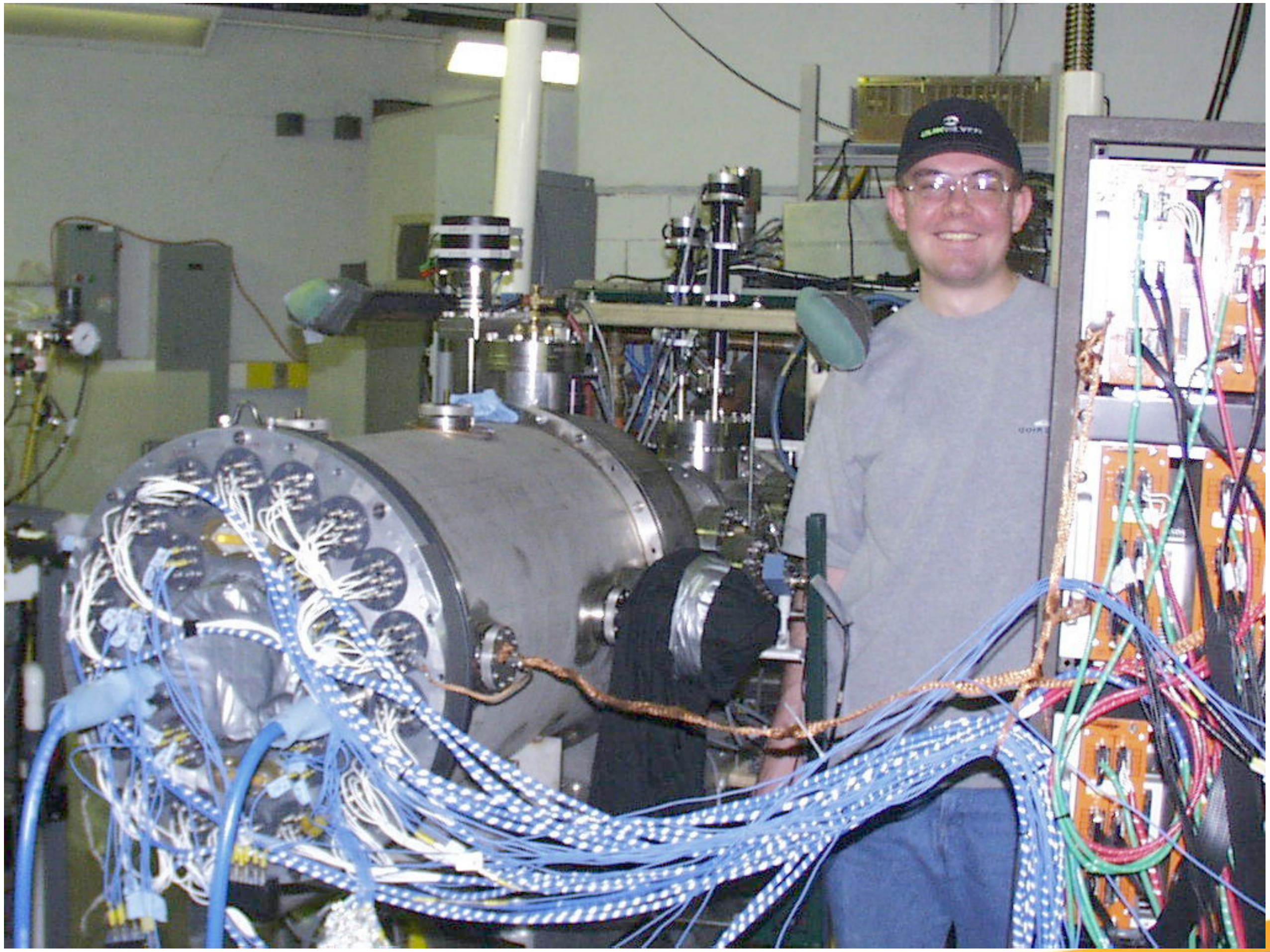
- 1995 – Entered as a Biology Major (Dr. English) & Chemistry Minor
- 1996 – Became a Dual Major
  - Biology
  - Chemistry (Certified by the ACS) – (Dr. Hartzell)
- 1998 – Added a Minor in Physics (Dr. Delinger)
- Undergraduate Research (Dr. Ketterer)
  - *Variations in the Isotopic Composition of Hafnium in Contaminated River Sediment*
  - ICP-MS
  - Funded through the Hopper Undergraduate Award Program

Graduate School

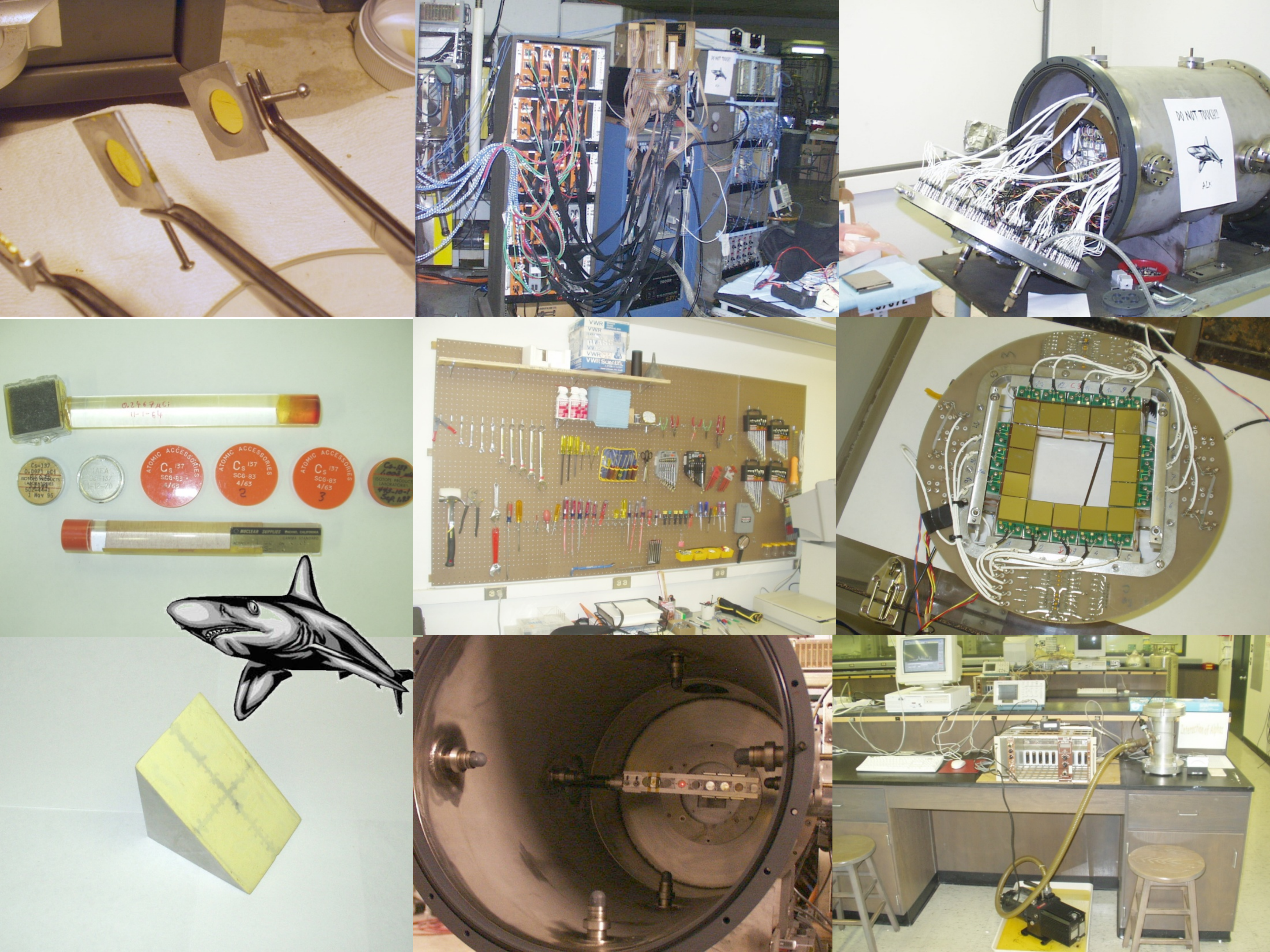
- University of California, Berkeley
- Texas A&M University
- Washington University, St. Louis
- Oregon State University
- University of Kentucky
- Clark University, Mass.

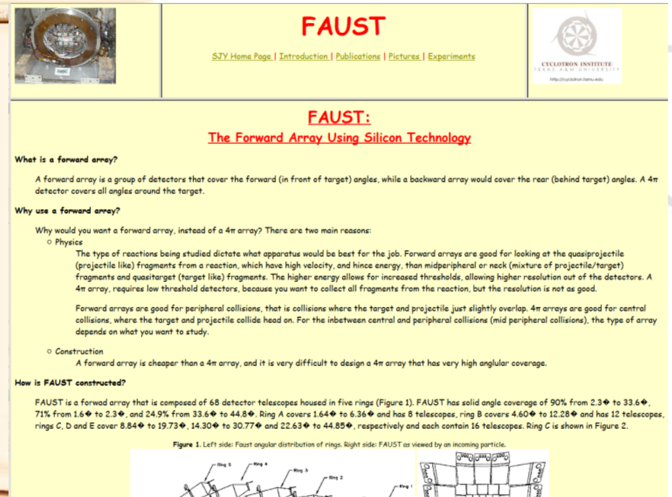
- Accepted to 4 / Tours / Decision

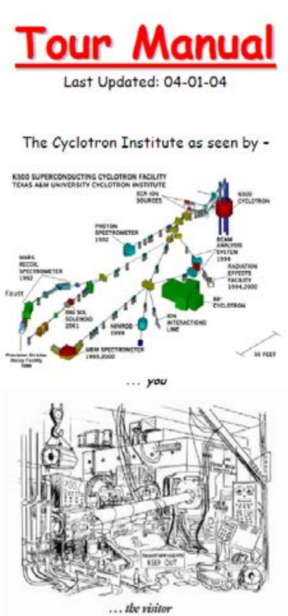
Texas A&M Cyclotron Institute (2000 – 2007)

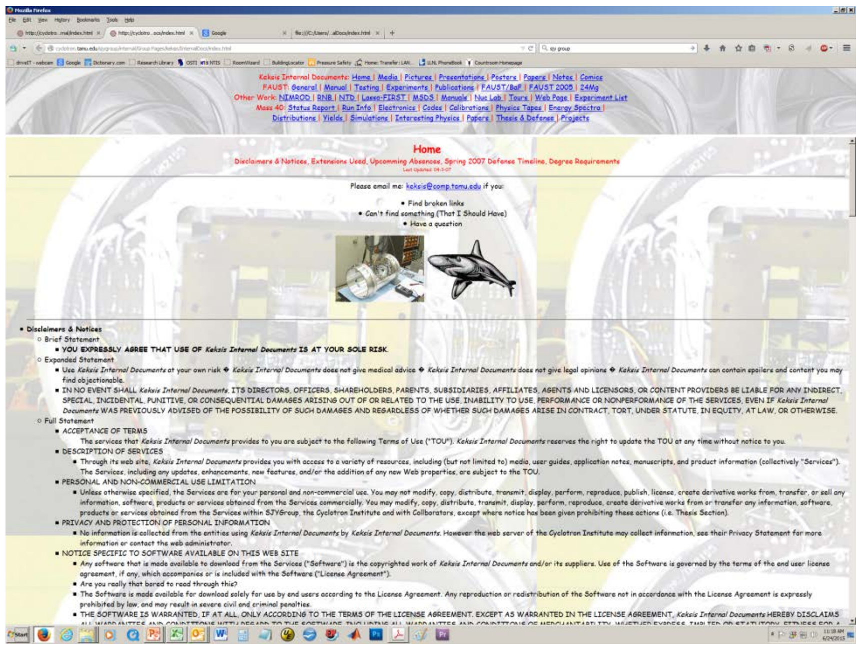


Sara, Sarah, Sherry, AJ, Gus, George,
Mike, Cass, Brian, Beth, Dinesh


DO NOT TOUCH!!
0.2467 µCi
11-1-64
Cs-137
0.0971 µCi
ISOTOPE PRODUCTS
LABORATORIES
1 Nov 95
IAEA
Cs-137
1-12-70
ATOMIC ACCESSORIES
Cs 137
SCG-83
4/63
ATOMIC ACCESSORIES
Cs 137
SCG-83
4/63
2
ATOMIC ACCESSORIES
Cs 137
SCG-83
4/63
3
NUCLEAR SUPPLIES
GAMMA STANDARD







N/Z EQUILIBRATION IN DEEP INELASTIC COLLISIONS AND THE FRAGMENTATION OF THE RESULTING QUASIPROJECTILES

A Dissertation

by

AUGUST LAWRENCE KEKSIS

Submitted to the Office of Graduate Studies of
Texas A&M University
in partial fulfillment of the requirements for the degree of

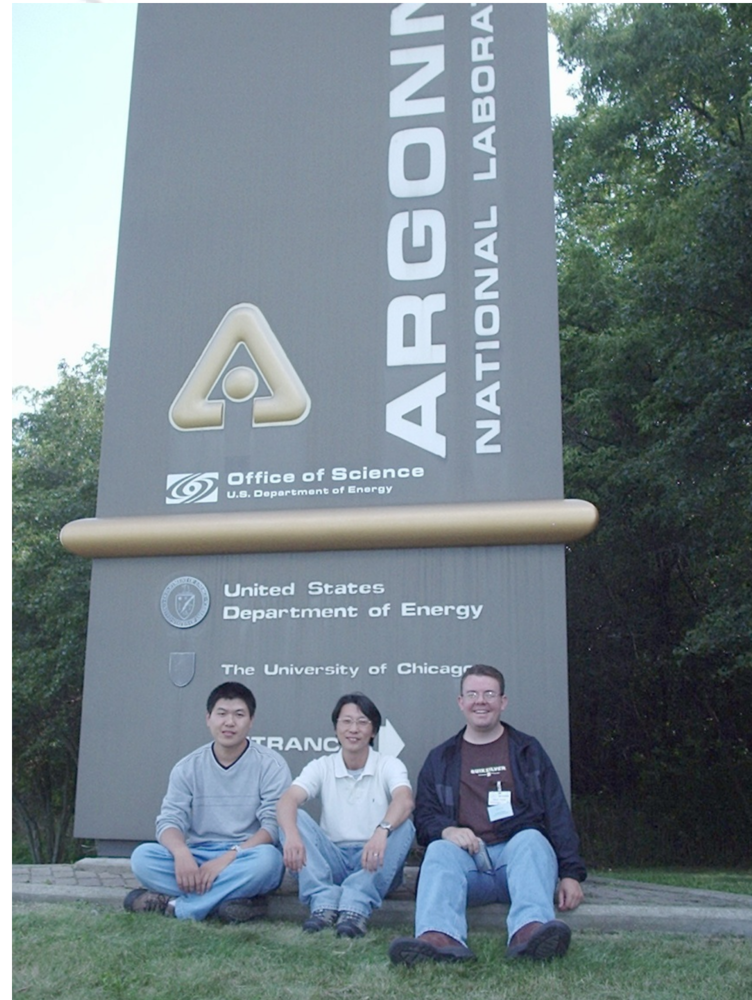
DOCTOR OF PHILOSOPHY

Approved by:

Chair of Committee,	Sherry J. Yennello
Committee Members,	Che-Ming Ko
	Rand L. Watson
	Joseph B. Natowitz
Head of Department,	David H. Russell

May 2007

Major Subject: Chemistry


ARGONN
NATIONAL LABORA
Office of Science
U.S. Department of Energy
United States
Department of Energy
The University of Chicag
TRANC

Travel / Schools

- RIA Summer School
- Gordon Conferences
- ACS Conferences
- APS Conferences
  - Career Fair
    - Los Alamos Table – Met with Staff Scientist
      - Interview / CV / Resume
      - Paul Passed around X-Division
      - Chuck (X-Division) and Dave (C-Division)
      - Paperwork / Training

Los Alamos

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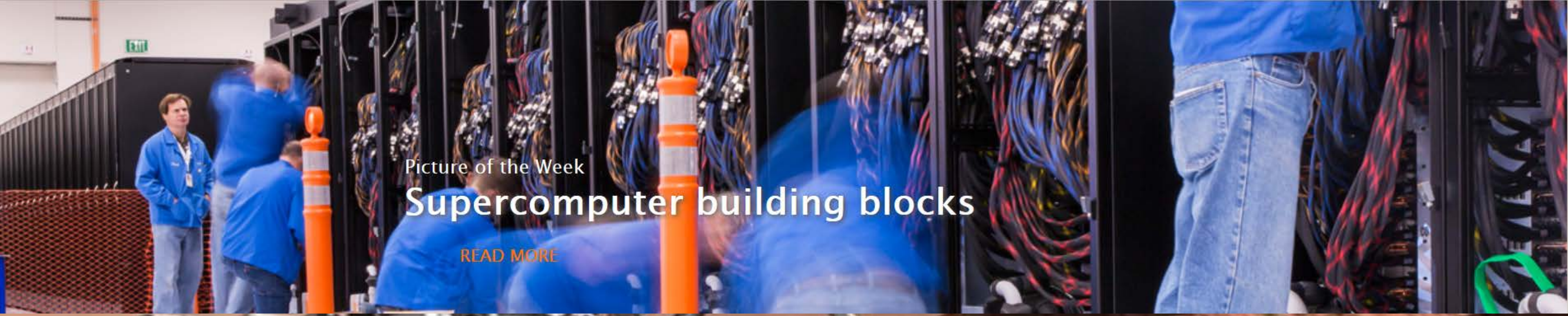
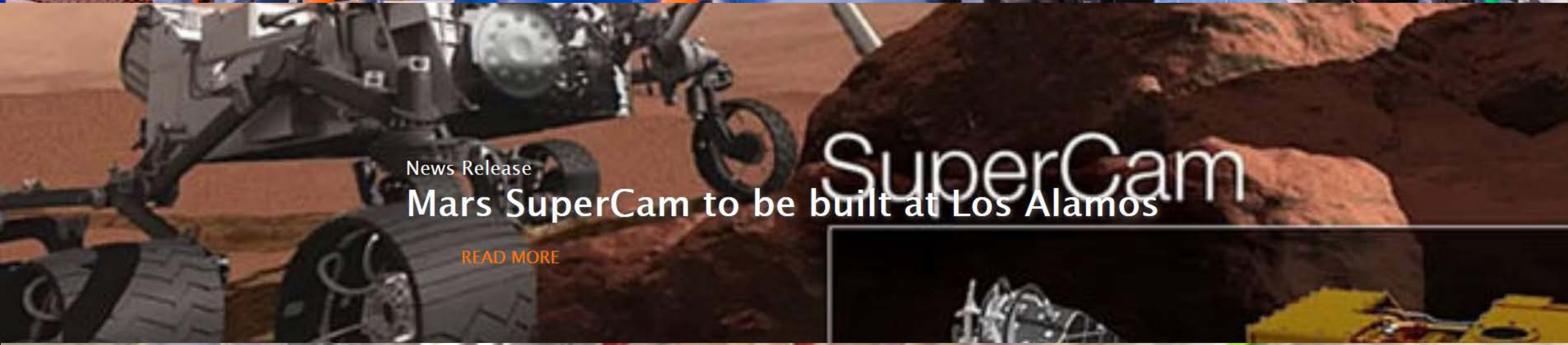
Los Alamos National Laboratory

- National Security Mission
  - Developing capabilities to meet the needs of U.S. national security
- Covers 40 square miles
  - 268 Miles of Roads, over 2000 facilities, 8 million ft^2 of buildings
- 10,199 Employees (FY14)
  - 953 Students, 365 Postdocs
- $2.1 Billion annual budget (FY14)
- Replacement Value: $9.8 Billion
- Owned by DOE NNSA
- Managed by Los Alamos National Security, LLC
  - University of California, Bechtel, Babcock & Wilcox Technical Services and URS Energy and Construction


Picture of the Week
Supercomputer building blocks
READ MORE


News Release
Mars SuperCam to be built at Los Alamos
SuperCam
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News Release
ATHENA: Surrogate human organs
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LANL Media

Webpage: http://www.lanl.gov/

Los Alamos National Laboratory

Delivering science and technology to protect our nation and promote world stability

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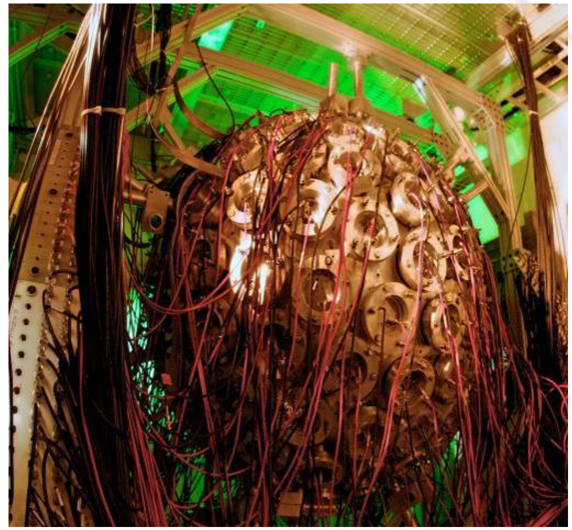
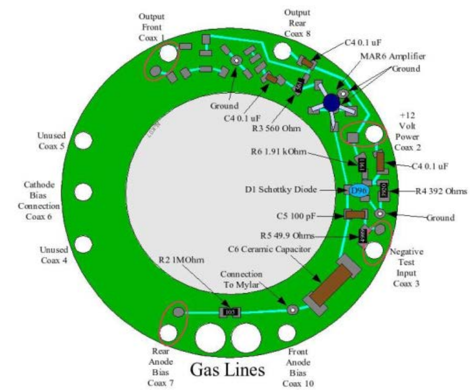
- http://www.flickr.com/photos/losalamosnatlab/
- https://itunes.apple.com/us/app/lanl-app/id647349599?mt=8
- http://www.youtube.com/user/LosAlamosNationalLab

Los Alamos National Laboratory Post-Doc (2007-2009)



Artists Rendition of
PPAC 2 – Mark 2: Single Stage



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Available online at www.sciencedirect.com

ScienceDirect

Nuclear Data Sheets 111 (2010) 2891–2922

Nuclear Data Sheets

www.elsevier.com/locate/nds

Los Alamos NATIONAL LABORATORY EST.1943

Fission Product Data Measured at Los Alamos for Fission Spectrum and Thermal Neutrons on ^{239}Pu, ^{235}U, ^{238}U

H.D. Selby,* M.R. Mac Innes, D.W. Barr, A.L. Keksis, R.A Meade, C.J. Burns, M.B. Chadwick, and T.C. Wallstrom

Los Alamos National Laboratory, Los Alamos, NM 87545, USA

(Received 30 June 30 2010; revised received 20 September 2010; accepted 1 October 2010)

We describe measurements of fission product data at Los Alamos that are important for determining the number of fissions that have occurred when neutrons are incident on plutonium and uranium isotopes. The fission-spectrum measurements were made using a fission chamber designed by the National Institute for Standards and Technology (NIST) in the BIG TEN critical assembly, as part of the Inter-laboratory Liquid Metal Fast Breeder Reactor (LMFBR) Reaction Rate (ILRR) collaboration. The thermal measurements were made at Los Alamos' Omega West Reactor. A related set of measurements were made of fission-product ratios (so-called R-values) in neutron environments provided by a number of Los Alamos critical assemblies that range from having average energies causing fission of 400–600 keV (BIG TEN and the outer regions of the Flattop-25 assembly) to higher energies (1.4–1.9 MeV) in the Jezebel, and in the central regions of the Flattop-25 and Flattop-Pu, critical assemblies. From these data we determine ratios of fission product yields in different fuel and neutron environments (Q-values) and fission product yields in fission spectrum neutron environments for ^{99}Mo, ^{95}Zr, ^{137}Cs, ^{140}Ba, ^{141,143}Ce, and ^{147}Nd. Modest incident-energy dependence exists for the ^{147}Nd fission product yield; this is discussed in the context of models for fission that include thermal and dynamical effects. The fission product data agree with measurements by Maeck and other authors using mass-spectrometry methods, and with the ILRR collaboration results that used gamma spectroscopy for quantifying fission products. We note that the measurements also contradict earlier 1950s historical Los Alamos estimates by ∼5–7%, most likely owing to self-shielding corrections not made in the early thermal measurements. Our experimental results provide a confirmation of the England-Rider ENDF/B-VI evaluated fission-spectrum fission product yields that were carried over to the ENDF/B-VII.0 library, except for ^{99}Mo where the present results are about 4%-relative higher for neutrons incident on ^{239}Pu and ^{235}U. Additionally, our results illustrate the importance of representing the incident energy dependence of fission product yields over the fast neutron energy range for high-accuracy work, for example the ^{147}Nd from neutron reactions on plutonium. An upgrade to the ENDF library, for ENDF/B-VII.1, based on these and other data, is described in a companion paper to this work.

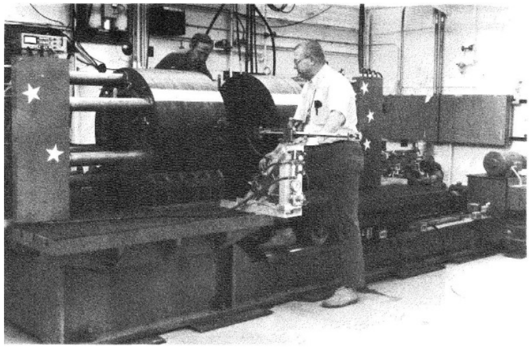
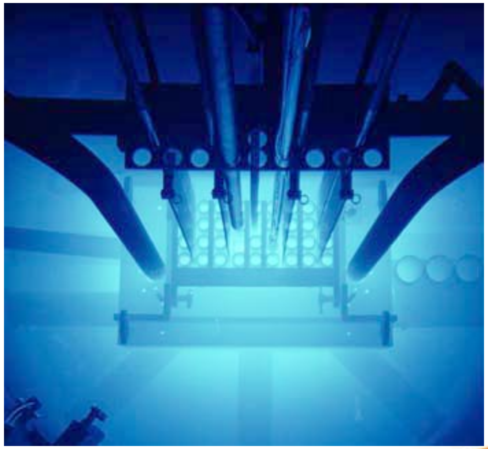


Fig. 30.
Big Ten, the all-uranium-metal assembly with core averaging 10% uranium-235. Behind is Gordon Hansen of Group Q-14, and in foreground is Jerry Koelling who left to join Group WX-8.



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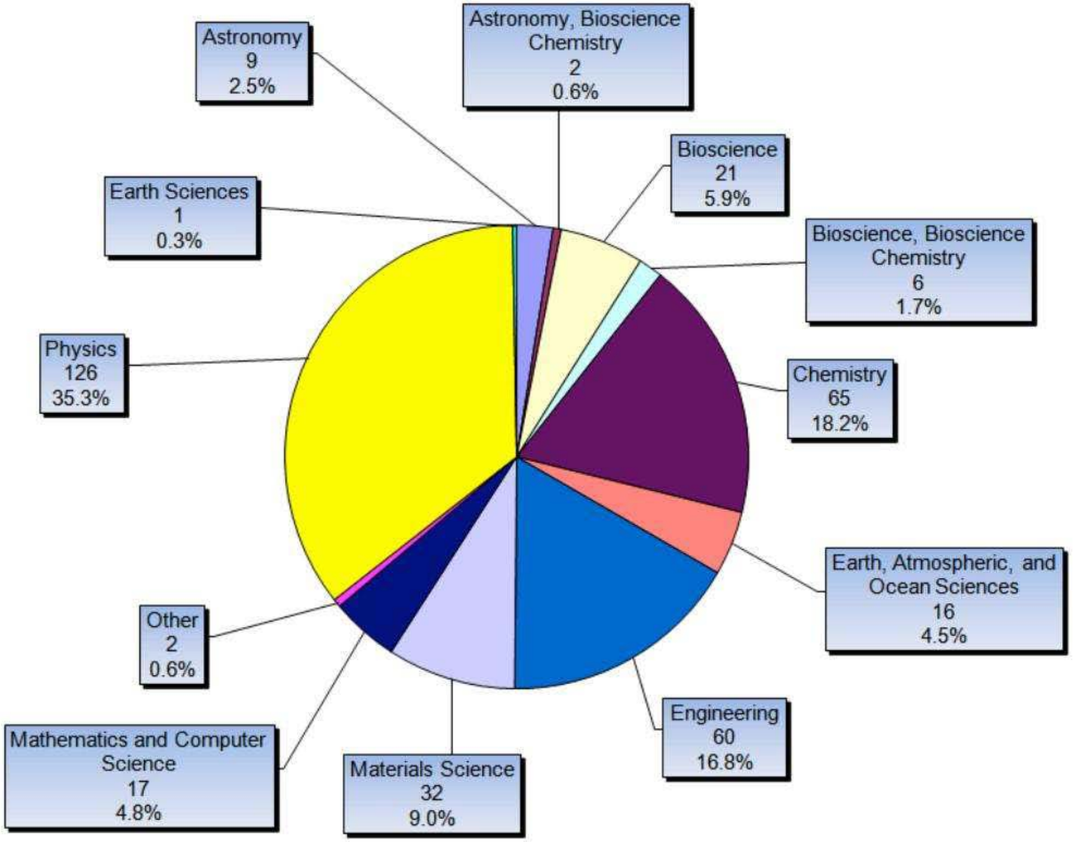
Postdoc Information

- ~365 Postdocs at LANL
- Salary start at $73k, based on years since PhD.
  - Comprehensive Benefits Package (Health, Vision, Dental, 401k plus matching, …)
- Temporary Position Usually 2-3 years
  - Find another job – Job Fairs
  - Go through Conversion Process to become a Staff Member
    - 25% of all Staff were formerly postdocs or students
    - 52% of new hires were formerly students/postdocs

~ Postdoc Composition



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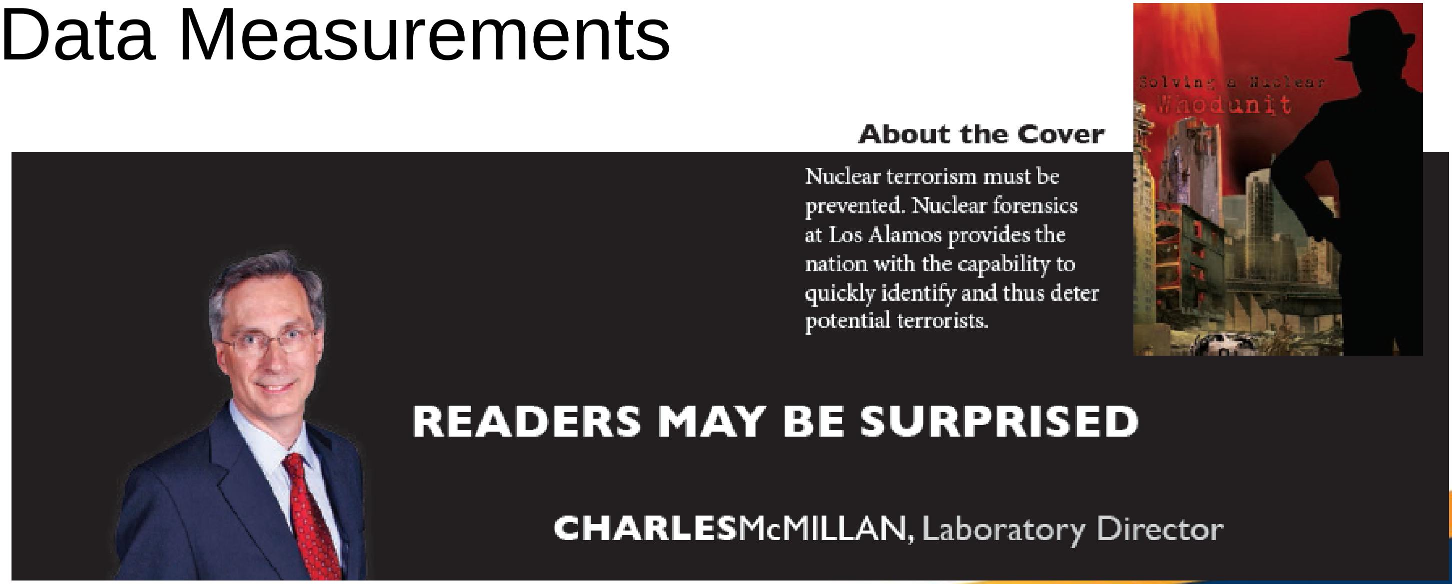
LAPA – Los Alamos Post Doc Association

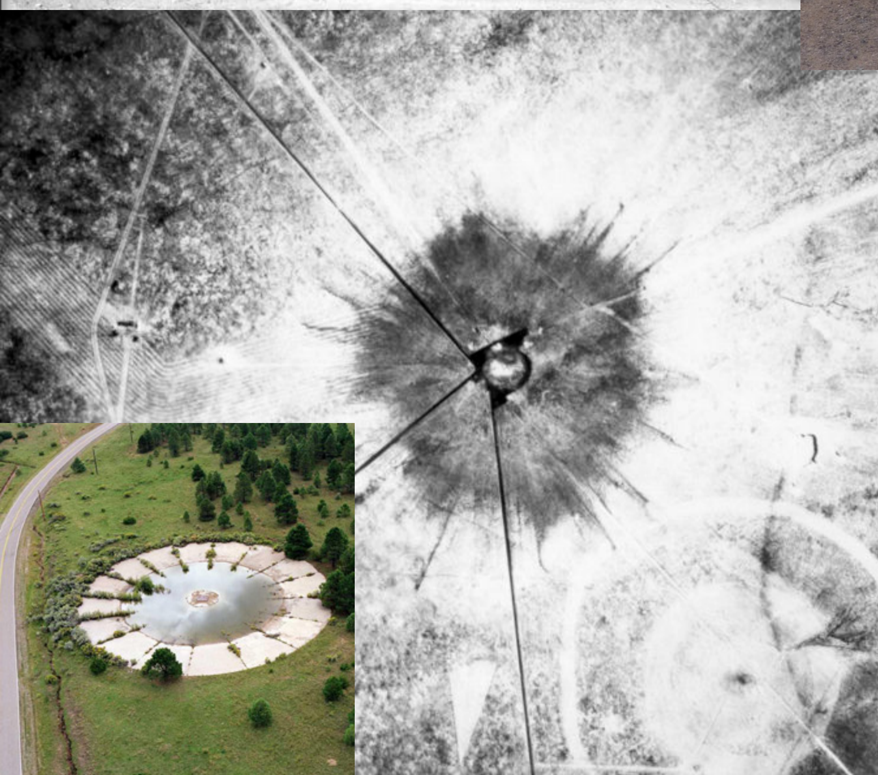
Los Alamos National Laboratory Staff Scientist (2009-Date)

- Historical Archiving
- Stockpile Stewardship
- Nuclear Forensics
- Nuclear Data Measurements

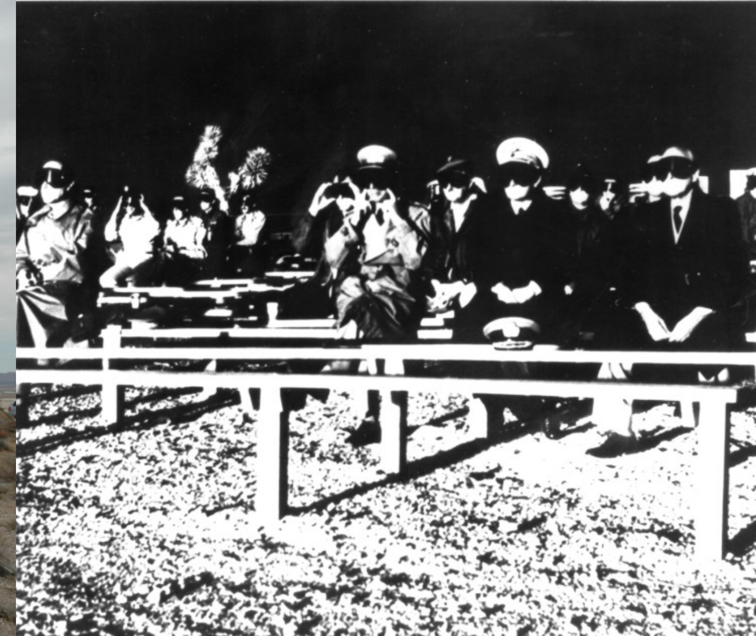


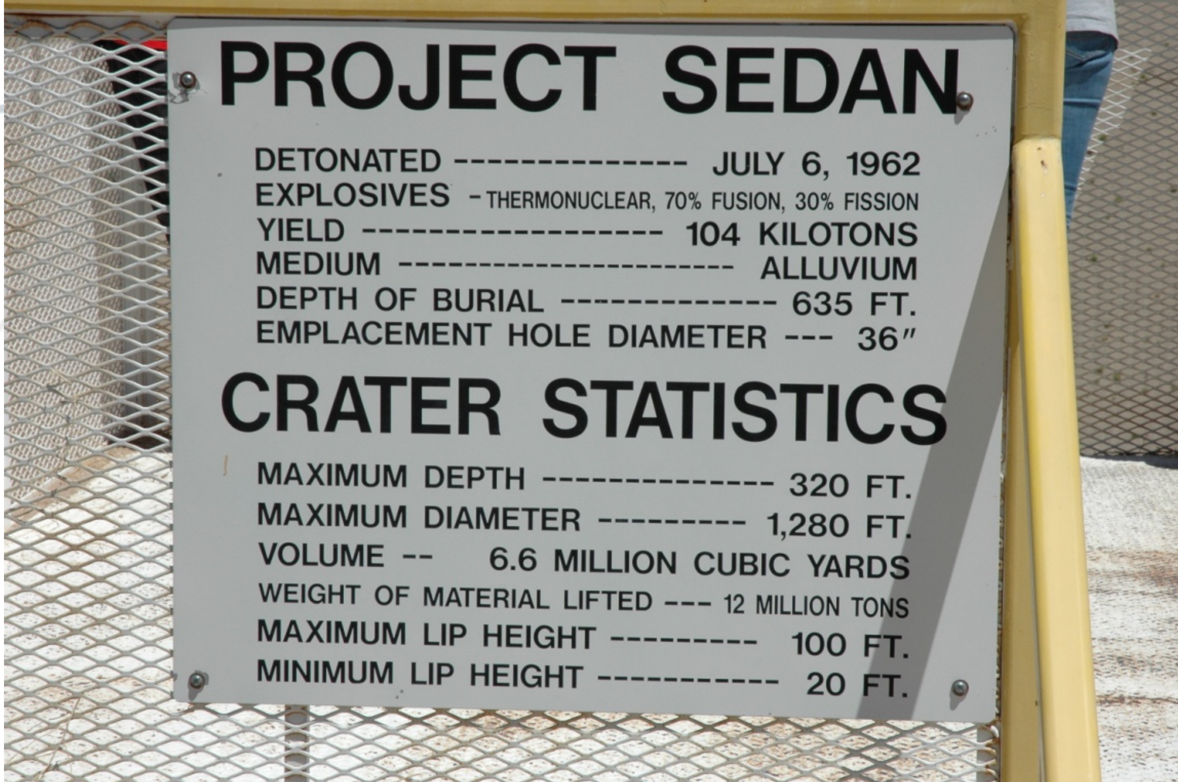

TR 25.


TRINITY SITE




TR-96



Los Alamos
NATIONAL LABORATORY
EST. 1943

C-NR: Nuclear & Radiochemistry

Felicia Taw, Group Leader
Richard Oldenborg, Deputy Group Leader

Liza Velasquez (Administration)
Ashlee Rendon (Administration)

Nan Watts (PM)

Nuclear Chemistry

Todd Bredeweg, TL

Bayar Baramsai^
Beau Barker^
Evelyn Bond
Jennifer Braley*
Jaimie Daum+
Matthew Gooden^
Marian Jandel
Michael Koehl+
Audrey Roman^
Robert Rundberg
Gencho Rusev
Rebecca Springs+
David Vieira*
Carrie Walker^
Jerry Wilhelmy*
Xinxin Zhao

Radiochemistry

Warren Oldham, TL

Jennifer Berger
Scott Bowen
Michael Cisneros
Susan Hanson
Jeffrey Miller
Angela Olson
Susan Pacheco

Countroom

Donald Dry, TL

Jose Cordova
David Finnegan
Malcolm Fowler*
Michael Gallegos
Lisa Hudston
Kevin Jackman
Michelle Mosby^
Mark Smith
Katelyn Narum+
Randy Rendon
Jennifer Romero
Patti Wills

Assessment

William Inkret, TL

Sydney Andrews+
Alex Gancarz*
Gus Keksis
Amy Lee
Bret Lockhart
Michael MacInnes*
Bill McKerley*
Roger Meade*
Michael Murrell*
John Musgrave
Serena Rodriguez
Mario Schillaci*
Hugh Selb
Nicholas Travia^
Christopher Waidmann

Clean Chemistry

Robert Steiner, TL

Patrick Foy
Richard Hervig*
Dale Melton
Arthur Montoya
Danielle Roybal
Gilbert Sosaya
Joseph Sullivan
Beverly Williams+

Spectroscopy
Marianne Wilkerson, FLM
William Mullen+
Alison Tamasi+
Nicholas Wozniak+
Sandra Zerkle+

ICP-MS
William Kinman, FLM
Gerald Alfano
Sharon Baldwin
Chloe Bonamici^
Annelise Cardon+
Rebecca Foley
Michael Harris
Anthony Pollington^

Stable Isotopes
David Podlesak, FLM
Rachel Huber^
Ronald Amato

SF Mass Spectrometry
Robert Steiner, FLM
Steven Goldstein
Kimberly Hinrichs
Andrew Nunn

Radiochemistry
Fred Roensch, FLM
Julianna Baca
Paula Cisneros
Camilla Lance
Lynn Miller
Morgan Schake+
Emily Schmidt

TIMS
Jeffrey Roach, FLM
Carol Hughes
Kimberly Israel
Azim Kara
Dennis Lopez

**Affiliate, Guest Scientist, etc.*
+Students
^Postdocs

March 30, 2015

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TA-48

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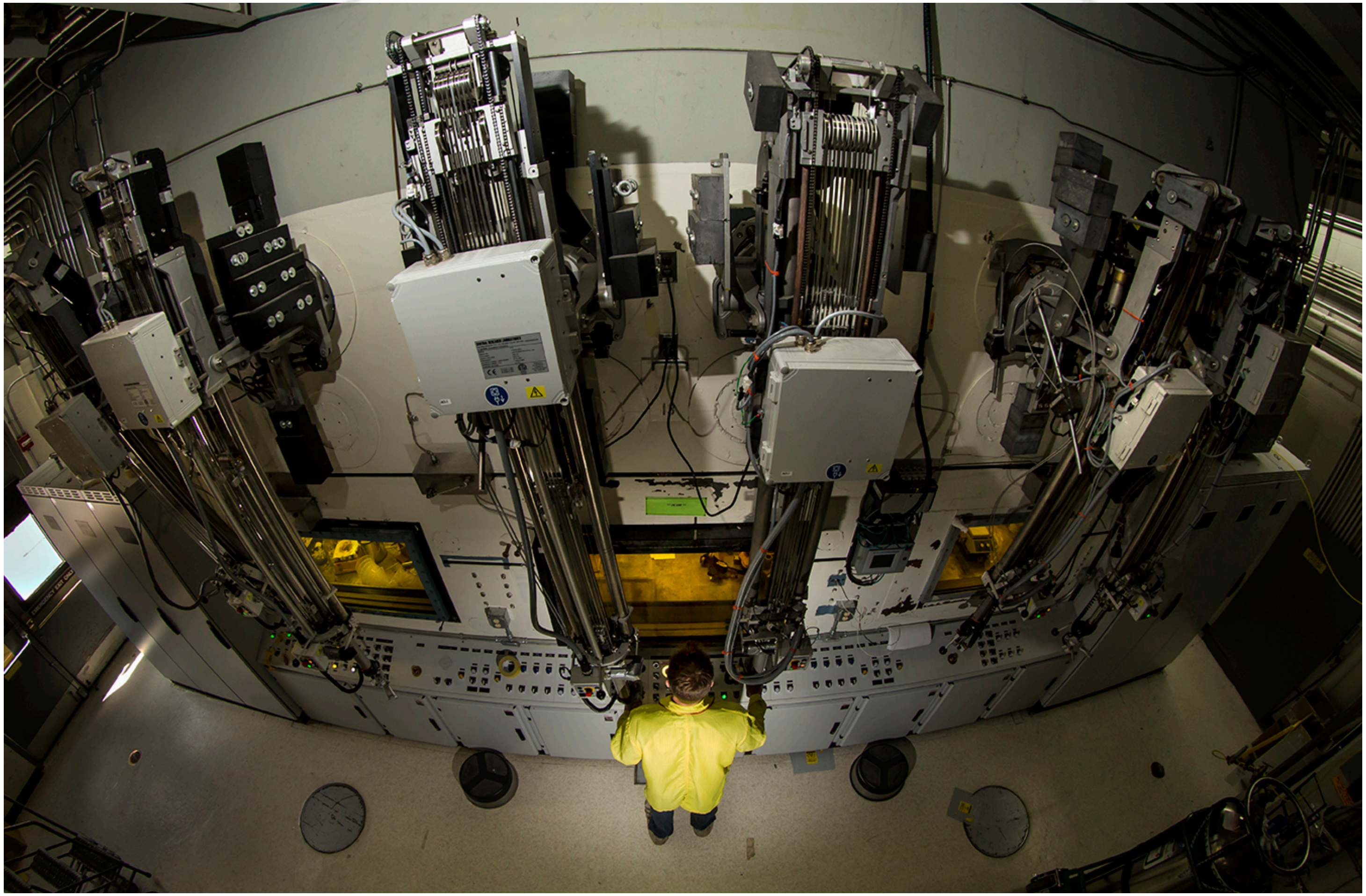
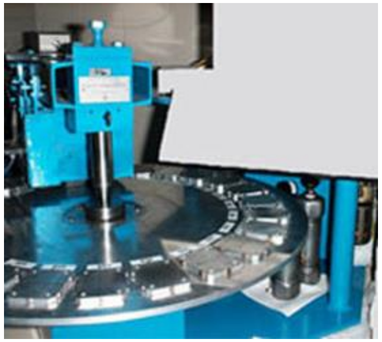
Hot Cells – Medical Isotopes



Rb-82 from the parent Sr-82

Countroom

- 7000 sq. ft.
- 24/7/365
- ~ 70,000 Measurements Annually
  - Medical Isotopes, Separation Chemistry, Pu Bioassay, Environmental Monitoring, National Security Programs
- 50+ HPGe Detectors
  - 1 has been in continuous operation since 1978
- 15 Beta Counters
- 100 Alpha Counters
- 5 NaI(Tl) Detectors
- Low Backgrounds, Highly Calibrated

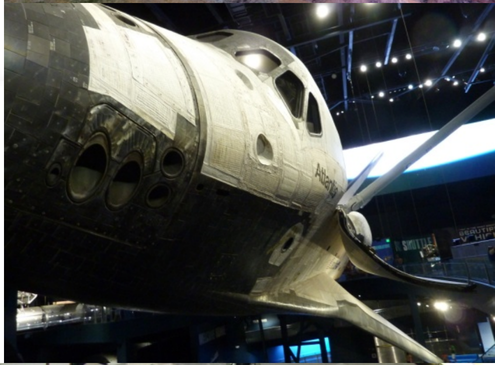
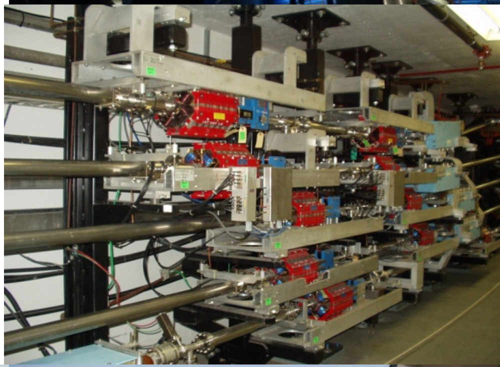


Travel

- London, UK
- Paris, France
- Washington DC
- Florida, Nevada, California, Tennessee, New Hampshire, Virginia, …







1,700+ Cultural Sites

Aerial View of Tsirege

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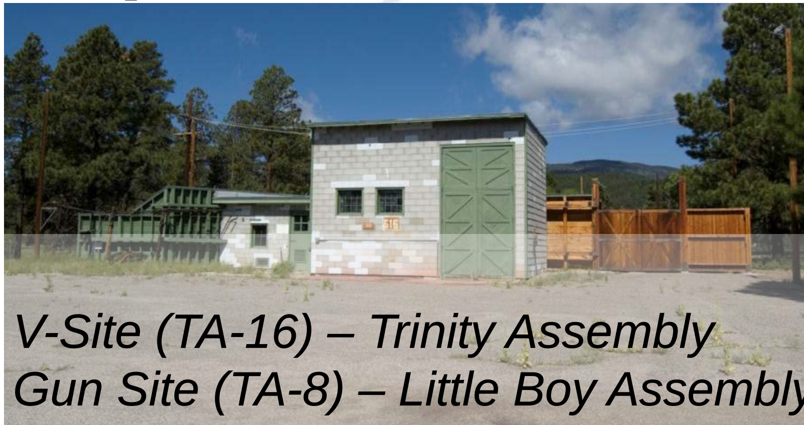
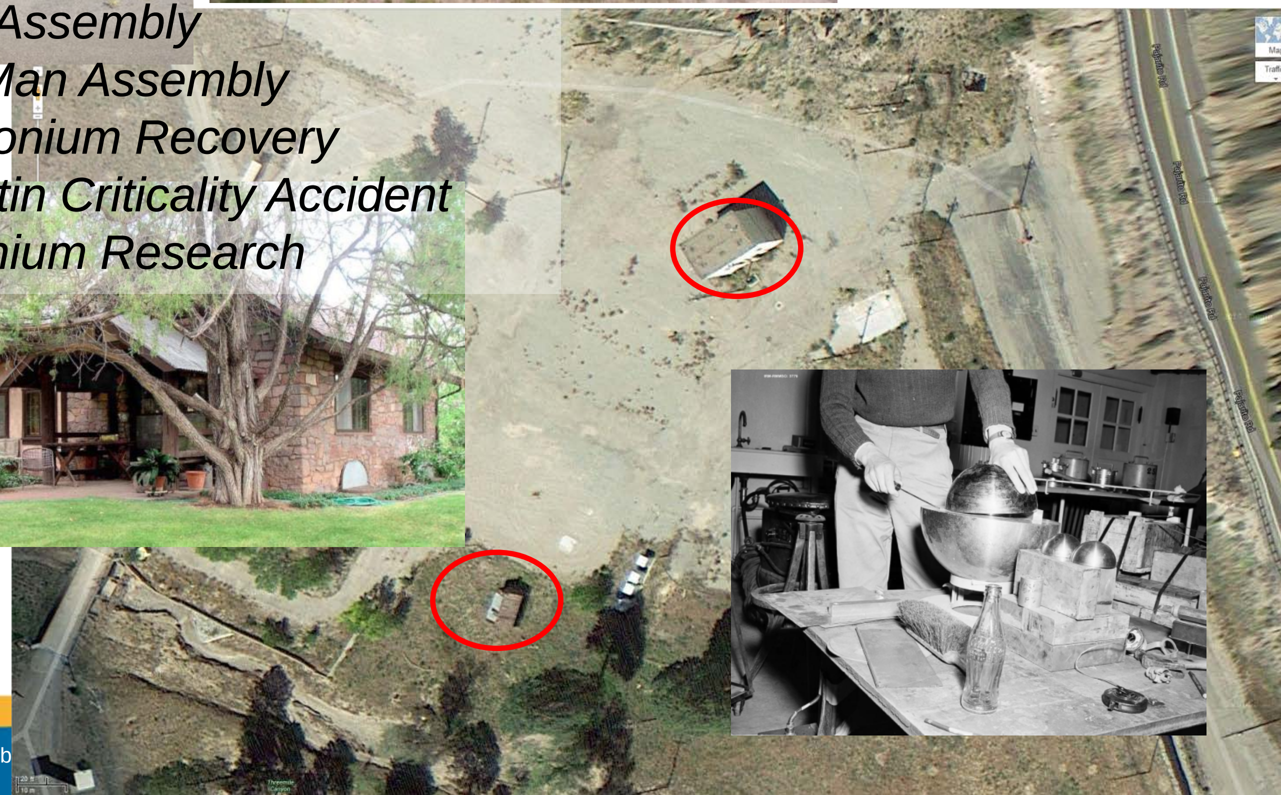
Manhattan Project Sites (MED National Park – In The Works)



V-Site (TA-16) – Trinity Assembly
Gun Site (TA-8) – Little Boy Assembly
Quonset Hut (TA-22) – Fat Man Assembly
Concrete Bowl (TA-6) – Plutonium Recovery
Slotin Building (TA-18) – Slotin Criticality Accident
Pond Cabin (TA-18) – Plutonium Research



Activities

- Bandelier National Monument
- Bradbury Museum
- Pajarito Ski Area
- World's Highest Altitude Olympic Size Swimming Pool
- Running, Bicycling, Camping, Rafting, Outdoor Activities
- Santa Fe (State Capitol) ~ 50 Minutes
- Albuquerque ~ 90 Minutes

Differences between University & National Lab Environment

- Training – ½ Day every month, 2 Weeks initially
- Rules & Regulations
- Processes / Procedures
  - Publications / Presentations LAUR-15-24834
    - Reviewed / Process – 3 to 7 working days
  - Testing Detectors in a Vacuum Chamber
    - TAMU ~ 2 Weeks
    - LANL ~ 6 Months
      - IWD – Integrated Work Document
      - Purchasing / Counterfeit Check
      - Assembling the right people

Handling Cf-252 Fixed Sources in RC-17 at TA-48

IWD – PART 1 (Activity Specific Information)

IWD#: IWD-RC17-0007 Revision#: 0.0 **Work Document #: (work order #)**			**Activity/Task Title: Handling Cf-252 Fixed Sources in RC-17 at TA-48**
TA: 48	**Building: RC-17**	**Room: 100-A**	**Additional Location Description: NA**

Work Tasks/Steps Identify work steps/tasks in sequence when such sequencing contributes to safety, security, and/or environmental protection. These may be limited to basic steps if an independent Work Instruction Documet is to be developed.	**Hazards, Concerns, and Potential Accidents/Incidents** Identify both activity and work-area hazards for each task/step.	**Controls, Preventive Measures, and Bounding Conditions** Specify preventive measures, controls for each hazard (e.g., lockout/tagout points, specific PPE, TIDs, alarms, safes, recycle, waste minimization)	**Reference Documents** List permits, operating manuals, security plans, and other reference procedures.	**Training** List training and qualification requirements.
All Tasks	TA-48 RC-17 emergencies After hours and weekend work Radiological contamination of personnel or equipment due to breach of source windows or leakage.	Personnel must be aware of the evacuation plan, lights and signals used in RC-17 and TA-48. Personnel must be aware of C-NR policies, especially after-hours and weekends. Installation and removal of Cf-252 sources are not allowed after hours or weekends, unless special permission has been given by the C-NR Group Leader. The thin windows of the source are the protective barrier that keep the Cf-252 material contained. Care must be exercised to protect the windows during handling and mounting.	C-INC-POL-1001: Unattended Operations Posting Policy C-NR-POL-1000 R2.0: Working Alone Policy PRO-C-DO-007.R3: Radioactive Material Inventory Control at RC-1 PRO-C-DO-008 R.5: TA-48 Radioactive Material Handling	TP 115 - Radiological Worker II TP 4138 – Rad Sealed Source Custodian/User TP 5875: MCFO TA-48 RC-1 Complex TP 6113: RC-1 Radioactive Inventory Control TP 6351: C-NR General Worker Lab Policies TP 6957: IWM Worker Training Requirements

Detector and Equipment Testing and Development in RC-17 at TA-48

Los Alamos NATIONAL LABORATORY EST.1943

IWD – PART 1 (Activity Specific Information)

IWD#:	IWD-RC17-0008	**JHA Validation #**	N/A	**Part I Development Participants:** August Keksis, Dave Vieira, Todd Bredeweg, Bob Rundberg, Xinxin Zhou, Marian Jandel
Revision#:	0.0	**Hazard Analysis Documentation**	What-If Matrix Attached	
Activity/Task Title:	Detector and Equipment Testing and Development in RC-17 at TA-48			
TA: 48	**Building:** RC-17	**Room:** 100-A	**Additional Location Description:** NA	

Activity Description/Overview

This document describes work associated with detector and equipment testing and development in RC-17 at TA-48. Detectors and equipment will be built and tested in room 100-A. There is a vacuum chamber for detector testing, which requires rigging and Engine Hoist to lift the lid – this is handled in a separate IWD (IWD-RC17-0009). Low activity (<10μCi) beta and gamma sources (such as Ru-106, Co-60, Y-88, and Na-22) will be used along with low activity fixed alpha and fission sources (such as Th-228, Th-230, and Cf-252). The Cf-252 fission source is covered in a separate IWD (IWD-RC17-0007), due to its fragile window.

No classified work is involved.

This IWD took assorted tasks (based on the scope of this IWD) from the following IWDs:
LANSCE-NS-26 – Flight Path 1FP14 (DANCE) Neutron Beam Experiments at LANSCE/Lujan Center
LANSCE-NS-34 – Use of alpha, beta, gamma emitting samples at DANCE
LANSCE-NS-39 – Testing and operation of the PPAC fission-tagging detector with actinide targets at DANCE
as well as certain tasks from the RC-1 Countroom IWDs, Xinxin Zhou's IWDs and Marianne Wilkerson's IWDs.

List Names of Hazard Analysis (HA) Team: August Keksis, Todd Bredeweg, Dave Vieira, Xinxin Zhou and Bob Rundberg **Date HA Performed:** April 29, 2008

Work Tasks/Steps Identify work steps/tasks in sequence when such sequencing contributes to safety, security, and/or environmental protection.	**Hazards, Concerns, and Potential Accidents/Incidents** Identify both activity and work-area hazards for each task/step.	**Controls, Preventive Measures, and Bounding Conditions** Specify preventive measures, controls for each hazard (e.g., lockout/tagout points, specific PPE, TIDs, alarms, safes, recycle, waste minimization)	**Reference Documents** List permits, operating manuals, security plans, and other reference procedures.	**Training** List training and qualification requirements.
All Tasks		Personnel must be aware of the evacuation plan, lights and signals used in RC-17 and TA-48. Personnel must be aware of C-NR policies, especially after-hours and weekends. Follow postings directions before intering the lab. PPE: Must wear TLD and Safety Glasses with side-shields while in lab	C-INC-POL-1001: Unattended Operations Posting Policy C-NR-POL-1000 R2.0: Working Alone Policy HCP-C-INC-001: General Laboratory, Office and Field Operations	TP 115 Radiological Worker II TP 5875: MCFO TA-48 RC-1 Complex TP 6351: C-NR General Worker Lab Policies TP 6957: IWM Worker Training Requirements

UNCLASSIFIED

Using the Ruger RC-1000S engine hoist at TA-48

IWD – PART 1 (Activity Specific Information)

IWD#:	IWD-RC17-0009	**JHA Validation #**	N/A	**Part I Development Participants:** Richard Johnson, August Keksis, Russ Gritzo, Todd Bredeweg, Dave Vieira
Revision#:	0.0	**Hazard Analysis Documentation**	What-If Matrix Attached	
Activity/Task Title:	Using the Ruger RC-1000S engine hoist at TA-48			
TA: 48	**Building:** RC-17	**Room:** 100-A	**Additional Location Description:** All of TA-48	

Activity Description/Overview

This IWD covers the use of the Ruger RC-1000S engine hoist at TA-48. The hoist will be used in RC-17 for opening and closing a chamber lid as well as in multiple locations in RC-1 for moving shielding and detectors. Anyone who uses the hoist must have incidental crane operator training (TP 122) and be wearing steel toed shoes (which can be ordered through the group office) and leather gloves. As always read the entry requirements and wear the appropriate PPE for the location where the hoist will be used (i.e. in RC-17 saftey glasses are required in the lab). Also the hoist must be within the annual preventative maintenance inspection, which is shown by a sticker on the hoist. All rigging must be inspected before use and then the object that will be lifted should be lifted 1" to check the stability of the rigging and alignment of the load. Check the path that the hoist will traverse for obstacles then proceed with the lift and move. If at any time a question arises contact the PIC for information. Only weights upto 750 pounds are allowed under this IWD. Most objects have their weights listed/stamped on them. If unsure of a weight attain a rigging scale to measure, but only lift up to 750 pounds.

Before using the hoist a Preoperational Inspection Record for Overhead Cranes and Hoists (Form 1489 – 7/08 Version) must be filled out. Also each month a Monthly Inspection Record For Manually Lever-Operated Hoists (Form 1592 – 4/93 Version) needs to be filled out.

Restrictions: NO CRITICAL LIFTS ALLOWED: A critical lift is lifting a wieght greater than 75% of the manufacturers rated capacity, so for the Ruger RC-1000S, which has a rated capacity of 1000 pounds means that only weights less than 750 pounds are allowed to be lifted. Critical lifts are also defined by using two or more cranes, having a person being hoisted, any lift where there is a possibility of contacting an energized power line, any lift that is in close proximity to critical or expensive items which could be damaged and when the item being lifted requires special care because of weight, size, asymmetry, center of gravity, installation tolerances or other unusual factors. All of the activities listed in the previous sentence are forbidden under this IWD.

List Names of Hazard Analysis (HA) Team: August Keksis, Todd Bredeweg, Marian Jandel, Dave Vieira **Date HA Performed: July 30, 2008**

Work Tasks/Steps Identify work steps/tasks in sequence when such sequencing contributes to safety, security, and/or environmental protection.	**Hazards, Concerns, and Potential Accidents/Incidents** Identify both activity and work-area hazards for each task/step.	**Controls, Preventive Measures, and Bounding Conditions** Specify preventive measures, controls for each hazard (e.g., lockout/tagout points, specific PPE, TIDs, alarms, safes, recycle, waste minimization)	**Reference Documents** List permits, operating manuals, security plans, and other reference procedures.	**Training** List training and qualification requirements.
Task 1. Review site specific hazards for TA-48 (pre-job briefing)	Site specific hazards are listed on the form 2102 (part 2 of the IWD). Area specific hazards.	Follow instructions for hazards on the form 2102 (part 2 of the IWD). Site specific training and C-Division specific training are required. Follow all posting that are in the area where hoisting operations are taking place.	ES&H Form 2102.	TP 5875: TA48 General Training TP 6351: C-INC General Worker Lab Policies TP 6957: IWM Worker Training Requirements TP 6113: RC-1 Radiological Inventory Control

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Summary – Overarching Themes

- Networking
  - Interact with folks
  - LinkedIn, Business Cards, Resumes
  - APS has a CV database, Many labs have CV databases
  - Go to meetings, summer schools, lectures
  - New Ideas, New People

- Documentation
  - CV – Update Yearly
    - What have you done? Training, Work, Coding, Volunteering, Memberships
    - This is where you can pull specific information for a resume to a specific job application
  - Reports, Presentations
    - This is how people typically first interact with you
    - Quality

Digital Files on History of LANL

- LALP-95-2-6&7. Dateline Los Alamos – LANL A Proud Past and Exciting Future.
- LASL-79-78. Los Alamos 1943-1945 – The Beginning of an Era.
- DOE/MA-0002. The Manhattan Project – Making the Atomic Bomb.
- Science in the National Interest – Photographs Celebrating Six Decades of Excellence.
- LALP-12-010. National Security Science. November 2012.