

**Meeting Summary**  
**Los Alamos Historical Document Retrieval and Assessment Project**  
**Thursday, June 25, 2009, Pojoaque, NM**  
**Hilton Santa Fe Buffalo Thunder Hotel, 5:00 p.m. to 7:00 p.m.**

The following is a summary of the public meeting that was hosted by CDC and the LAHDRA project team on Thursday, June 25<sup>th</sup>, 2009. The associated presentation utilized two projection screens. The images that were presented side-by-side are reproduced here to represent the program as faithfully as possible. Any text that follows the slides is not a detailed transcript of what was said. Statements and discussions are not reproduced verbatim— they are paraphrased, and where the speaker simply vocalized information what was shown in the slides, that language is not reproduced in the text.



Guests checking in and receiving project materials



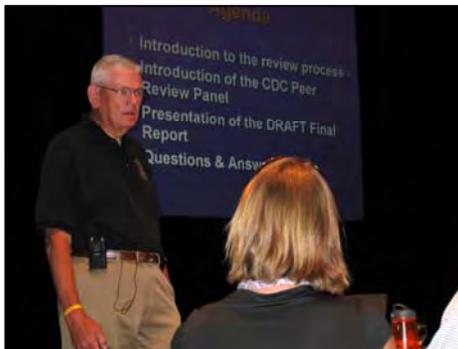
The room beginning to fill for the LAHDRA public meeting in Pojoaque



A portion of the audience of about 130 people



Peer review panel members Ron Kathren (chair of panel, left) and Dr. John Poston



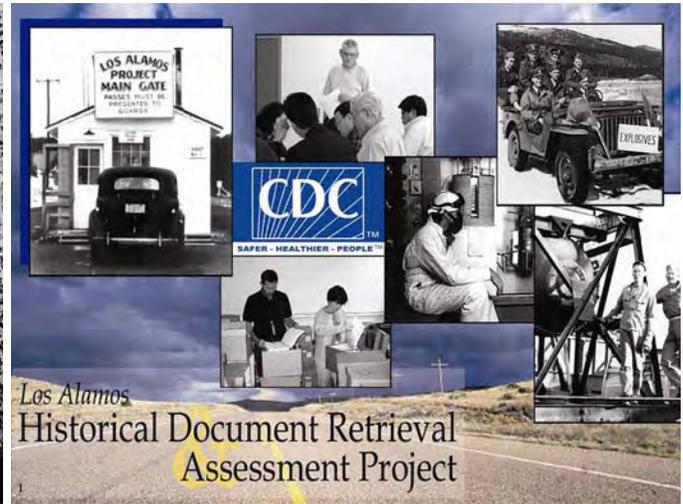
Dr. Charles Miller, Chief of CDC's Radiation Studies Branch, opens the public meeting



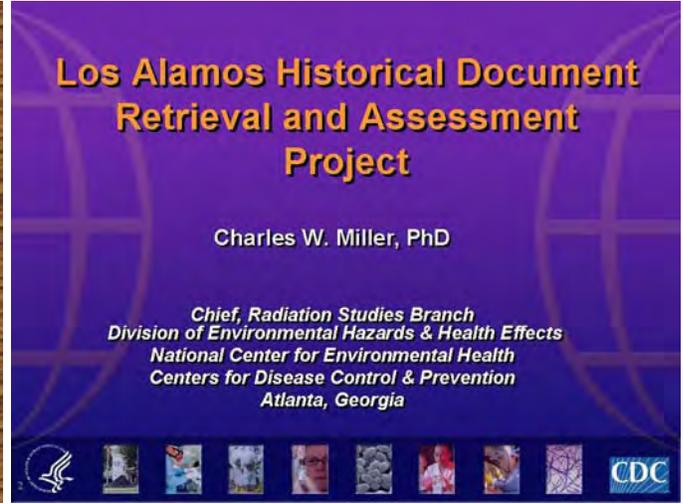
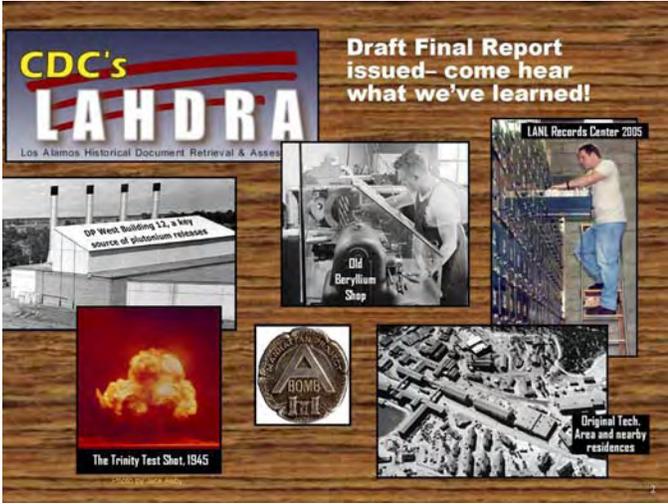
LAHDRA Project Director Tom Widner of ChemRisk listens to a question from the audience



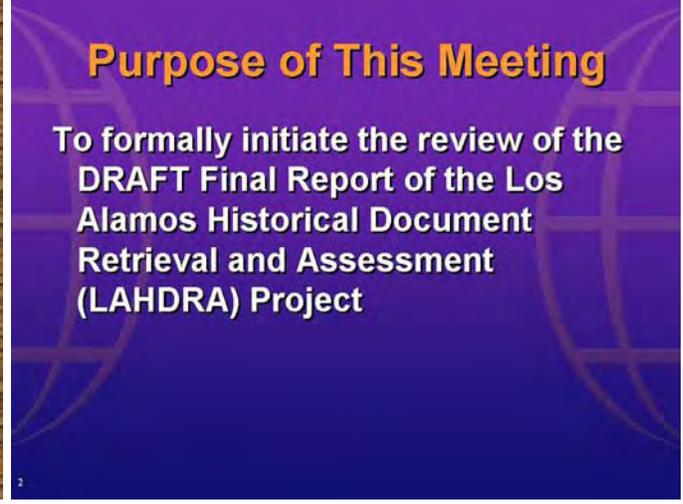
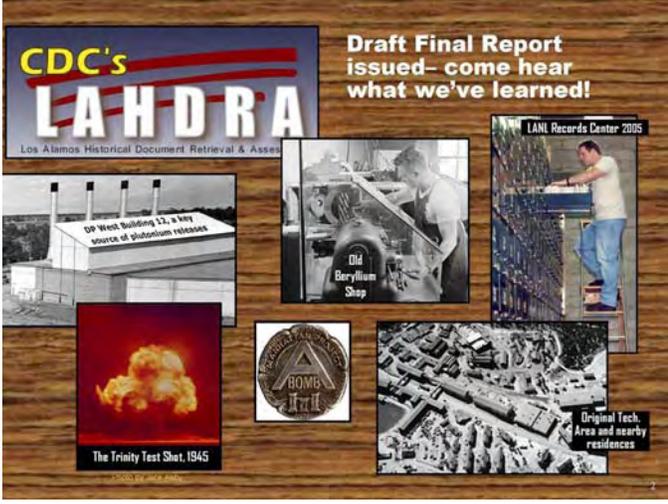
Santa Fe resident Cathie Sullivan offers comments on the draft final LAHDRA report



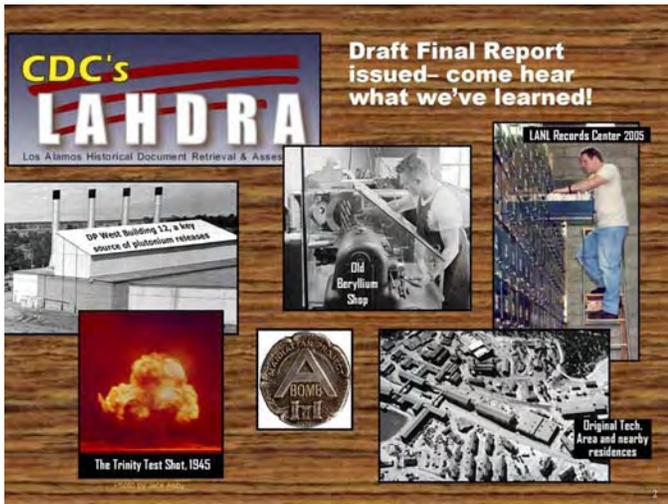
Welcome



Good evening, welcome to the meeting. I'm Charles Miller, Chief of the Radiation Studies Branch at the CDC in Atlanta. Welcome to tonight's meeting-- this is a great turnout.



As you know, the purpose of tonight's meeting is to formally initiate the review of the draft final report of the Los Alamos Historical Document Retrieval and Assessment Project. We've been at this for awhile, and tonight we're going take a look at the draft of the final report.

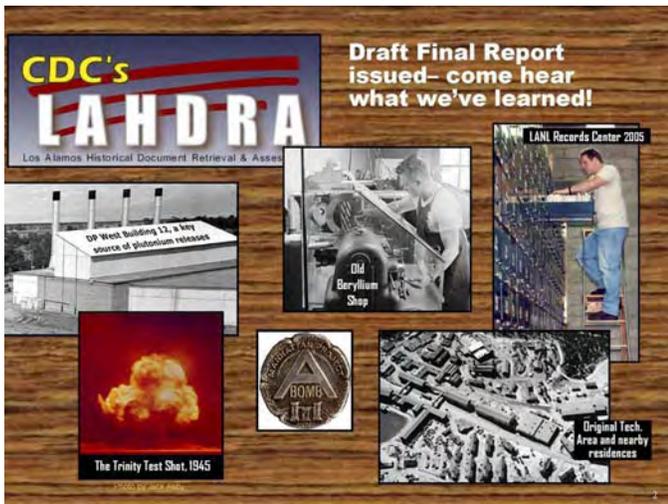


Draft Final Report issued- come hear what we've learned!

## Agenda

- Introduction to the review process
- Introduction of the CDC Peer Review Panel
- Presentation of the DRAFT Final Report
- Questions & Answers

This is the agenda. After I describe the review process that we are starting, and introduce a peer review panel that the CDC has put together to assist us in this process, I will turn the floor over to Tom and ChemRisk to give us a presentation on the draft final report. There will be time for questions and comments. We'll do our best to address them. We understand that you probably have not had time to review the entire document, and that's fine.

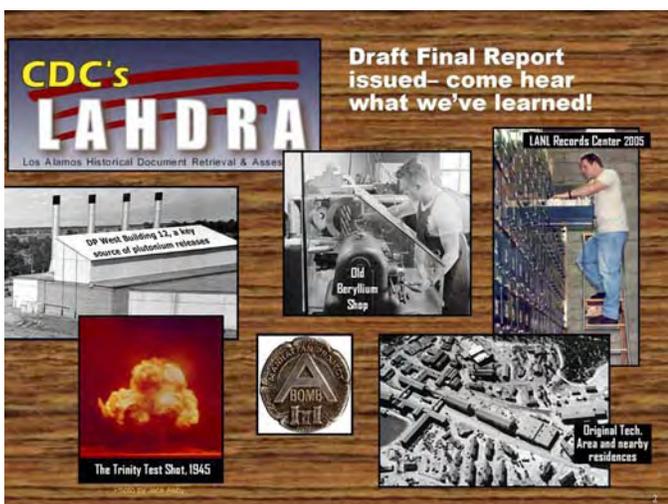


Draft Final Report issued- come hear what we've learned!

## The DRAFT Final LAHDRA Report

- Prepared by ChemRisk, Inc. under a contract with CDC
- DRAFT report has been delivered to CDC for review
- Available to the public for review simultaneously
- This report is an update of interim reports previously available for review
- The views presented in the report do *NOT* necessarily represent the views of CDC!

We decided to begin drafting the final report right from the beginning, and update it as we went along. We at CDC are also reviewing the report. After we get everyone's comments, we will decide where to go from here.



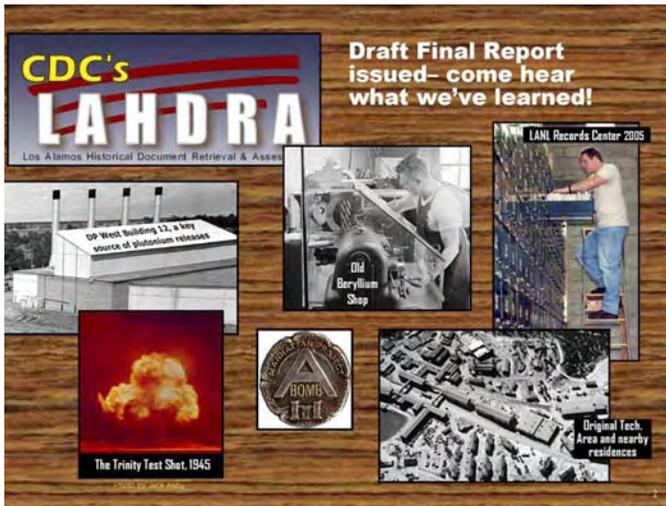
Draft Final Report issued- come hear what we've learned!

## Goals of LAHDRA Contract

Issued December 1998

- Documents will be retrieved and evaluated for their usefulness for off-site dose assessment
- Relevant documents will be declassified (if necessary), copied and made available to the public
- Relevant documents will be entered into an electronic database
- A prioritized list of contaminant releases from the LANL site will be developed

We've been at it awhile. The contract was let in December 1998. We met some of you for the first time in early 1999, when a group of us came out to Los Alamos to initiate the work. This report represents the culmination of these four tasks, in combination with the database and the documents, which you may have access to at any time.

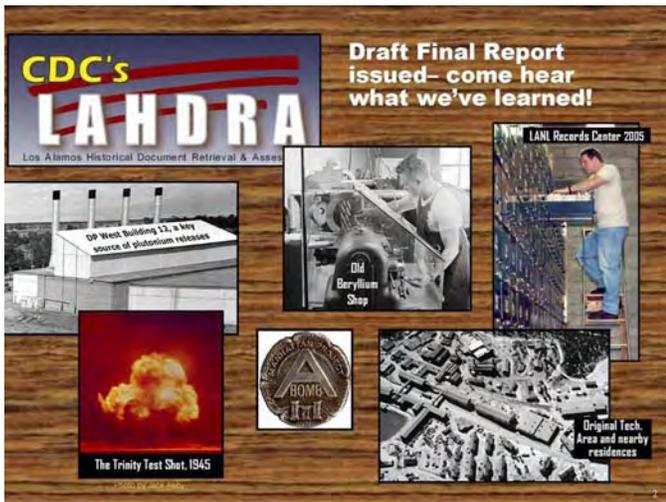


## Classification Issues

- We have **NOT** examined every record located at Los Alamos National Laboratory (LANL)
- We may **NOT** have seen every document repository located at LANL
- We are **CAUTIOUSLY OPTIMISTIC** that we have located all existing documents related to potential releases of radionuclides and chemicals offsite

We at CDC started talking many years ago about this Los Alamos project. I came to work at CDC in 1992. When I got there, this site was on our list to be considered. CDC has done dose reconstructions at many DOE sites. We came to two conclusions— we should do something, and it would be interesting. One of the biggest issues we recognized right away dealt with classification. We have not seen every document located at Los Alamos. We were told this was not going to happen. It was our initial goal going in, but we were later told this would not happen. We may not even have seen every document repository. I was told by a LANL person that the president of the United States doesn't have the clearances needed to look at everything they have at LANL.

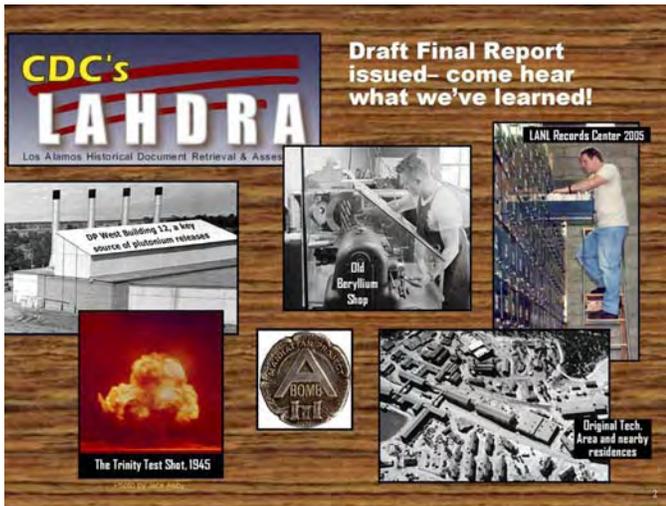
So why can I make the last statement? ChemRisk has listed the classifications we could not look at. Based on our experience, we would not expect documents in those categories to have information related to off-site releases. So I am cautiously optimistic that we have found everything that is there to be found. I cannot guarantee that we've seen everything that is relevant. I can only tell you what I've seen and not seen. I came to talk to you about it. I asked: do you want us to stop or go on, given these restrictions? You said, as a group, go on. What we're trying to do here tonight is to present what we've found, most of it found by ChemRisk, with some documents also reviewed by CDC staff. But, we've given you everything we've found.



## Peer Review Panel

- Persons with significant expertise and experience to assist CDC in the technical review of the DRAFT report
- This is **NOT** a chartered Federal Advisory Committee
- CDC is seeking individual advice and comments, **NOT** consensus advice

We're beginning a process of review of this report. At CDC, I decided we needed some technical assistance from people who are experienced in working with similar projects. I've asked Dr. Jim Smith, who has retired from CDC, to help. He's done a lot of dose reconstructions, and is now a contractor. He is helping us to put together a group to review the report. I'm going to introduce those people in a few moments.

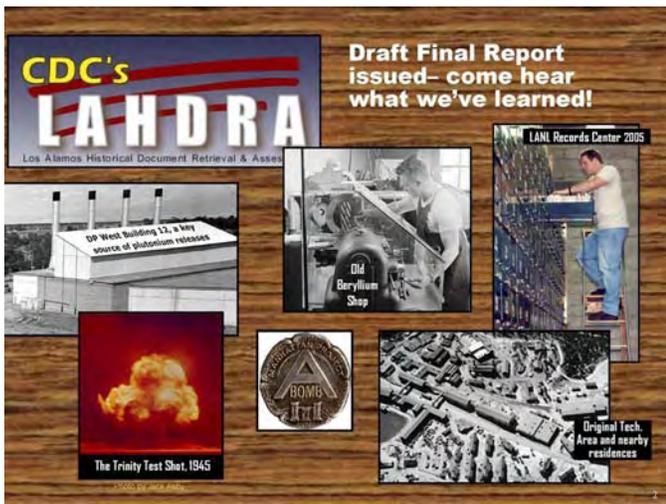


## Options for Future Work

- Finalize this report and stop
- Proceed to some form of more detailed dose reconstruction
  - For all releases and locations identified in this report
  - For selected releases and locations identified in this report

*There is currently no funding for doing any additional work at LANL*

If you've done any reading at all, you know that this report does not answer all the questions by everyone in this room. The question I have is this: can we even answer these questions with the information we have? We can't do everything, but maybe there are some specific things we need to do. For this type of work, CDC hires the contractor. DOE supplies the funding, and CDC handles the project. There is no more funding in the current budget for further work. We would have to ask for additional funding.

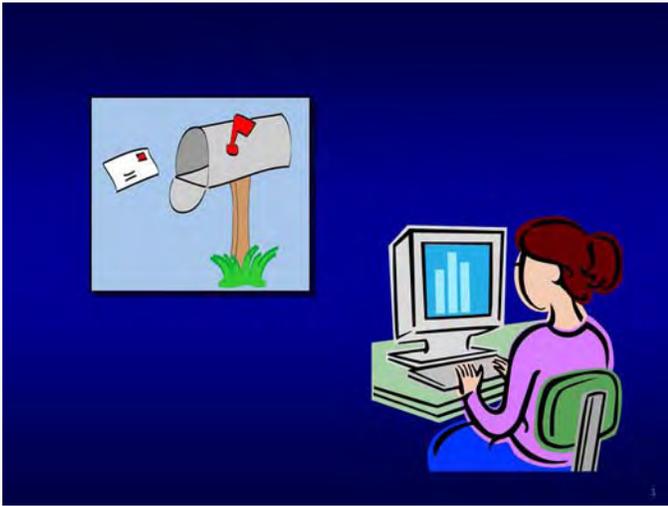


## Charge to Peer Review Panel

- Determine whether historical releases warrant further assessment
- If so, recommend prioritization scheme focused on possible adverse health effects
- Provide robust justification for any recommendations for further work

This morning, I met the peer review panel for the first time and gave them a formal charge. After this meeting, all slides will be posted on LAHDRA Web site, including the full text of that charge [see below]. I've asked individual panel members, looking at their areas of expertise, to give us an opinion as to what historical releases warrant further assessment, if any. Is there something more we need to do that would help in looking at potential health effects? As I said, there is no pot of money sitting out there just waiting for us to tap into. We will have to justify it to the DOE, and they in turn will have to go through the administration and to Congress.

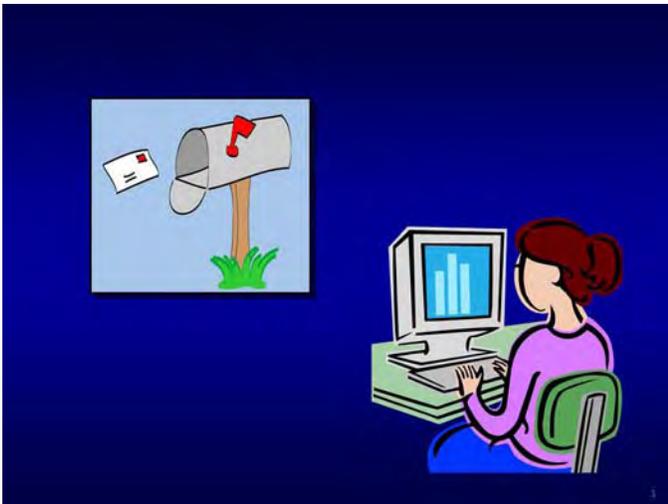
Charge to the Peer Review Panel: "Based upon evaluation of the findings of the LAHDRA draft final report, determine whether historical releases to the environment of radionuclides or other toxic materials from Los Alamos operations warrant more in-depth assessment. If further work is recommended, a prioritization scheme should accompany the recommendations. Any proposed additional work should be exclusively focused on possible adverse health effects to people who live or who have lived in the area surrounding the LANL. Given the potentially considerable costs and time for an extension of the project, recommendations for a more detailed assessment would require robust justification."



## Review Process

- The review process formally begins tonight
- Comments will be received by CDC through *September 4, 2009*
- All comments received will be public documents unless commenter requests otherwise

All comments we receive will be public documents unless you ask me to not make them public. If you do that, I will do my best to honor that request. However, when you send a comment to the federal government, I wouldn't swear to you I could keep it confidential. I would prefer we do everything aboveboard so that everyone can see what is going on. I want to share everybody's comments with everybody, so you see what other people say. We will look at them all together and see where we go from here. When this process is over, and we've decided how we want to finalize this report, we'll come back to New Mexico and sit down with you again and go over what we did and why we did it. I don't have a date for that, but that's the plan.



## Send your comments to

Radiation Studies Branch  
Centers for Disease Control and Prevention  
4770 Buford Highway, NE; MS:F58  
Atlanta, GA 30341

E-mail: [rsbinfo@cdc.gov](mailto:rsbinfo@cdc.gov)



You can send comments to us by mail or by e-mail. We will compile the comments and consider every one of them. I'm not saying we are going to include every one and make all the changes each of you ask for. I bet you we will get conflicting comments. Someone will say change A to B and someone else will say change B back to A. We will do our best. If you would like to have a copy of the report, or if you want additional hard copies or CDs of the report, ask for them at that address as well. You can also contact Tom Widner at ChemRisk directly. If you have questions, you may do that as well.

## Membership of the Panel

- Ronald L. Kathren– Chair of the Panel

Professor of Pharmaceutical Sciences (Emeritus) and retired Director, U.S. Transuranium & Uranium Registries. Washington State University Tri-Cities, Richland, WA

- Thomas F. Gesell, Ph.D.

Professor of Health Physics, Department of Physics, Idaho State University, Pocatello, ID

- Bernd Kahn, Ph.D.

Director, Environmental Radiation Center; Professor Emeritus of Nuclear and Radiological Engineering. Georgia Institute of Technology, Atlanta, GA

- H. Robert Meyer, Ph.D.

Principal, Health Risk Assessment, Tetra Tech Inc., Fort Collins, CO

- John W. Poston, Sr., Ph.D.

Professor and Graduate Academic Advisor, Department of Nuclear Engineering, Texas A & M University, College Station, TX

**Panel Facilitator:**

James M. Smith, Ph.D., Former Associate Division Director for Radiation, CDC, Atlanta, GA

The chair of the panel, who is going to have the responsibility to corral these comments, is Ron Kathren. As you might know, there is quite a bit in the report that is relevant to human tissue analyses and the U.S. Transuranium and Uranium registries, so I've asked Ron to serve as chair. I'm going to let Ron introduce himself and other members of the panel before Tom takes over from there.

**RON KATHREN:** As Charles said, I'm Ron Kathren. In 1999, I retired from WSU, where I was in the college of pharmacy and was director of the U.S. Transuranium & Uranium Registries. USTUR was a research program that studied the movement, fate, doses, and possible biological effects of heavy elements like plutonium in people. Los Alamos supported us for a time by doing radiochemistry. My career has been devoted to radiation protection and radiation safety. I am a board certified health physicist and an environmental engineer. My main concerns have been with protection of people and the environment from the harmful effects, real or potential, of radiation. And with that, we'll go in reverse alphabetical order, John Poston.

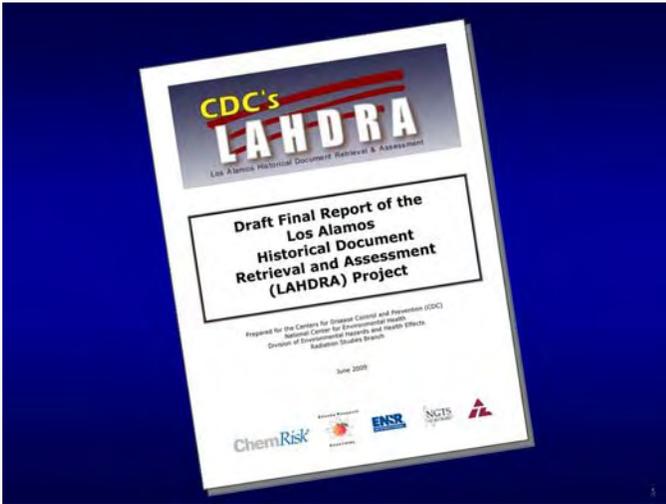
**JOHN POSTON:** Howdy. I'm John Poston. I've been at Texas A & M University for almost 25 years. For 10 of those years, I served as the department head. I started out at Babcock & Wilcox Company, spent 13 years at Oak Ridge National Lab, and additional time on the faculty of Georgia Tech before Texas A & M. Many years ago I served on the external advisory committee for the environmental safety and health program at Los Alamos when Denny Erickson was the lead. I've also served on the advisory committee for the U.S. Transuranium and Uranium Registry when Mr. Kathren was in charge of that. Finally, I am a member of the Advisory Board on Radiation and Worker Health, appointed by President Bush, working with the Dept. of Labor and NIOSH.

**BOB MEYER:** I'm Bob Meyer, and I am with Tetra Tech in Ft. Collins, CO. My degree is in radiation biology, and my specialty has been environmental radiation protection, most recently uranium licensing work, which ties in here pretty well. I've been involved in a few other dose reconstruction projects, namely Savannah River and Rocky Flats. I began my career as an officer in the Navy during the Vietnam era. From there, I went to Oak Ridge National Lab and I've been working in radiation protection, health physics, and environmental science for my entire career.

**BERND KAHN:** I'm a radiochemist who has been analyzing environmental radioactivity all my life. Right now, I'm at the Georgia Institute of Technology. I began my career at the Oak Ridge National Laboratory, and I worked for 20 years for the U.S. Public Health Service and US EPA.

**TOM GESELL:** Hi, and welcome. I'm a Ph.D. physicist, working at Idaho State University as a professor in health physics. I began my career at the University of Texas Health Science Center in Houston, School of Public Health, then moved on to the Idaho National Engineering Laboratory for ten years. At INEL, I ran the radiological and environmental sciences laboratory, and almost 20 years ago I switched over to Idaho State University. I teach, do some research, and run the radiological laboratory that is charged with some of the oversight work at INEL.

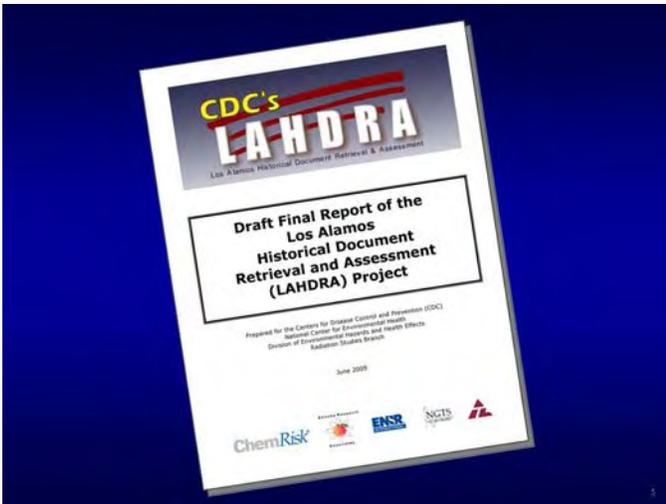
**RON KATHREN:** Now I'm going to turn this over to Tom.



## Presentation of the DRAFT Final Report of the LAHDRA Project

Thomas Widner, M.S., C.H.P., C.I.H  
Project Director

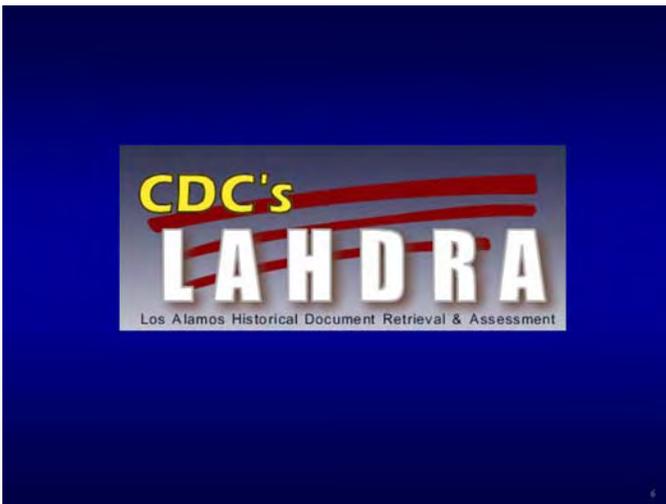
TOM WIDNER: Good evening everybody, it is good to see you all again. I'm Tom Widner and I work with ChemRisk. I've been working in New Mexico for over 10 years. It's been a very interesting process, very challenging, and I'm proud to present to you our draft report tonight.



## Report Availability

- Can download at [www.lahdra.org](http://www.lahdra.org)
- Some CD and paper copies are available here today
- You can sign up for a copy, and it will be sent to you

Charles mentioned a little bit about report availability. You can download the report in its entirety or in sections from our project Web site. We have about 60 copies of the report on CD out on the front table. Feel free to take one. You can sign up for a paper copy, too. Just give us your name and we'll be glad to give you a copy of the report.



<b>Los Alamos Historical Document Retrieval and Assessment Project</b>	
 CDC <small>CENTERS FOR DISEASE CONTROL AND PREVENTION</small>	Charles Miller Lynn Evans Phil Green <span style="color: green;">In attendance today...</span>
 ChemRisk	Tom Widner Ellen Donovan Susan Flack Matthew Le
 <small>Shonka Research Associates, Inc.</small> NGTS <small>INCORPORATED</small>	Joe Shonka Bob Burns Jack Buddenbaum
 ENSR <small>ENVIRONMENTAL SCIENCE &amp; RESEARCH</small>	

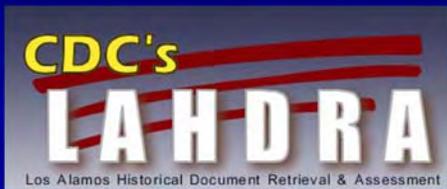
I want to mention a little bit about who's here tonight. I've been asked to represent the project team, which includes quite a number of people. From CDC, we have Charles Miller, Lynn Evans, and Phil Green. From ChemRisk we have Ellen Donovan, Susan Flack, and Matthew Le. Some of the subcontractors on our project team, from Shonka Research Associates, Joe Shonka; from NGTS, Bob Burns; and from ENSR, Jack Buddenbaum. These are some of the key project team members that contributed a lot to information gathering and the writing to the draft final report.



## Our Assignments

- Retrieve historical documents and evaluate their usefulness for off-site dose assessment
- Declassify (if necessary) relevant documents and release them to the public
- Enter relevant documents into a database
- Develop a prioritized list of contaminant releases from the LANL site

As Charles mentioned, our basic assignment was to retrieve, assess, and share historical documents that a competent scientist could use in reconstructing doses of chemicals or radionuclides to off-site populations.



## Five Phases of Dose Reconstruction

- 1 Retrieval and assessment of data
- 2 Source term and transport pathway analysis
- 3 Screening-level dose assessment
- 4 Development of Methods for Assessing Environmental Doses
- 5 Calculation of Environmental Exposures, Doses, and Risks

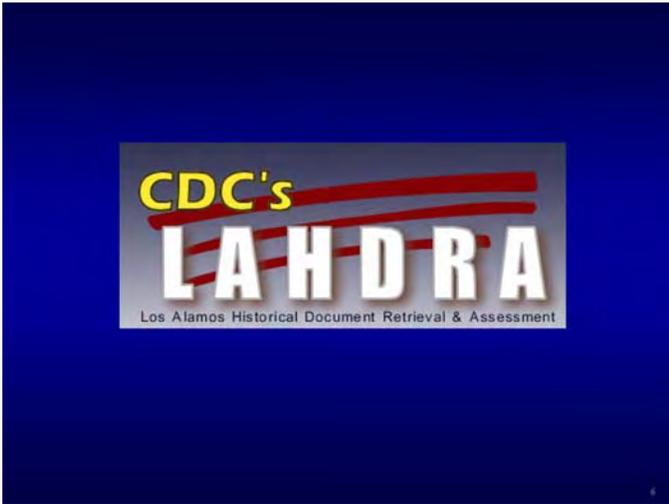
When CDC conducts dose reconstruction projects, they usually follow this series of steps. Not all steps are necessarily conducted at a given site. What we've done so far falls largely under the first step.



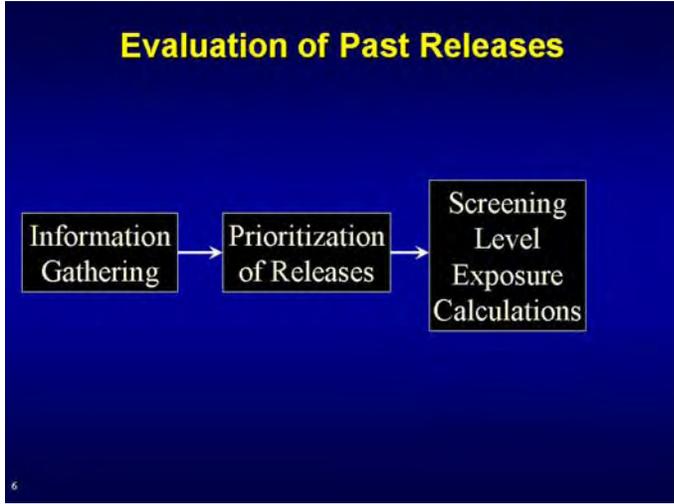
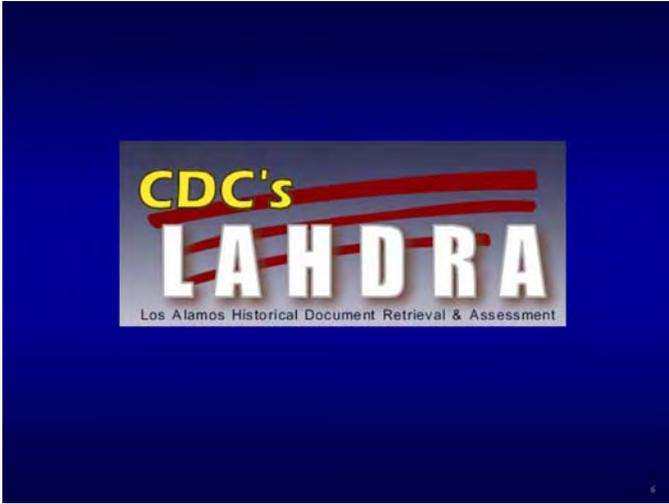
## Evaluation of Past Releases

Information Gathering

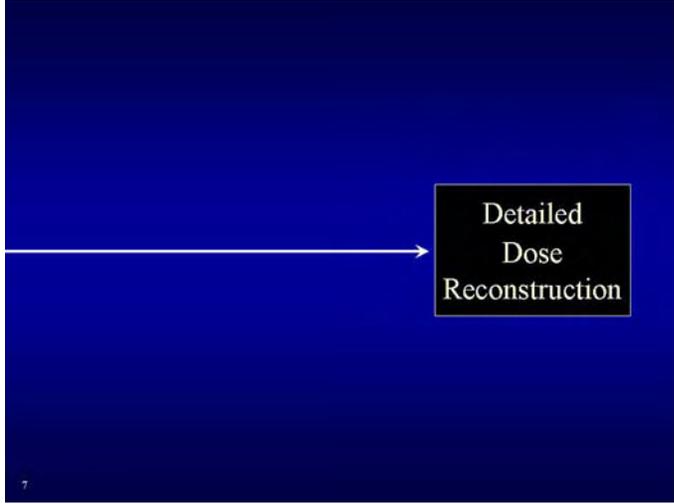
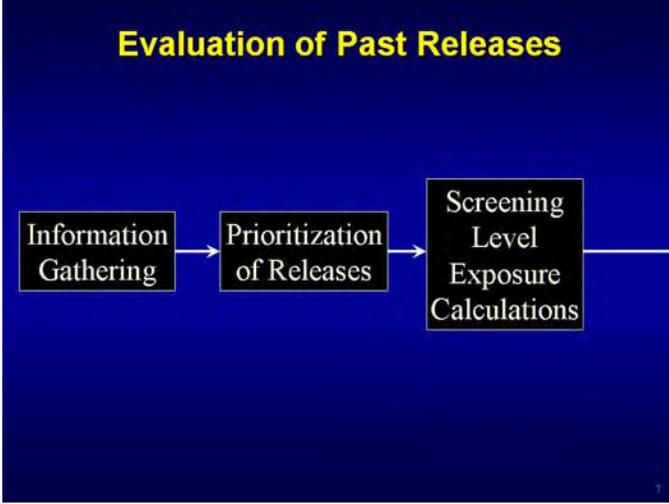
We have stepped into a little bit of source term development and a preliminary screening for selected releases, but for the most part, the work we've done is almost exclusively information gathering.



I will describe for you tonight how we have prioritized both radionuclide and chemical releases, over time, in both airborne and waterborne forms.



As we looked at the information we were collecting, we hoped to get a little past prioritization. So I asked CDC if we could, for a select number of contaminants, go a step farther and do some screening-level assessments of potential exposures. This list included airborne plutonium, beryllium, tritium, and uranium. We've used widely accepted screening methods to assess whether these contaminants could have posed off-site health hazards or not.



What I want to point out here is that what we've done is a long way from detailed dose reconstruction. Members of the project team have done detailed dose reconstruction at Rocky Flats, at Oak Ridge, and at Savannah River. We know what detailed dose reconstruction is, and we need to remind folks that what we've done so far is a long way from that. We're hoping to direct resources and attention to those historical operations and releases that, based on the information we've collected, warrant a closer look.



## Decisions Faced Now

- Is further assessment warranted? It is not for us to say.
- We have significantly expanded the amount of original documentation that is publicly available relevant to past activities and releases.
- The people who will decide this are much better armed with the information that they need than they were 10 years ago.

The decision faced now is whether further assessment is warranted. It is not for us to say as contractors. It is clear, however, that we have significantly expanded the number of original documents that are available to you, the public, concerning past operations at Los Alamos. We think that the people that do need to answer this question are a lot better off than they were ten years ago. They are better armed with the information they need to answer that question and decide what happens next.



## Important Points

- We were not here to say that LANL did all wrong or that LANL did no wrong.
- The documents guided us.
- We are not trying to be judgmental.
- Times were different.

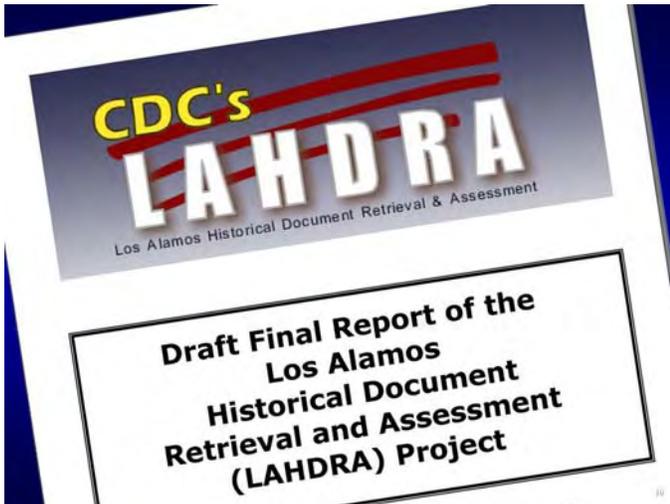
There are several points that I must make. We had no idea 9-10 years ago that we'd be focusing on the things that we are focusing on tonight. The documents truly do guide us. We've done research at other sites where releases that people thought might be important ended up being not so important. For other sites that we've worked at, the documents pointed us to releases that were not previously recognized as important. We don't have an agenda. We have focused on collecting information that addresses off-site releases, and we can show you tonight how we've begun to prioritize and screen some of the releases. We are not trying to be judgmental. It's been pointed out in the press around here lately that times were different in 1940s and 1950s. Most of the releases that were most important did happen in the early decades of Los Alamos' operations. Times were different— we recognize that— but we're trying to focus on the facts, what the releases were, and making information available to those who will decide what to do next.



## We Have Identified

- Several operations that, in our judgment, stand out in terms of potential off-site health significance.
- Several other operations are associated with important data gaps that make it hard to put them into perspective.
- We can provide indications, but no final answers.

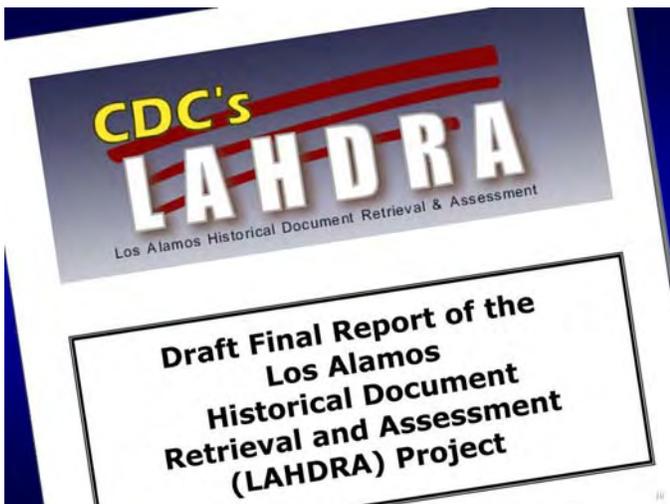
We've identified several historical operations that stand out to us in terms of potential off-site health significance. I'll be summarizing those briefly tonight. For several other operations, significant data gaps make it hard for us to put associated releases in perspective. Data might not be available to fill some of these gaps. For other gaps, information has been found, but it would take more work to compile and assemble from widely scattered documents that we could do in this phase. Just because we couldn't answer a question yet doesn't mean it can't be answered. As of now, we can provide indications, but we have very few final answers at this point.



## Contents of the Draft Final Report

- Useful information (acronyms, code words, units, table of elements)
- Executive Summary
- Introduction to the LAHDRA project
- Overview of LANL Operations

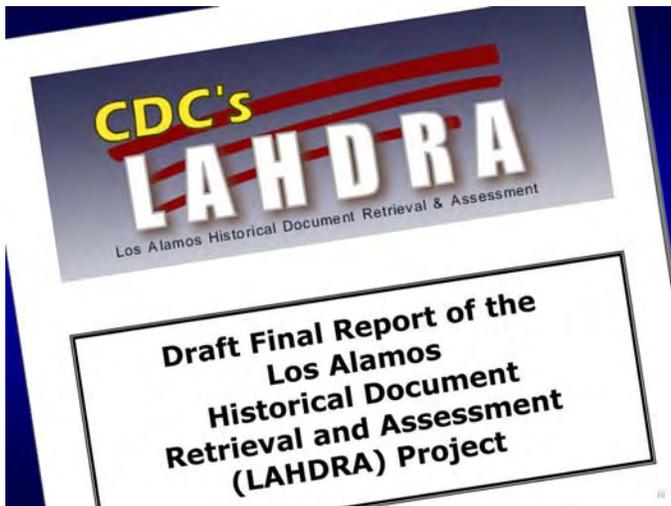
I would like to highlight what is in the draft final report. In the front of the report is some useful information—acronyms, code words, and such. There were a lot of code words used at Los Alamos. If you're looking at old documents, this can be problematic if you don't understand, for example, that "25" is uranium-235 and "49" or "product" is plutonium-249, "Postum" was polonium, a "case of Postum" was a curie of polonium.



## Contents of the Draft Final Report

- Plutonium Processing
- Reactor Development & Operations
- Accelerator Operations
- Tritium Processing
  - with screening assessment **NEW**
- Hot Cells Facilities & Operations **NEW**
- Other Radionuclides
  - with screening for uranium **NEW**
- The Trinity Test

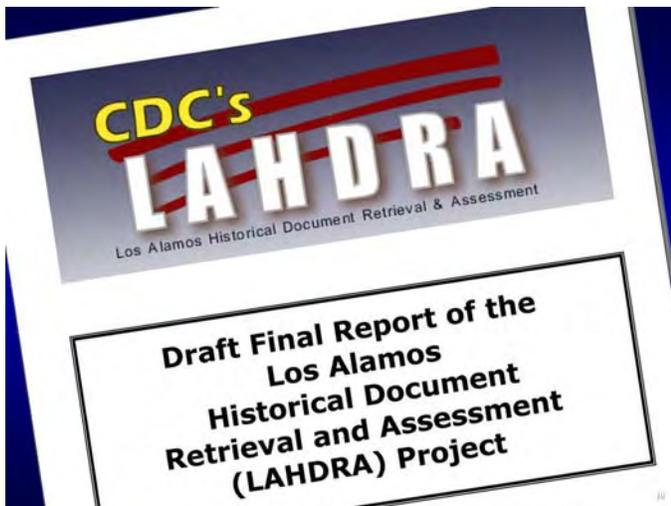
One of the things we added in this version of the report is a screening level assessment of tritium releases. We recognize that it takes a lot of tritium to be an off-site health hazard, so we performed a screening-level assessment to see if there was possibly enough tritium released from Los Alamos to be an off-site health hazard. Based on comments from members of the public, we added a section to the report on hot cell facilities and operations. Whenever they did work in a hot cell, that was indication that they were handling high levels of radioactivity or particularly toxic chemicals. Uranium is another material for which we did a preliminary screening to help us determine if enriched uranium or depleted uranium could have posed off-site health hazards. The Trinity test was determined to be within the scope of our project because we're looking at Los Alamos activities within the state of New Mexico. We found a lot of interesting information about Trinity test, and I will briefly describe that shortly.



### Contents of the Draft Final Report

- Beryllium uses at LANL
- High explosives processing & testing
- The LANL Health Division
- Environmental monitoring at LANL
- Development of residential areas
- Chronology of accidents & incidents

The Lab used a lot of beryllium before anybody fully understood the hazards of the material. The records of the LANL Health Division— the H Division, or the Health Group as it started out— are some of the most useful records to people like us who are trying to assess off-site health hazards. You'll see tonight that, compared to other DOE sites, people lived closer to operations at Los Alamos than at any other site that we have seen. That is a factor of importance when you are looking at potential public health effects. We went through a lot of Health Division reports and correspondence and compiled a chronology of accidents and incidents. We didn't include everything we saw, rather we tried to focus on those that could be of environmental release significance.



### Contents of the Draft Final Report

- Prioritization of radionuclide releases
- Screening of airborne Pu releases **NEW**
- Prioritization of chemical releases
- Screening of airborne beryllium **NEW**
- Public involvement within LAHDRA
- Findings of the LAHDRA project

We have included a brief summary of the public involvement components of our project. Our previous reports included summaries of each of our previous meetings. Now these are all available on the project Web site, including copies of all the slides of the 15 meetings we have conducted and the workshops we've given over the years.



## Information Gathering Methods

- Systematic document review was performed
- Some directed searching late in project
- Relevant documents were identified
  - A Document Summary Form completed
  - Copies often requested for public release
  - Bibliographic data entered in a database
  - Scanned documents linked to database

We performed systematic document searching for the most part. What that means is that when we went into a records repository, we asked them for listings of their holdings and descriptions of the systems that their records were stored or organized under. We systematically went through all the records, not really looking for information on one particular topic, but going through the records to see what we would find. Later on in the project, when key questions came up, we did some directed searching. Let's say, for example, that D-Building ventilation was a concern, or tritium releases, we went to specific locations where we thought we would most likely find information on that topic, or we interviewed folks that were experts in those subjects.

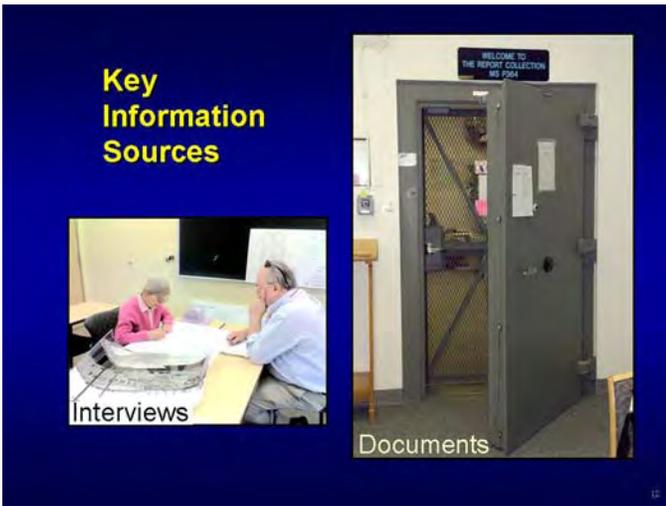
We haven't wanted to receive documents that we can't share with you. We have received some documents that are "for official use only" and we can't share with you, but we have really tried to minimize that and get everything we use in publicly releasable forms. The bibliographic data from Document Summary Forms were entered into a database. Halfway through the project, we started scanning the documents. The 10,000 or so documents we have collected as relevant have all been scanned and are available and linked to their database records. To us, it has proven to be a very powerful tool, and it can be made available to all of you too.



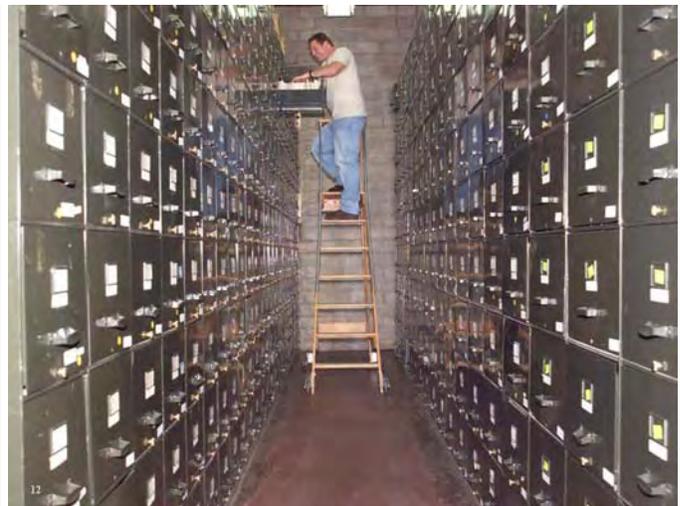
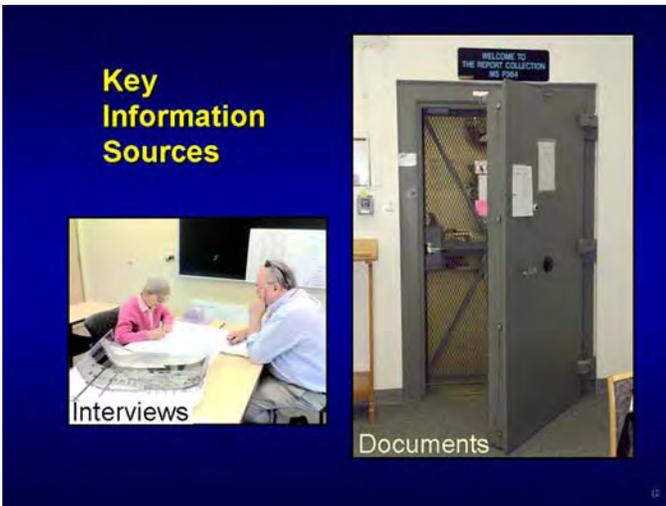
## Key Document Collections

Location	Documents Selected
LANL Records Center	2,902
LANL Reports Collection	1,529
ES&H Records Center and satellites	333
LANL Archives	992
Litigation Support Database	347
LANSCE Division	43
WEM / WP Divisions	2
Engineering Drawings Center	188 docs, ~1,000 drawings
Environmental Stewardship Division	1,056
Industrial Hygiene & Safety Records	17
Former J Division (Field Testing)	0

These are some of the key document collections and information sources. The most valuable one was the Los Alamos Records Center. You can see the number of documents we got from each collection. We started out with the centralized repositories, then met with some of the Laboratory divisions that we thought most likely to contain records relevant to our work.



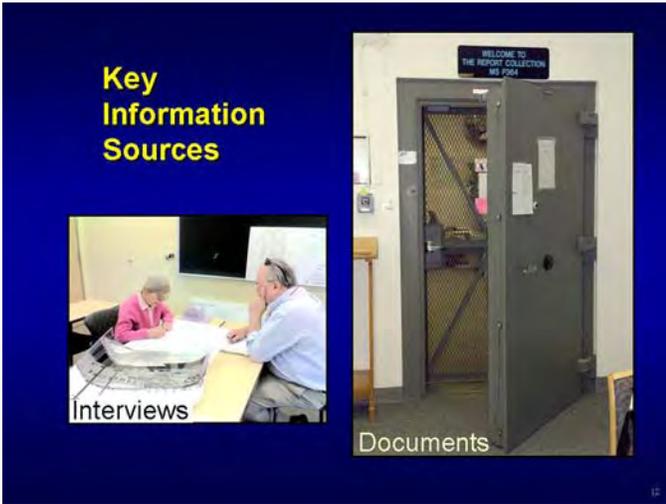
This is a picture of a portion of the Records Center in 2005. Since then, it has moved to the new NNSB facility, and the building shown here has been demolished, I believe. This is F-Bay, and there were a number of bays, or sections, like this in this huge warehouse of records.



This is another portion of the Records Center. Not your typical file cabinets, these are 10 drawers high, row after row after row, and typically contain documents or notebooks. Some people might wonder how it took us 10 years to get this done, but as you can see, we had a lot of work to do.



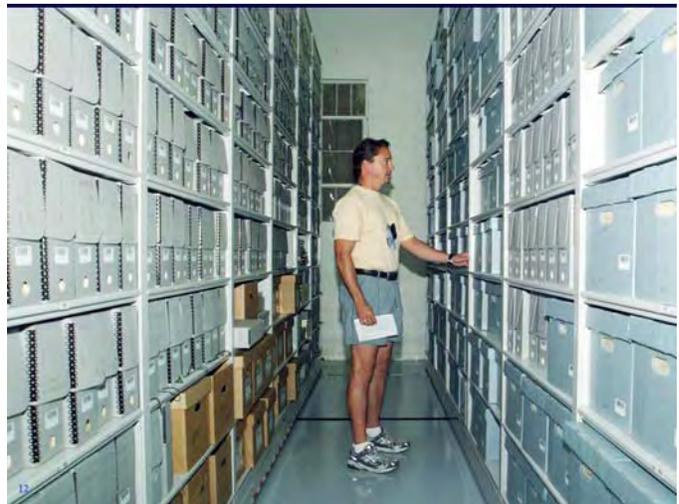
Again, row after row of file cabinets in the Records Center.



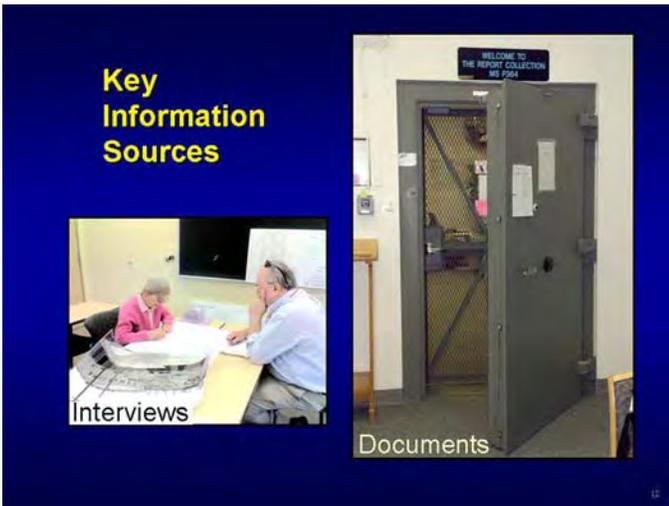
Unfortunately, a lot of the records are on microfilm and microfiche. It's not fun, but we went through thousands of rolls of microfilm and thousands of sheets of microfiche to get the information we needed.



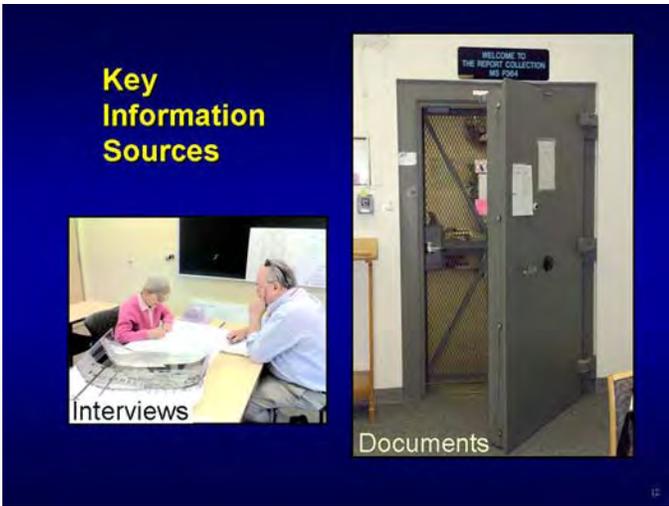
This is a view of the LANL Archives, which are for the most part housed on movable shelving.



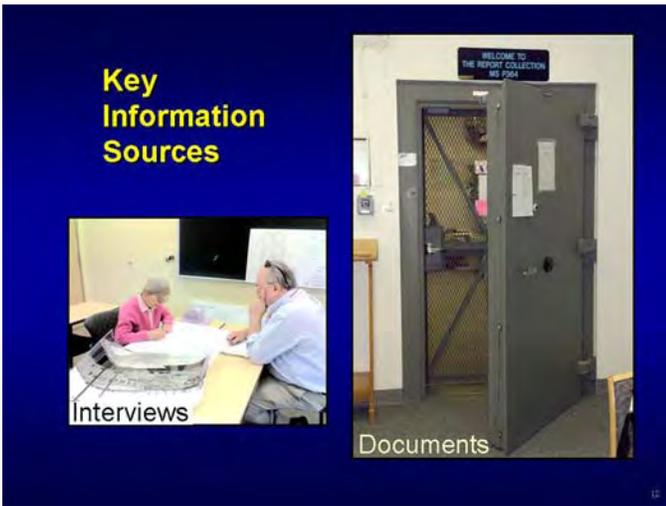
These Archives contain records that have been judged to be particularly significant from a historical standpoint, and that warrant long-term preservation.



This is a portion of the motion picture collection in the Archives. Over the last year, we've reviewed quite a few motion pictures, most of which have been converted to video tape.



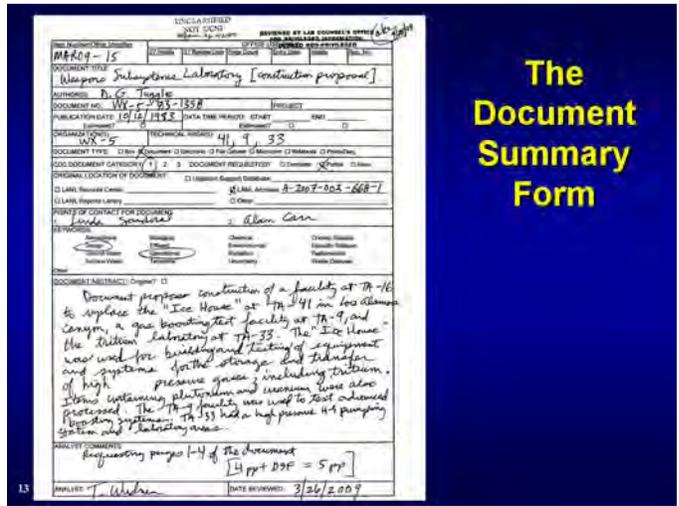
This is a view of the LANL Reports Collection. From the beginning, the Lab has issued many technical reports. The Reports Collection has been a repository for reports, both classified and unclassified, issued by the Lab, by other DOE contractors, and by other entities.



Again, row after row of technical reports.



The reports collection also has millions of reports on microfiche. We came up with a system of categorizing the microfiche, and for each category we looked at a certain fraction of the records what might have been relevant.



**The Document Summary Form**

The Document Summary Form was the most basic tool that we had. It was basically a paper form we took into the record repositories. When we found a document that was relevant, we filled out the title, the authors, the date, the publication, some key words, the abstract, and so on. We had to fill these out by hand, because typically we didn't have access to a computer in the repositories. The completed DSFs were submitted through review for public release. In this case, we requested four pages from the document and put them through the review process. Each document and DSF received a classification review, a review for Privacy Act information, and a review for legally privileged information before it was provided to us.



### The DocSleuth Database

Documents are "filtered" to those whose bibliographic data (from DSFs) contain terms entered in these oval fields. More fields can be seen by scrolling to the right.

A full-text search of OCR-processed documents is performed for terms entered in this rectangular field.

LAHDRA Report#	Size	LAHL Document #	Title	Abstract	Author	Date Published	Keywords
1929	1,874,422	LA-1236	Los Alamos Technical Series - Chapter 2 (User's Manual: Metallurgy (Metallurgy, Ser. Cyril S. Smith)			1945-12-31	metallurgy
2162	2,055,718	LA-1236-49	Radioactive Air Emissions, 1953 Summary	This report summarizes, by tabulation, level	Linnea W.	1953-12-31	atmosphere
1958	172,828	LA-1236	Chapter 3 (User's Manual: Metallurgy (Metallurgy, Ser. Cyril S. Smith)	Date of volume 10 (User's Manual: Metallurgy (Metallurgy, Ser. Cyril S. Smith)	Cyril S. Smith	1945-12-31	metallurgy

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View DSF View PDF Download PDF Print DSF

#### LAHDRA Document Summary Form - Rep# 3530

**Title:** Chapter 3 Beryllium Divide of Volume 10 metallurgy

**Author(s):** Cyril S. Smith

**Document Number:** LA-1236      **Project(s):**

**Publication Date:** 12-31-1945      **Data Time Period:** 01-01-1945 - 12-31-1945

**Organization(s):** Metallurgy      **Technical Area(s):**

**Document Type:** (1) Document      **CDC Document Category:** 2

This is a view of the DocSleuth database search screen. DocSleuth is a database into which we have entered between 8,000 and 9,000 records. Each record can represent a single document or a collection of documents. I think we have close to 10,000 documents in our collection now. Using the various windows on the search screen, you can do filtered searches. In this case, we wanted to find documents for which the document number started out with “LA”, like an LA or LA-MS report, with author name = Smith, and with text containing “beryllium.” It’s a very powerful tool to find information on any particular subject. This is available on a controlled access basis to various libraries around here and to some researchers at government agencies and universities around the country.



### Information Gathering was Challenging

- In the beginning, LAHDRA analysts with requisite security clearances had unescorted access to document centers.
- After security incidents at LANL and the terrorist attacks of 2001, restrictions increased significantly.

In the beginning, our hosts verified that we had safety shoes on, gave us training on how to climb ladders, and we basically had free reign. Over the years, after a number of security incidents at the Lab (none of which involved our project) and the terrorist attacks of 2001, restrictions increased significantly. It became more and more difficult to access the records. I’m not saying that these controls weren’t appropriate. I’m just saying they did complicate our access to historical documents.



## Challenges Faced

- The Cerro Grande fire
- Security stand-downs after incidents involving LANL staff
- Numerous requirements to re-establish need-to-know
- Establishment of security plans for accessing documents
- Increased escorting requirements and limits on numbers of analysts,
- Calls for review of documents by titles alone,
- Establishment of seven categories of information to be withheld,

I've described our work on this project as being like a rollercoaster ride. The Cerro Grande fire shut us down for a good number of months, and when we'd get started up again, there would be a security incident or a stand-down, there were numerous requirements to re-establish our need-to-know, to establish new security plans that documented everybody's responsibilities and what procedures we would follow, to access, review, and release the records. Over the years, the escorting requirements increased. We had more and more calls for review of documents by titles alone, which can be problematic because many titles tell you little or nothing about what the document contains.



## Challenges Faced *(continued)*

- Pre-screening by document "owners",
- Reports "owned" by defunct entities,
- Establishment of an appeal process for use when information was withheld,
- Arranging access to documents at LANL generated by the UK,
- At one point, a significant backlog of documents awaiting classification review,
- Limited resources (staffing) at repositories impacting LAHDRA access,
- Initiation of pre-screening of documents by LANL Legal staff.

About midway through the project, there were seven categories of information identified by the Lab that were to be withheld from us. Pre-screening began by the "owners" of the documents. This was problematic because a lot of the reports were issued by entities that no longer exist. An appeal process was established. If an owner looked at a document and said we could not review the document because it contained nuclear weapons design information or foreign intelligence, for example, we had a process under which a federal government employee from CDC could come in and sit down with a DOE person to determine whether the document contained relevant information. We had some complications in accessing records issued by foreign governments, such as the United Kingdom. At one point, when the classification reviews were done by contractors to the Lab, a contract expired and the follow-up contract was slow in coming, and a significant backlog developed of documents that required review. Limited resources at the different repositories from time to time limited our access or limited the number of people we could have working there. Late in the project, pre-screening of documents was initiated by the Lab's legal counsel staff.



## Categories of Information Withheld

- Nuclear weapons design information,
- Information under Sigma levels 14 & 15,
- Sensitive Compartmented Information (SCI),
- Special Access Programs (SAPs),
- Foreign Government Information (FGI), and
- Unclassified Sensitive Vendor Proprietary Information

These are the categories of information that were withheld from us for much of the project. Sigma levels 14 and 15, I believe, deal with nuclear weapon vulnerabilities, or how you can disable weapons— topics that have no relevance to the types of information that we were tasked to collect. It is our judgment that it is very unlikely that documents in these categories had information relevant to our project.



## Information Captured by the LAHDRA Team

- LAHDRA team members reviewed millions of documents
- Approximately 264,000 pages of material was captured.
- This information is summarized in ~8,400 records that make up the project's information database.

We reviewed millions of documents, and captured approximately 264,000 pages of material that we summarized in about 8,400 records in our database.

# prioritization

## Prioritization was performed for:

- Airborne radionuclide releases
- Waterborne radionuclide releases
- “Chemicals”

CDC asked us to prioritize which releases could have been most important. We prioritized airborne radionuclide releases, waterborne radionuclides, and “chemicals.” In this sense, anything that is not a radionuclide is a “chemical.” It could be a metal, a solvent, or an inorganic compound.

# prioritization



## Radionuclide Prioritization

- Was based on the “dilution volume required” method.
- Priority Index (mL) = Annual quantity released ( $\mu\text{Ci}$ )  $\div$  Maximum Effluent Concentration ( $\mu\text{Ci}/\text{mL}$ )
- Higher Priority Index values indicate more potential for off-site hazard.
- Method does not account for distance to receptor or decay in transit.

For prioritization of radionuclides, we initially used a very simple approach called the “dilution volume required” method. We looked at the amount of a material that was released in a year, and divided it by the maximum effluent concentration to calculate how much air or water was needed to dilute that release to an acceptable concentration. Some radionuclides released from accelerators and reactors are very short-lived. Nonetheless, the method provides us with useful information.

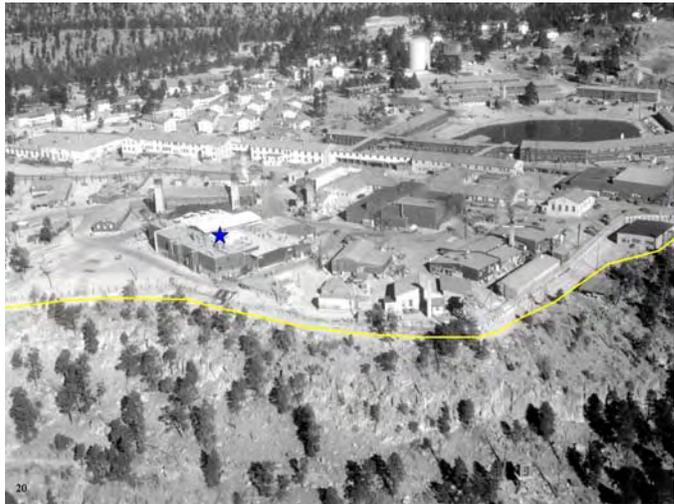
# prioritization



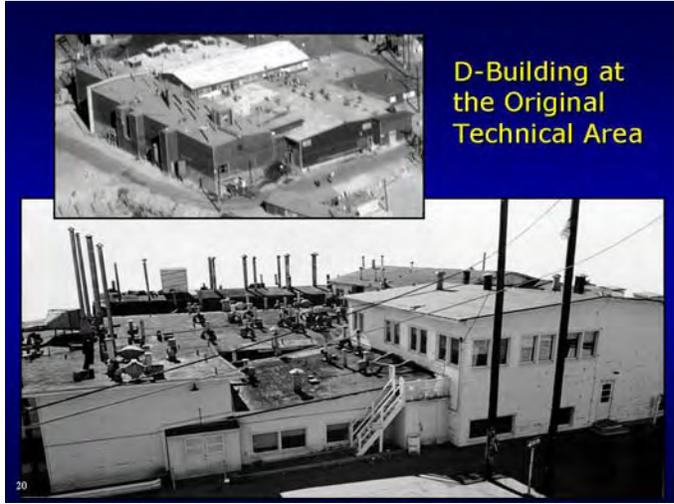
## Sources of Release Estimates

- Information compiled in preparation of LANL’s 1979 Final Environmental Impact Statement (1943-1972)
- Spreadsheet of air effluent data 1973-90
- A study of the radioactive lanthanum shots
- Memo re: uranium in explosive tests 1944-70
- A 1950s study of releases based on soil measurements
- 1956 memos re: corrections to Pu release estimates 1948-55

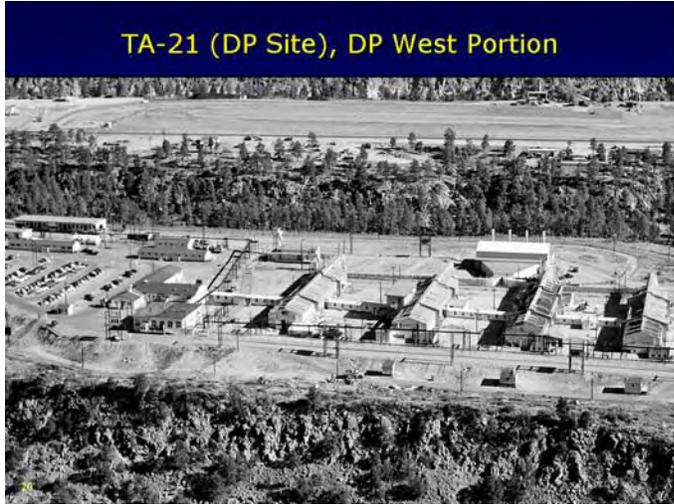
In the 1970s, the Lab was asked by ERDA (predecessor to DOE) to document how much radioactivity had been historically released. They issued a final environmental impact statement in 1979, and the workers who compiled that data created a set of binders that contained historical documentation that we found useful. We were also given a spreadsheet of radioactive effluent data after 1973, and there is a useful report on Rala shots at Bayo Canyon. We found a memo regarding uranium used in explosive tests from 1944 to 1970, and a 1950s study by Jordan and Black that used data from soil samples and particle deposition trays and related those data to historical releases of plutonium. Memos we found from 1956 document how Lab industrial hygienists looked at the quality of the stack sampling at DP West Site. Sampling was performed with an improved sampling system, and they came up with correction factors that were applied to release estimates for previous years.



D Building in the Original Technical Area was the first building in the world to handle plutonium in visible quantities, purify it, convert it to metal, and make weapon parts from it. D Building is marked here with a blue star. The yellow line is the outline of the rim of Los Alamos Canyon.



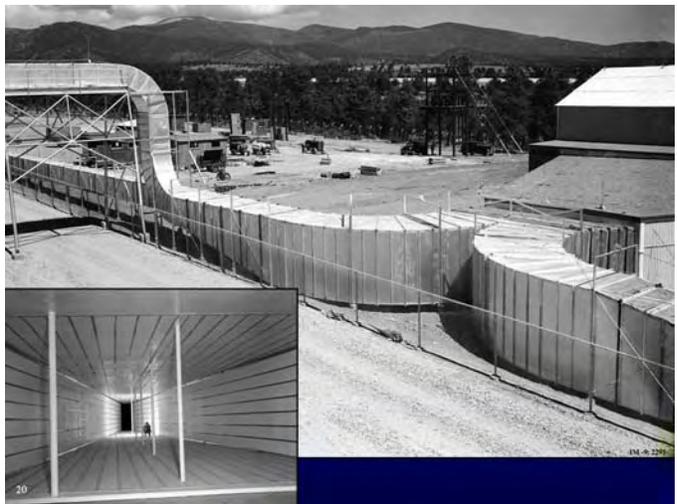
D Building was originally planned to be used for one year, but they kept adding on to it, and it was used for about ten years. D Building had about 85 rooftop release points, which were unmonitored and for the most part unfiltered. In the later years, they added crude glass wool filters to some exhausts, but this is one of the big data gaps for plutonium. From 1944 through 1953, releases from D Building were not monitored and have not been estimated.



Late in 1945, main plutonium production operations moved to DP West Site facilities, which you can see here.



While they didn't have stack sampling or filtration in D Building, they apparently learned from their experiences and put what I would consider a monster of a ventilation system on DP West facilities. Each building had large ventilation ducts that combined at what was Building 12, the central exhaust treatment building.



Here you see exhaust ducts combining into a central plenum.



And here you see Building 12, with its four exhaust stacks. Inside the building were some crude exhaust filters and electrostatic precipitator units. The precipitators proved to be ineffective and hard to maintain and were shut down.



These photos show filters, precipitators, and one of the blowers that forced air up each stack.



Stack sampling was done at DP West. Here you can see a gentleman operating an air sampler, a modified Filter Queen vacuum cleaner, of the type that was used for air sampling in the early years.



It was a pretty crude sampling system. We believe this sampling used essentially a pipe stuck into the ducts, as opposed to the modern day systems that use air straighteners and isokinetic probes— very elaborate systems. In contrast, this early sampling was very simple.

# prioritization



## Airborne Plutonium Release Estimates

- In the 1970s, LASL reported that 1.2 Ci of Pu had been released through 1972.
- Various documents show that value represents only releases from the DP West Building 12 stacks.
- No releases from D Building are included for any of its 10 years of operations.
- No releases are included for DP West before 1948.

In the 1970s, the Lab reported that 1.2 Ci of plutonium had been released from operations up through 1972. This value included no releases from D Building or from DP West operations prior to 1948. These are some of the key data gaps that we are dealing with.

# prioritization



## Airborne Plutonium Release Estimates

- Concerns about stack sampling were acted upon in 1955:
  - *Improved, isokinetic samplers were added on each Building 12 stack.*
  - *The systems were operated side-by-side for about six months, and results compared.*
  - *Correction factors were applied to releases previously estimated for 1948 through 1955.*

In 1955, Industrial Hygiene staff member Edwin Hyatt acted on concerns about the stack sampling at DP West.

# prioritization



## Corrected Plutonium Release Estimates

- Memos from Los Alamos IH group leader E.C. Hyatt in 1956 document the grams of Pu released from the four stacks each month 1948–1955:
  - 227 g total corresponds to 14 Ci
  - With line-loss and filter burial correction factors, corresponds to release of 170 Ci over those 8 y

Sample line-loss and filter burial correction factors are now widely recognized as appropriate for application to stack sampling and alpha-emitting radioactivity measurements of the type that were made.



### Components of LANL Pu Releases

D Building Stacks 1944-53	DP Site Building 12 Stacks
DP Site Building Vents	Accidents and Incidents
CMR Building Exhausts (chemistry/metallurgy 1953+)	Burial ground fires
Waste Disposal: (burial, incinerators, etc.)	TA-55 releases (modern Pu facility, 1978+)

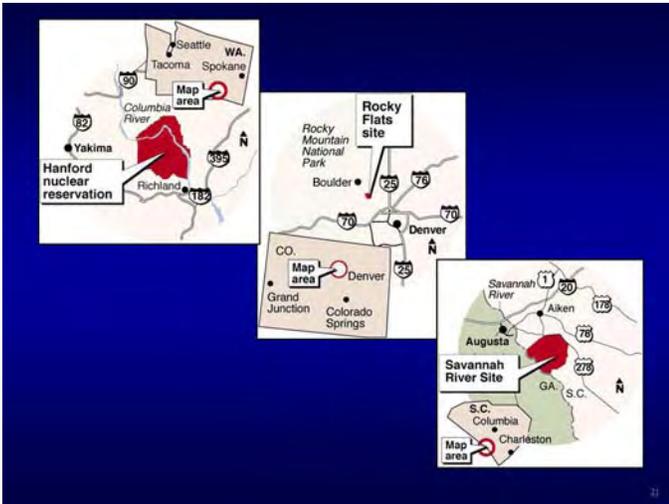
I just mentioned how the 170-curie total is associated with releases from just the DP West Building 12 stacks. If we want to consider site total plutonium releases, here are the sources that we recognize. Accidents and incidents have been significant contributors to plutonium releases from some DOE facilities, such as the Rocky Flats plant. At Los Alamos, we know that there were several burial ground fires, including a major one in 1946 in a burial ground by DP West Site. TA-55 is modern facility. Much better controls and monitoring were put in place there, so we don't expect that facility to be a major contributor to site total plutonium releases.



### What the Airborne Pu Release Estimate based on Hyatt's data (170 Ci) Includes

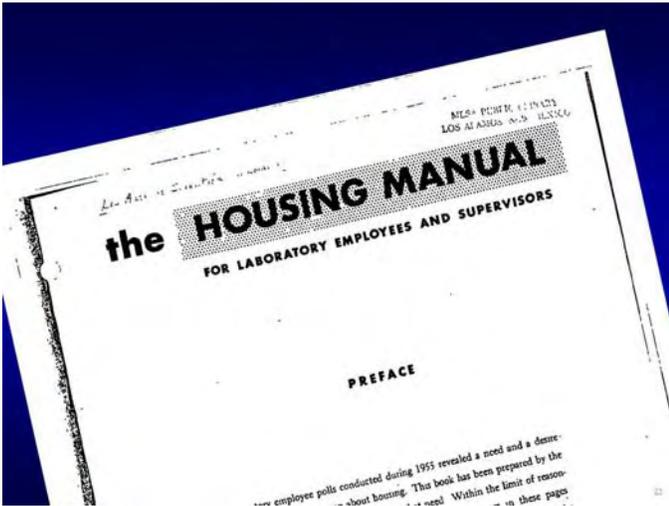
D Building Stacks 1944-53	DP Site Bldg 12 Stacks	8 of 34 y of ops.
DP Site Building Vents	Accidents and Incidents	
CMR Building Exhausts	Burial ground fires	
Waste Disposal: (burial, incinerators, etc.)	TA-55 releases	

If you look at which contributors to site-total plutonium releases are reflected in the 170-Ci release estimate, you will see that only one source is included, and even that one for only 8 of the 34 years of DP West Site operations.

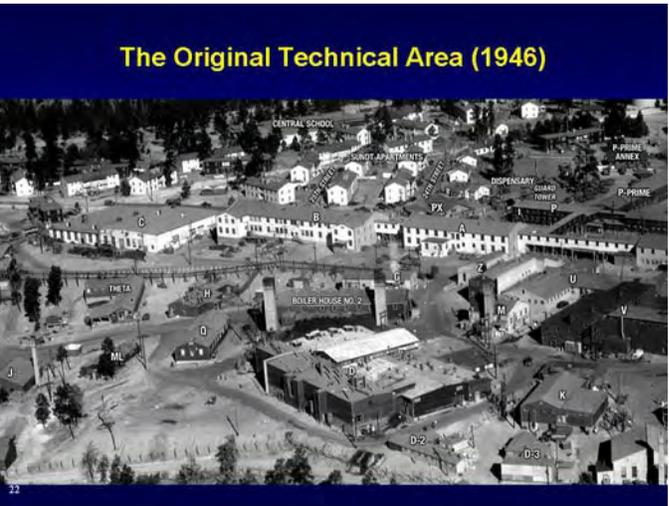
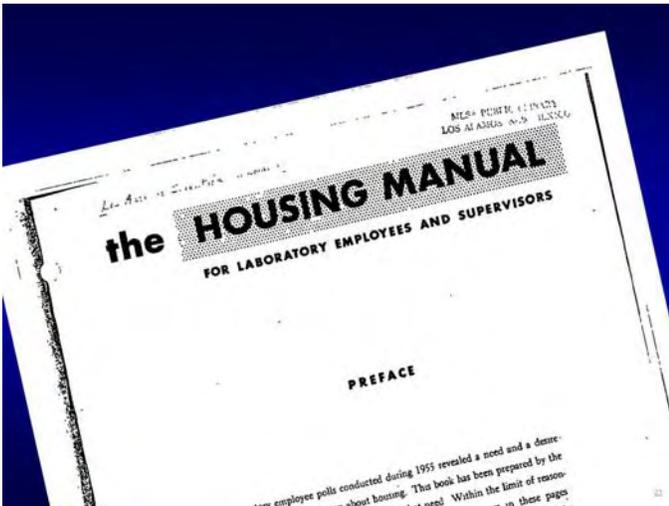


- ### Based on the Adjusted Data
- Total releases might climb well above 170 Ci with all sources and years included
  - Compare to other DOE sites' Pu releases:
    - Rocky Flats: roughly 24 Ci.
    - Hanford: just under 2 Ci.
    - Savannah River: roughly 13 Ci.
  - ~39 Ci combined for the three production plants vs. 170+ Ci for LANL
  - With people living *much closer* to LANL

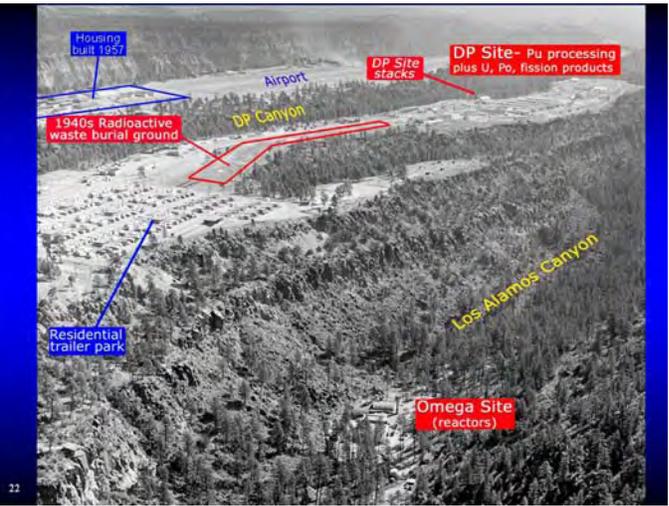
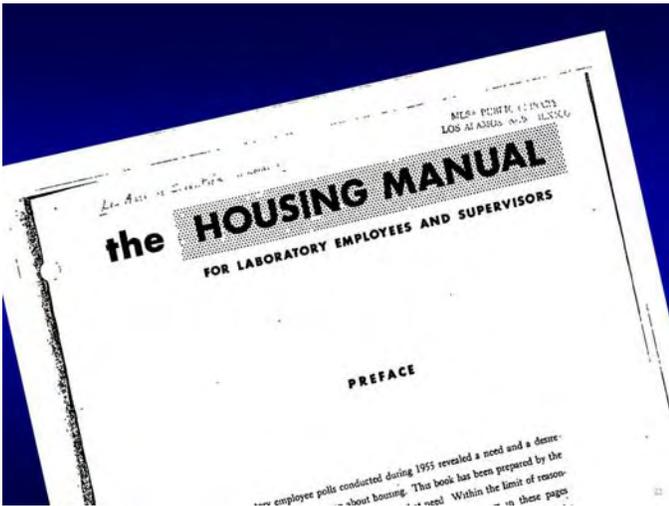
The reason we are particularly concerned about these releases from Los Alamos operations is that people were living much closer to key operational buildings than at any other major DOE site.



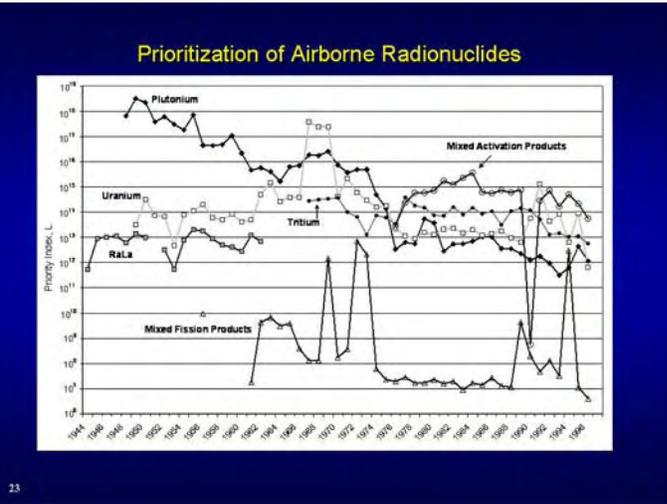
I will show several illustrations of the closeness of residential areas. This photo shows the Original Technical Area from above. You can see D Building, V Building, and Sundt Apartments across the street. Again, compared to other DOE sites, possibly tied to the image of Los Alamos being “not a production facility,” the people lived quite close to where the processing was done.



This is another view in which you can see D Building and the Sundt apartments.



This is the view toward DP West Site. You can see a residential trailer park south of DP Road, right next to Material Disposal Area B, the 1940s-era radioactive waste burial ground. It is not too far from DP West Site with its four stacks that are labeled, and was directly above Omega Site in Los Alamos Canyon, where five versions of nuclear reactors were operated. This is another example how people were not far from the “action.”



As far as prioritization of airborne release, I mentioned how we used the “dilution volume required” method. This graph shows the Priority Index values, which represent the liters of air required to dilute the annual release total for each year. You can see that plutonium releases were most important in the early years. We think that the three elevated uranium values reported around 1968-1970 might be erroneous. Uranium expended in explosive tests might have been reported with no accounting for a release fraction. Mixed Activation Product radionuclides show up as important in later decades, largely from operations of the LANSCE accelerator.



### Classes of airborne radionuclides with highest Priority Indices for each period of LANL operations

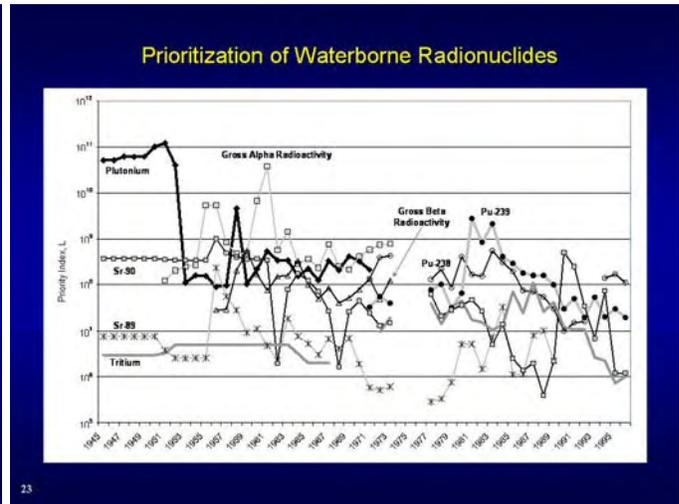
Years	Radionuclide Class	Range of PIs (L)
1944-1947	Radioactive Lanthanum	$6 \times 10^{11}$ to $1 \times 10^{13}$
1948-1966	Plutonium	$7 \times 10^{14}$ to $1 \times 10^{18}$
1967-1969	Uranium	$1 \times 10^{17}$ to $1 \times 10^{17}$
1970-1974	Plutonium	$2 \times 10^{14}$ to $3 \times 10^{15}$
1975	Uranium	$7 \times 10^{13}$ to $7 \times 10^{13}$
1976-1977	Tritium	$3 \times 10^{13}$ to $4 \times 10^{14}$
1978-1989	Mixed Activation Products	$6 \times 10^{14}$ to $4 \times 10^{15}$
1990	Tritium	$1 \times 10^{14}$ to $1 \times 10^{14}$
1991	Uranium	$1 \times 10^{15}$ to $1 \times 10^{15}$
1992-1996	Mixed Activation Products	$6 \times 10^{13}$ to $7 \times 10^{14}$

If you look at each decade, you can see that RaLa was most important in the earliest years by default, because it was the only operation with data available for those years. This simple prioritization was used to determine which radionuclides were important and which were less important.



- ### Addressing Data gaps for Airborne Pu
- The LAHDRA team used several approaches to gain information about how high releases could have been during the periods when effluent monitoring was not performed or was incomplete:
    - Evaluation of historical measurements of Pu in soil samples collected around Los Alamos
    - Examination of measurements of Pu in human tissue samples collected at autopsy from 236 people who lived in Los Alamos.
    - Estimation of releases from the chemical processing in D Building using a process adopted by DOE.
    - Analysis of airborne radioactivity data from inside D Building to estimate what could have been released.

We looked at measurements of plutonium in soil samples to “back calculate” how much would have to have been released to match what is in the “environmental record” in the soil. This is what got us started on the path of believing that releases were much higher than officially reported. We are examining a rarely available set of data from measurements of plutonium in tissues from 236 people who had lived in the area. We have measurements of plutonium in the lung, liver, and vertebrae. We were able to reconstruct from public records where these people lived, and we are trying to get us much as we can from this rarely available data set. The problem with our estimation of emissions from D Building based on chemical processing techniques is that a lot of the emissions from that building came from accidents (i.e., dropping of beakers or leaks) rather than from day-to-day chemical processing if and when it progressed without event. Also for D Building, while we don’t have stack monitoring, we do have measurements of radioactivity in indoor air. We have used these data, with some knowledge of ventilation systems, to estimate releases from the building.



This graph shows the results of using the “dilution volume required” method for waterborne radionuclides.



Waterborne radionuclides with highest PIs for periods of LANL operations

Years	Radionuclide Class	Range of PIs (L)
1945-1952	Plutonium	$5 \times 10^{10}$ to $1 \times 10^{11}$
1953-1954	Strontium-90	$3 \times 10^8$ to $3 \times 10^9$
1955-1957	Gross alpha radioactivity	$8 \times 10^3$ to $5 \times 10^9$
1958	Plutonium	$5 \times 10^9$ to $5 \times 10^9$
1959	Gross beta radioactivity	$6 \times 10^3$ to $6 \times 10^9$
1960-1963	Gross alpha radioactivity	$6 \times 10^3$ to $4 \times 10^{10}$
1964	Gross beta radioactivity	$3 \times 10^3$ to $3 \times 10^9$
1965-1968	Gross alpha radioactivity	$2 \times 10^3$ to $8 \times 10^9$
1969	Plutonium	$4 \times 10^3$ to $4 \times 10^9$
1970-1973	Gross alpha radioactivity	$4 \times 10^3$ to $8 \times 10^9$
1977-1980	Plutonium-238	$9 \times 10^7$ to $4 \times 10^9$
1981-1989	Plutonium-239	$1 \times 10^3$ to $3 \times 10^9$
1990-1992	Strontium-90	$3 \times 10^7$ to $5 \times 10^9$
1993	Plutonium-239	$5 \times 10^7$ to $5 \times 10^7$
1994-1996	Plutonium-238	$1 \times 10^3$ to $2 \times 10^9$

Waterborne radionuclide classes with the highest priority indices for each period of operation are presented here.

# prioritization



## Prioritization of Chemicals

- LANL operations have used many non-radioactive materials, including metals, inorganic chemicals, and organic chemicals including solvents.
- Chemical use and release data were extracted from chemical inventories and various LANL documents.
- Prioritization took into account estimates of annual usage and USEPA toxicity values such as cancer potency slope factors and reference doses (RfDs).

Information concerning uses and releases of chemicals was difficult to find, particularly before the 1970s. It is very hard to find chemical inventory or effluent data for the early years. We talked to the modern day chemical inventory folks, and they think anything before 1985 is ancient history. We have a lot of Health Division reports, a lot of correspondence, and we've tried to pull the information we can from these to estimate the amounts of different chemicals that were used.

# prioritization



## Prioritization of Chemicals

- Carcinogenic chemicals were ranked based on estimated annual usage multiplied by the applicable cancer slope factor.
- Non-carcinogens were ranked by dividing the annual usage by the applicable RfD.

# prioritization



Chemical	Slope Factor (SF)	Reference Dose (RfD)	Peak annual use	Ranked based on cancer effects		Ranked based on non-cancer effects	
	(mg kg <sup>-1</sup> d <sup>-1</sup> ) <sup>-1</sup>	(mg kg <sup>-1</sup> d <sup>-1</sup> )	(kg)	Use × SF	Rank	Use × RfD <sup>-1</sup>	Rank
Acetone	-	0.9	18,800	-	-	20,889	13
Benzene	0.055	0.004	181	10	7	45,250	9
Carbon tetrachloride	0.13	0.0007	558	73	5	797,143	5
Chlorodifluoromethane	-	14.3	32,200	-	-	2,252	17
Chloroform	0.0805	0.01	3,088	249	4	308,800	7
Dichlorodifluoromethane	-	0.0571	32,200	-	-	563,923	6
Dioxane	0.011	-	32	0.35	8	-	-
Methanol	-	0.5	6,600	-	-	13,200	14
Methyl ethyl ketone	-	0.6	22,000	-	-	36,667	12
Methylene chloride	0.008	0.06	2,200	17	6	36,667	11
n-Hexane	-	0.06	304	-	-	5,067	16
Tetrachloroethylene	0.54	0.01	10,540	5,692	2	1,054,000	4
TNT (2,4,6-trinitrotoluene)	0.03	0.0005	37,950	1,139	3	75,900,909	3
Toluene	-	0.08	3,300	-	-	41,250	10
Trichloroethane	-	0.2	39,300	-	-	16,500	8
Trichloroethylene	0.4	0.0003	27,719	11,088	1	92,396,667	1

This is a portion of the table in which we summarize the prioritization of chemicals.

# prioritization



Chemical	Slope Factor (SF)	Reference Dose (RfD)	Peak annual use
	( $\text{mg kg}^{-1} \text{d}^{-1}$ ) <sup>-1</sup>	( $\text{mg kg}^{-1} \text{d}^{-1}$ )	(kg)
Acetone	-	0.9	18,800
Benzene	0.055	0.004	181
Carbon tetrachloride	0.13	0.0007	558
Chlorodifluoromethane	-	14.3	32,200
Chloroform	0.0805	0.01	3,088

Zooming in a little closer, we see that each chemical listed has a cancer potency slope factor and/or a reference dose.

# prioritization



Reference Dose (RfD) ( $\text{mg kg}^{-1} \text{d}^{-1}$ )	Peak annual use (kg)	Ranked based on cancer effects		Ranked based on non-cancer effects	
		Use $\times$ SF	Rank	Use $\times$ RfD <sup>-1</sup>	Rank
0.9	18,800	-		20,889	13
0.004	181	10	7	45,250	9
0.0007	558	73	5	797,143	5
14.3	32,200	-		2,252	17
0.01	3,088	249	4	308,800	7
0.0571	32,200	-		563,923	6

The toxicity values were coupled with estimates of annual usage to rank carcinogens and non-carcinogens.

# prioritization



## Results of Chemical Prioritization

- Four of the top five ranked carcinogenic chemicals were organic solvents.
- Trichloroethylene ranked highest for both cancer and non-cancer effects.
- For chemicals with cancer potency slope factors and some usage data available, TNT ranked highest for a non-solvent.
- Uranium as a heavy metal ranked highest for non-cancer effects among materials that are not solvents, followed by TNT.

If further work is done, we recommend that a screening assessment be conducted for chemicals. We've ranked chemicals within each category, but we haven't addressed how important any might have been in absolute terms.

# screening

Pu

Be

<sup>3</sup>H

U

## Preliminary Screening Assessments

- Screening-level assessments of potential public exposures were performed for:
  - Airborne plutonium from DP West Site
  - Airborne beryllium from four types of operations
  - Airborne tritium releases
  - Airborne uranium releases
- Each assessment, to some extent, used the methodology of the National Council on Radiation Protection and Measurements' Report No. 123.

As I mentioned, we asked CDC that a number of historical releases be taken past prioritization into screening.

# screening

Pu

Be

<sup>3</sup>H

U

## Screening of Airborne Pu Releases

- Addressed the apparent year of peak emissions, 1949, with 64 Ci.
- Nearest residents were in the trailer park south of DP Road (1,047 m west)
- Produce was available from gardens, but no animals likely raised in town.
- Results were compared to a Limiting Value based on 1 in 100,000 added risk of fatal or nonfatal cancer.

# screening

Pu

Be

<sup>3</sup>H

U



Here you can see modern aerial photo that shows DP West Site with an overlay showing where the trailer park was built around 1947. The trailer park was occupied until 1963, just over a kilometer away from the Building 12 release points. Group 18 housing to the west of the airport (top center), which could have been the closest housing for later years, was not established until 1957.

# screening



26

## Results of Screening of Airborne Pu Releases from the Building 12 stacks at DP West Site in 1949

Level	Features of Screening Methodology	Screening Value (Sv y <sup>-1</sup> )	Screening Limit exceeded?	NCRP Guidance
I	All pathways, concentration at exposure point set equal to 25% of stack conc.	313	Yes	Proceed to Level II
II	All pathways, Gaussian plume modeling to exposure point outside near-wake region, wind blows toward exposure point 25% of time.	0.367	Yes	Proceed to Level III
III	Specific pathways (inhalation, external exposure, consumption of vegetables), same dispersion assumptions as Level II.	0.367	Yes	"Seek assistance from experts in environmental radiological assessment"

26

We applied three levels of screening. One thing I should point out is that the screening values are solely for determining if compliance with the limiting value is assured, or whether more rigorous assessment of releases is warranted. They should not be considered estimates of doses to actual people. Under the NCRP Report No. 123 method, airborne plutonium releases from DP Site, as represented by releases from 1949, warrant a closer look.

# screening



27

## Screening of Airborne Beryllium Releases

- Much beryllium was used at Los Alamos before its hazards were known.
- It was used in atomic bomb initiators, reactor parts, and metallurgy experiments.
- Worker hazards were clear— deaths were attributed to beryllium exposure— but public hazards have not been as well assessed.
- Early processing and testing took place right across the street from residences.

27

# screening



27

## Sources of Airborne Beryllium Releases

- Machining, grinding, sanding, and handling of beryllium components typically occurred in machine shops or laboratories
  - The "Old Beryllium Shop" in V Building in the Original Technical Area (1943-53)
  - Beryllium Shop in Building SM-39 at TA-3 (South Mesa; started up in 1953)

27

screening

Pu

Be

<sup>3</sup>H

U

27

## Sources of Airborne Beryllium Releases

- Early in the 1940s, beryllium oxide powder was hot pressed to make moderator bricks for the "Water Boiler" reactor.
- This operation took place in Q Building in the Original Technical Area.

27

We have been told that the powder pressing was a particularly messy operation.

screening

Pu

Be

<sup>3</sup>H

U

27

## Sources of Airborne Beryllium Releases

- In an annex to B Building, a 20-mm Hispano-Suiza anti-aircraft autocannon was used to test scaled versions of gun-type weapon components and initiators.
- By Sept. 1944, the cannon had been used in nearly 180 experiments at a frequency of approximately one per day.
- The annex that was an unmonitored release point for beryllium and polonium.

27

screening

Pu

Be

<sup>3</sup>H

U

27

## Sources of Airborne Beryllium Releases

- Beryllium and other materials were used in explosive tests in the open air or with containment or confinement at facilities such as the Pulsed High Energy Radiographic Machine Emitting X-rays (PHERMEX) facility at TA-15.
- LANL personnel report that 1,224 kg of beryllium was used in dynamic testing at Los Alamos through 1997, with a peak of just over 100 kg in 1964.

27

# screening

Pu

Be

$^3\text{H}$

U

27

## Estimating Beryllium Releases

- "New" Beryllium Shops: Releases after 1963 (HEPA filters in place) were based on documented releases for 1964-66 and 1968-70; 1970 was highest.

Releases for 1953-1963 (before HEPA filters added) were based on 1970 releases times a factor of 167.

That's the ratio of the reduction factor for HEPA filters (99.97% efficient) to the reduction factor for the older filters (of assumed 95% efficiency).

27

HEPA filters were installed on SM-39 shop exhaust in 1964.

# screening

Pu

Be

$^3\text{H}$

U

27

## Estimating Beryllium Releases

- V Shop: Because of similarity of operations, releases for 1949-53 were assumed equal to those from the SM-39 shop before HEPA filters were added. For 1943-48, when not even crude filters were used, releases were assumed to be 20x higher.

- Beryllium Oxide Pressing: Releases based on an order for 6,100 lbs of BeO during 1944 for reactor components. Use of a release fraction of 0.25% yields a release of 2,500 g of beryllium over 1,600 working hours.

27

# screening

Pu

Be

$^3\text{H}$

U

27

## Estimating Beryllium Releases

- B-Building Gun Testing: Based on a frequency of 1 shot per day, 7 d per week, using 20-mm diameter projectiles that contained 120 g of beryllium.

It was assumed that 10% was aerosolized, yielding a release of 12 g per test over a 6-minute period.

27

screening

Pu

Be

<sup>3</sup>H

U

27

### Estimating Beryllium Releases

- Dynamic Testing at PHERMEX: Based on reported peak of 106 kg in 1964.

Assumed that 100 shots occurred in 1964; 80% did not involve beryllium and 20% did.

Of the 20 shots with Be, assumed that 16 used 3.31 kg Be and four used 13.25 kg.

If 10% of the Be in a larger shot was aerosolized, 1.325 kg released over 15 min.

27

screening

Pu

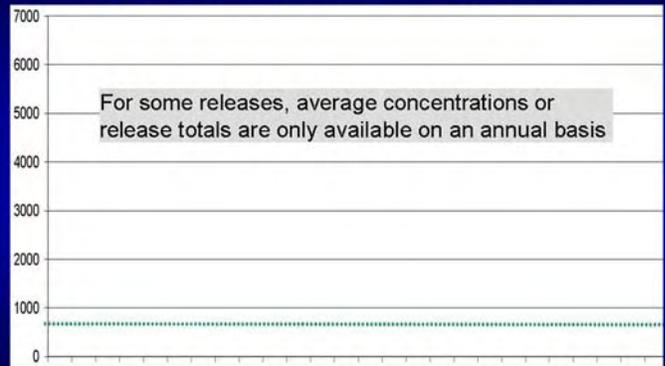
Be

<sup>3</sup>H

U

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### Regarding Durations of Exposures



27

One of the challenges in assessing beryllium releases is that, for some operations, usage or release data are only available as annual totals. This graph depicts an annual-average concentration for a Los Alamos facility in 1956.

screening

Pu

Be

<sup>3</sup>H

U

27

### Regarding Durations of Exposures



But if you were to look at monthly data, you would see that concentrations vary considerably over time. They are sometimes higher than the annual average, and sometimes lower.

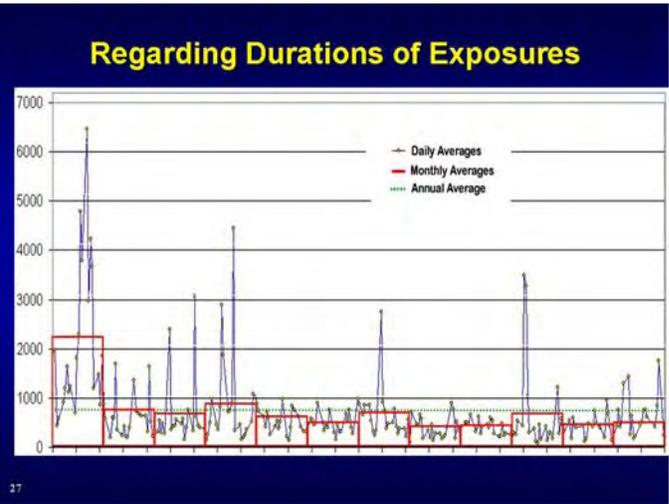
screening

Pu

Be

<sup>3</sup>H

U



And if daily average concentrations were measured, as shown here, you can see that there was significant variation. From a toxicity perspective, peak exposures are particularly important for potential health effects from beryllium exposure. Basing a screening assessment on an annual average concentration could be very misleading. For a number of beryllium sources, we only have annual data, but we wanted to come up with a way to estimate how high peaks could have been. What we did was look at plutonium release data that are available from DP West and made the assumption that beryllium varied over time in a similar pattern. This is a big assumption. If further work is done with beryllium, we suggest that temporal variation of beryllium releases be more closely examined. For preliminary screening, however, we thought this would be a good first step.

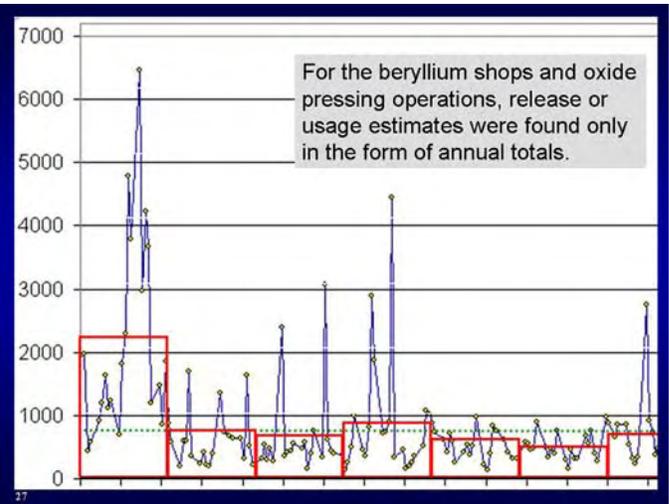
screening

Pu

Be

<sup>3</sup>H

U



We statistically analyzed the detailed plutonium release data and came up with factors to apply to annual beryllium release totals to estimate how high average release rates could have been over 6-minute, 30-minute, 8-hour, and 30-day periods.

screening

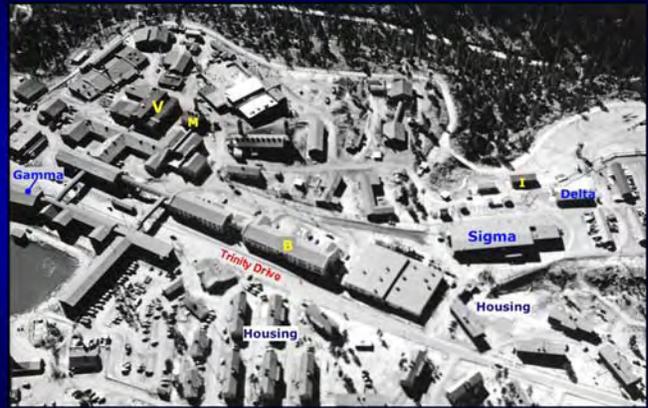
Pu

Be

$^3\text{H}$

U

### Facilities Active in Early Beryllium Processing



Some of the facilities in the original technical area that housed beryllium processing are shown here. V Building was the “old shop” and B Building housed the gun testing. Sigma Building, Delta Building, and other facilities also handled beryllium, but we know less about operations there.

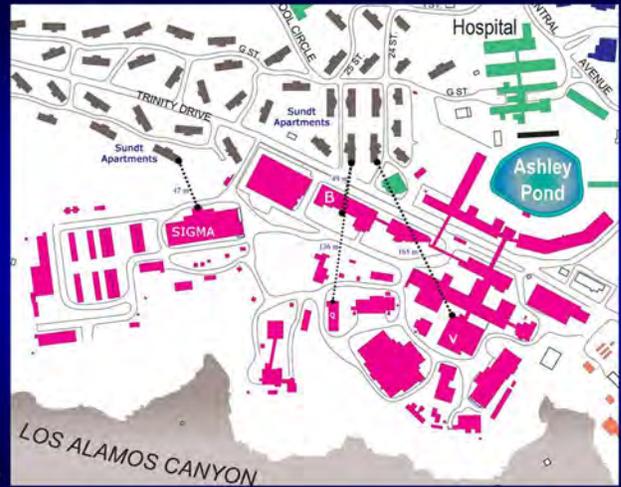
screening

Pu

Be

$^3\text{H}$

U



You can see here that some key facilities were only about 50 meters from the closest residences.

screening

Pu

Be

$^3\text{H}$

U



The “new” SM-39 shop is about 960 meters from Western Area housing located across Los Alamos Canyon.

# screening

Pu

Be

<sup>3</sup>H

U

27



27

And the PHERMEX facility is about 4.5 kilometers from Royal Crest Trailer Park.

# screening

Pu

Be

<sup>3</sup>H

U

27

	B-Building Gun Tests <sup>a</sup>	BeO Powder Pressing	V Shop 1943-48
Distance to exposure point (m)	49	140	170
Relative concentration (s m <sup>-3</sup> )	1.1×10 <sup>-2</sup>	2.5×10 <sup>-4</sup>	1.1×10 <sup>-4</sup>
Release rates (μg s <sup>-1</sup> ) for relevant averaging periods;			
0.1 h:	33,000	64,000	12,000
0.5 h:	6,700	20,000	3,900
8 h:	420	3,600	680
730 h (1 month):	140	150	29
Exposure point concentrations (μg m <sup>-3</sup> ) for relevant averaging periods;			
0.1 h:	350 <sup>c,d</sup>	16 <sup>d</sup>	1.4 <sup>d</sup>
0.5 h:	71 <sup>c,d</sup>	5.1 <sup>d</sup>	0.44 <sup>d</sup>
8 h:	4.4 <sup>b,d</sup>	0.90 <sup>d</sup>	0.077 <sup>d</sup>
730 h (1 month):	1.5 <sup>d,e</sup>	0.038 <sup>d,e</sup>	0.0033

27

For each operation, we estimated the distance to the nearest residence and used the air dispersion models of the NCRP Report No. 123 method to estimate exposure point concentrations based on the estimated release rates for the different averaging periods. These concentrations were compared to occupational and ambient exposure limits. Occupational limits are not applicable to ambient concentrations, but the public is generally afforded an extra degree of protection compared to workers, so levels in public areas should certainly not be higher than worker limits.

# screening

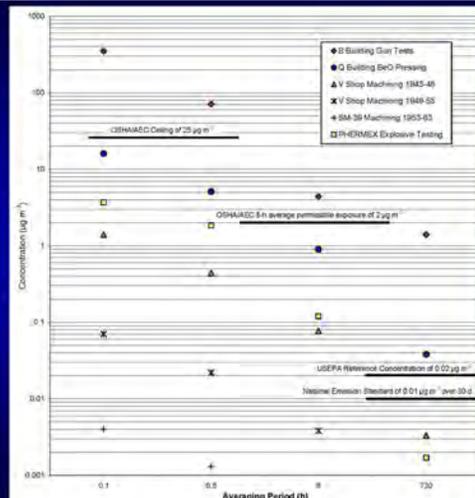
Pu

Be

<sup>3</sup>H

U

27



27

You can see that the B Building gun tests could have caused the OSHA ceiling to be exceeded for a 6-min release or a 30-min release. The OSHA 8-hr limit could have been exceeded by the gun tests, and the EPA 30-day limit could have been exceeded by oxide pressing and the B Building gun tests. We compare the estimated concentrations in public areas to these limits to show that the beryllium operations may warrant a closer look.

# Trinity

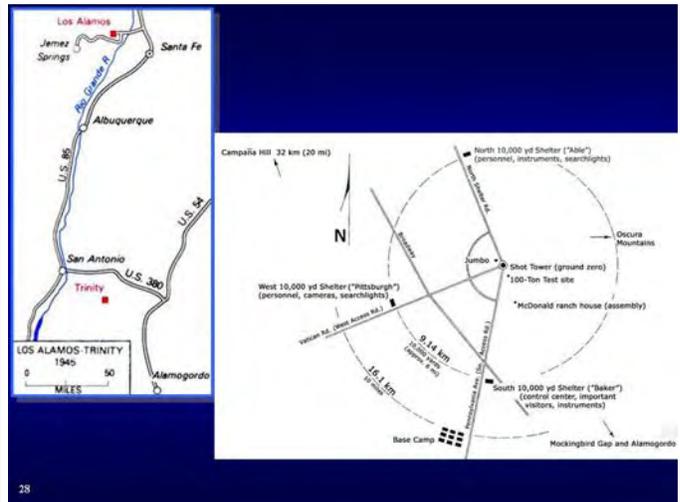


## The World's First Test of an Atomic Bomb

- During WW II, two atomic weapon concepts were carried through to production at Site Y.
- The implosion-assembled plutonium-based design was by far the more complicated.
- A test of that device was judged necessary.
- A "Fat Man" device was tested at the Trinity Site near Socorro NM on 16 July 1945
- Seen by some as one of the most significant events in world history, the Trinity test fell within the scope of the LAHDRA project.

The next area that has particularly attracted our attention as likely important is public exposure from the Trinity Test.

# Trinity



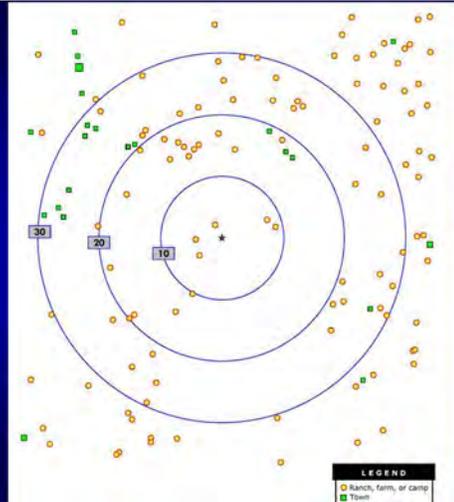
Eight sites in the US were considered for the Trinity test. Trinity was selected because (in part) it was mostly Government land already, and because of its proximity to Los Alamos.

# Trinity



The closest population centers were Socorro to the northwest and Carrizozo to the southeast.

# Trinity



Many people think that the area was deserted. But, based on maps distributed in the early 1950s, this figure shows where a good number of ranches, towns, and camps were located within about 40 miles of the test site.

# Trinity



The Trinity device was detonated on top of a 100-ft tower. The top right photo shows the “gadget” as they called it. The bottom right photo shows an old sign and the modern obelisk that have marked ground zero for the detonation.

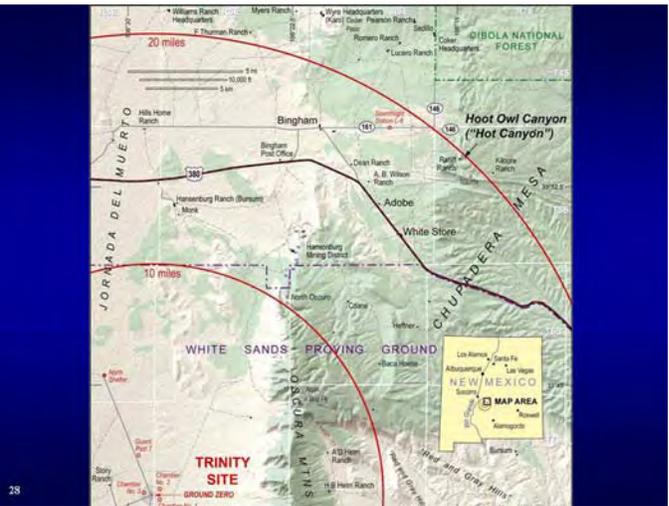
# Trinity



## The Trinity Blast – 16 July 1945 ~ 5:29 am

- Published yield: 21 kt of TNT equivalent
- A mushroom cloud rose to over 38,000 ft within minutes, and the heat of the explosion was 10,000 times hotter than the surface of the sun.
- At 10 mi away, this heat was described as like standing by a roaring fireplace.
- At  $t + 15$  min, the cloud divided into three parts, but traveled mostly to the NE.

# Trinity

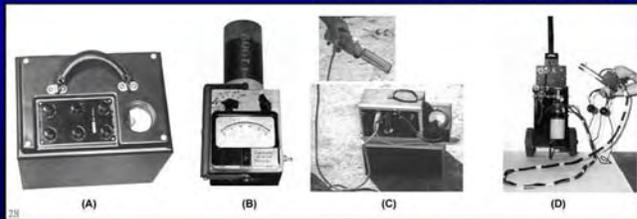


The map shows the areas to the northeast where highest exposures were measured from Trinity test fallout.

# Trinity



## Field Monitoring Teams



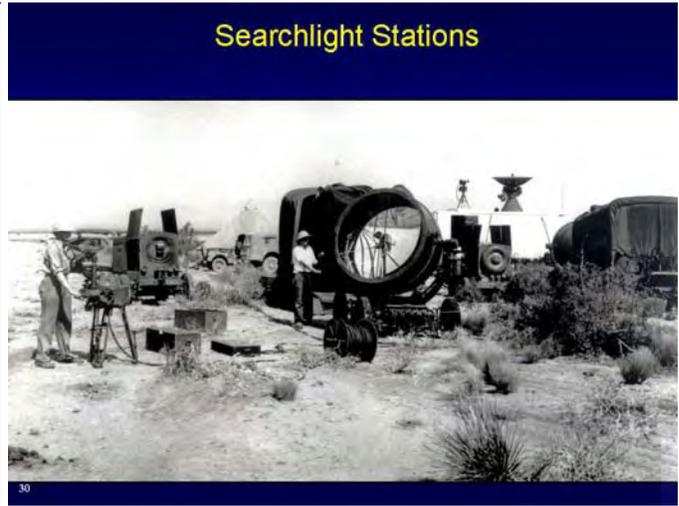
There were field monitor teams that were dispatched around the countryside after the Trinity blast. They used crude instruments that were not well suited for use in the dusty, hot environment or on rough roads. The instruments pictured are (left to right) a Victoreen Model 247 ionization chamber; a "Watts' Meter" ionization chamber; a Hallicrafters G-M count rate meter; and a "Supersnoop" methane gas-flow alpha counter.



## Bingham

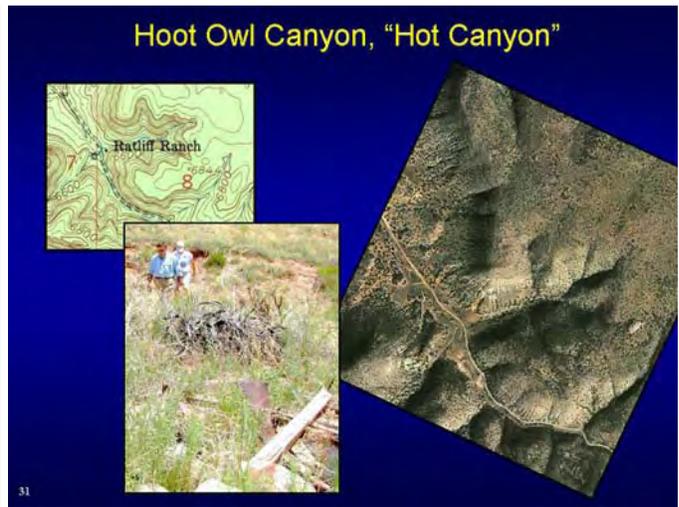


Areas of interest where particularly high exposure rates were measured include the town of Bingham. You can see the Bingham post office here.



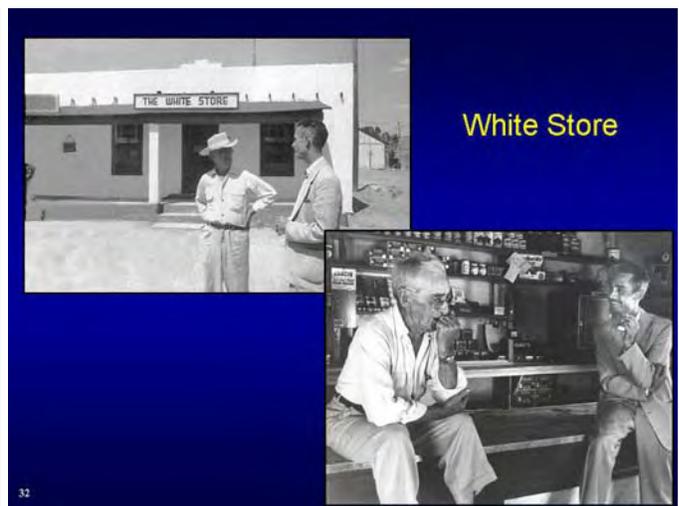
## Searchlight Stations

Several searchlight stations were placed in the area to illuminate and plot the path of the cloud from the blast, which was supposed to happen in darkness. Searchlight Station L-8, shown on the map here, was near where the cloud first touched down. This area experienced particularly high exposure rates. When the men at Station L-8 thought their work was done, they cooked steaks over an open fire. Their steaks became so heavily contaminated with fallout radioactivity that they had to bury them and relocate.



## Hoot Owl Canyon, "Hot Canyon"

Another area of interest was Hoot Owl Canyon, which became known to project staff as "Hot Canyon." Terrain and airflow patterns caused high deposition near this canyon.

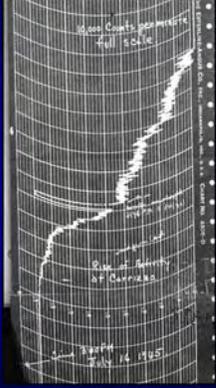


## White Store

White Store was a settlement that was named after the business shown here. This is one of the areas that the monitoring teams focused their attention on along Highway 380 because of elevated exposure rates measured in the area. The photo to the right shows Los Alamos health physicist Wright Langham visiting a proprietor of The White Store about 10 years after the Trinity blast.



### Carrizozo

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Carrizozo, about 32 miles to the southeast, saw the radioactive cloud pass over initially without any recognized elevations of exposure rates. But then a wind shift occurred and radioactivity came back over the town. You can see the strip chart on the right peak around 3 p.m. on the day of the test, pegging around 10,000 counts per minute. Medical staff came very close to recommending evacuation, but decided against it.

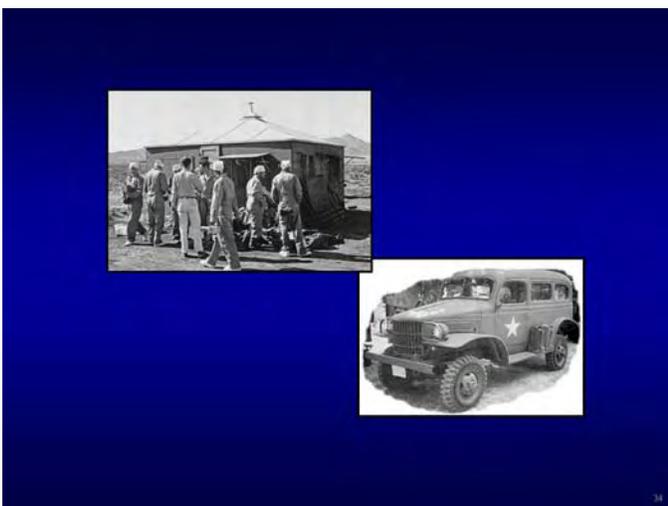


### Measured External Gamma Exposure Rates

- Exposures on test day were measured up to 15 or 20 R/h around Bingham and Searchlight Station L-8.
- The “hottest” residential areas on Day 2 were not known to monitoring teams, could have been higher on the day of the blast.

34

The Army tried to map the locations of all residences around the Trinity Site, but they missed a few. The Ratliff ranch and the Wilson ranch were in areas of high deposition, but were not known to exist until the day after the blast.



**Table 10-1.** Exposure rates 0.1 R h<sup>-1</sup> or greater measured 16-17 July 1945 near Trinity Site

Date and Time	Off-Site Location <sup>a</sup>	Recorded Exposure Rate (R h <sup>-1</sup> )
7:30 a.m.	Searchlight Station L-8	0.1
7:45 a.m.	11-16 km W of Carthage on US 380	0.2
8:00 a.m.	Searchlight Station L-8	0.5
8:25 a.m.	Bingham	1.5
8:25 to 9:15 a.m.	Searchlight Station L-8	2.0
8:29 a.m.	0.4 km W of Hansenburg Ranch	0.25
8:30 a.m.	Searchlight Station L-8	0.1
8:30 a.m.	5.6 km SE of L-8 ("Hot Canyon" area)	"vicinity of 20"
8:35 a.m.	Searchlight Station L-8	2
8:42 a.m.	1.6 km E of Bingham along US 380	1.0
8:45 a.m.	3.3 km W of Bingham	1.6
8:45 a.m. <sup>c</sup>	"Cooler spot" retreated to from 8:30 spot in canyon	15
8:46 a.m.	3.2 km E of Bingham along US 380	2.2
8:47 to 8:56 a.m.	From Searchlight Station L-8 to Hot Canyon	1.2 to 14.5
8:49 a.m.	Bingham	3.3
8:49 a.m.	6.4 km E of Bingham along US 380 (Adobe)	6.5
8:50 a.m.	4.8 km E of Searchlight Station L-8	15.0
8:50 a.m.	Hansenburg Ranch	0.45
8:56 to 9:40 a.m.	From Hot Canyon to Searchlight Station L-8	1.5 to 6.5

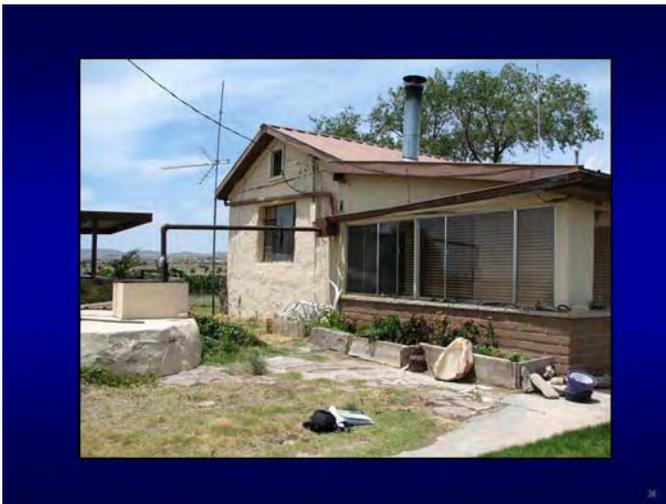
34

In the report, you'll see a table like this that gives a chronology of exposure rates above 100 mR/hr that were recorded starting at 7:30 am. You can see Hot Canyon's "vicinity of 20 R/hr" measurement. It is recorded that the monitoring team members retreated to a "cooler spot" after that measurement, and no further investigation was done of what the exposure rates in the canyon could have actually been.



### Fallout from the Radioactive Cloud

- Ranchers reported that fallout “snowed down” for days after the blast.
- A rancher whose house was 20 mi NE of ground zero reported that “for four or five days after [the blast], a white substance like flour settled on everything”



### Fallout from the Radioactive Cloud

- Local ground water was not palatable to humans, so many residents collected rain water off their metal roofs into cisterns and used it for drinking water.
- It rained the night after the test, so fresh fallout was likely consumed in water.
- Most ranches had one or more dairy cows and a ranch near Hot Canyon maintaining a herd of 200 goats.

We have some indication that the goats raised at the Ratliff ranch were raised for their hair or wool, not for milk.



### Monitoring Team Measurements

- Monitors used instruments that were crude, ill suited to field use, and incapable of effectively measuring alpha contamination.
- About 4.8 kg of unfissioned plutonium was dispersed.
- Monitoring team records show that vehicle shielding and contamination were recognized but not corrected for.

Many recorded measurements were made inside vehicles with the windows rolled up, in some cases while traveling along a road at a good rate of speed. A team member traveling east from Searchlight Station L-8, realizing that he had forgotten his respirator, drove back to get it with his windows rolled up and breathing through a slice of bread.

# Trinity



## Protective Action Decisions

- To preserve the secrecy of the mission and avoid claims against the Army, residents were not warned before the blast.
- They were not informed of residual health hazards afterward.
- Site workers knew to evacuate areas, to wear respirators, to close their windows and breathe through a slice of bread, and bury their contaminated food rather than eat it.
- Members of the public did not realize that changes in their behavior were prudent.

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# Trinity



## Protective Action Decisions

- Exposure rates, total exposures, and alpha count rates exceeded pre-established limits.
- A “cover story” was in place that would have provided for relatively inconspicuous evacuation of selected residents.
- Evacuation personnel, vehicles, shelters, and supplies were on standby.
- But no evacuations of members of the public were conducted.

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A “cover story” press release stated that an ammunition magazine had exploded on the nearby airbase. It said that the magazine contained some gas shells, and that evacuation of selected populations might be necessary.

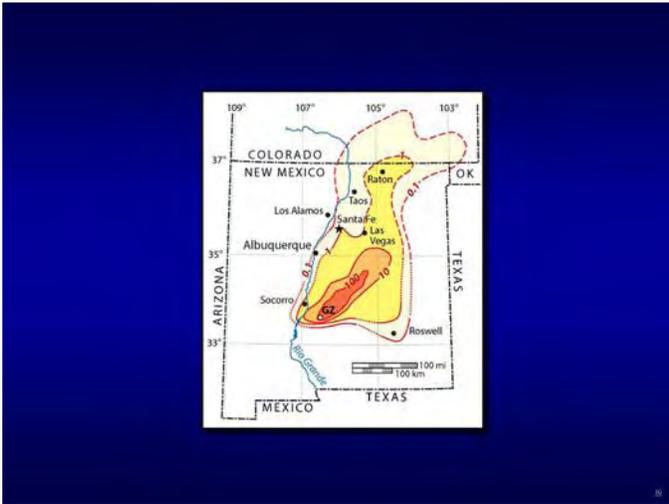
# Trinity



## Lessons Learned from the Trinity Test

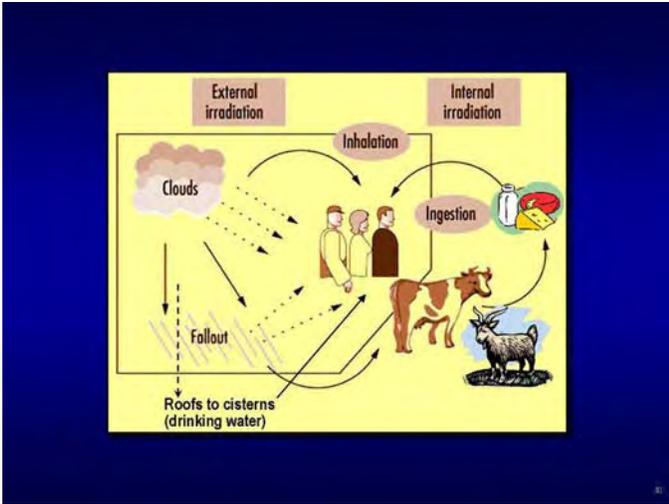
- Exploding devices so close to the ground decreases blast power and enhances fallout production.
- The Trinity Site was judged too small for further testing. Called for 150 mi separation rather than ~15 for Trinity.
- Terrain features and wind patterns can cause “hot spots” of particularly high radioactive fallout.

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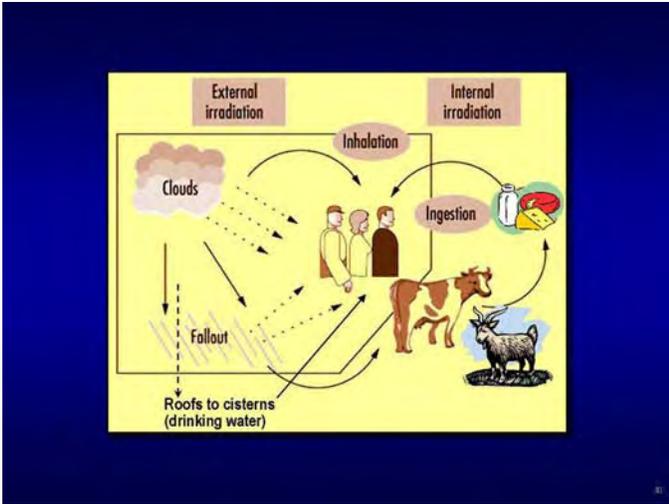


- ### Fallout Was Not Just Local or Regional
- Exposure rate contours were generated based on field team data by the Weather Service Nuclear Support Office and extended by LLNL.
  - Airplanes equipped with filters followed the Trinity cloud across Kansas, Iowa, Indiana, upstate New York, New England, and out to sea.
  - Kodak observed spotting on their film that was traced to contamination from Trinity.

The figure on the left shows estimated local Trinity fallout patterns represented as exposure rate, mR/hr at t + 12 h, based on the field monitoring team data analyzed by WSNSO, extended (dashed lines) with LLNL modeling.



- ### Trinity Dose Assessments To Date
- All assessments of public exposures from the Trinity Test published to date have been incomplete.
  - They have not reflected internal radiation doses from intake of contaminated air, water, or food products.
  - The National Cancer Institute reportedly completed a preliminary dose assessment, but it has not been publicly released.
  - The LAHDRA team supplied site-specific information to support the NCI work.



- ### Trinity Dose Assessments To Date
- Too much remains undetermined about exposures from the Trinity test to
    - put the event in perspective as a source of public radiation exposure, or to
    - defensibly address the extent to which people were harmed.
  - Beyond omission of internal doses, assessments to date have been based on monitoring data that have not been subjected to quality checking, cross-checking against other data sources, application of appropriate adjustments or corrections, or uncertainty analysis.

screening

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### Airborne Tritium Releases

- LANL first requested H-3 from Oak Ridge in 1944.
- LANL received H-3 in increasing quantities over the decades that followed for use at 10 or more sites.
- Annual airborne releases 1967-1995 were never lower than 10,700 Ci, and peaked at 38,600 Ci in 1977.

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### Airborne Tritium Releases

- No airborne H-3 effluent data have been found for years prior to 1967.
- Scattered incident reports describe episodic releases of H-3 that total 64,890 Ci in 1965 and 39,000 Ci in 1958.
- Episodic releases of H-3 before 1967 included accelerator losses of 10,000 Ci of H-3 that "have been happening for 13 years."

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In spite of the fact that tritium has been used since the 1940s, no effluent data for years before 1967 are included in official reports of environmental releases. This represents another important data gap.

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### Screening for Airborne Tritium

- NCRP Report No. 123 screening was performed for available H-3 release data.
- The chemical composition is very important for airborne H-3 releases.
  - If inhaled, tritium gas is not incorporated into the body to any appreciable degree.
  - Tritium oxide behaves as water and is readily incorporated into body tissues.
- H-3 has mainly been used as tritium gas at LANL.
- Oxide was likely formed in explosive testing and water reactions with tritium-bearing salts.

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## Screening for Airborne Tritium

- Used the peak releases reported for each of six TAs that released the most H-3.
- Release totals were re-stated in terms of the corresponding tritium oxide activity.
- The upper bound for the fraction of H-3 gas converted to oxide was taken to be 1%.
- The nearest residential population was identified for each release point.
- Included inhalation and consumption of contaminated soil and vegetables.

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## Screening for Airborne Tritium

- Level I screening for TA-3 releases exceeded the screening criterion by a substantial margin.
- Level II screening showed that only in the case of TA-35, for which the release was considered 100% oxide, was the adjusted screening criterion exceeded.
- Screening suggests that airborne tritium releases after 1966 do not warrant high priority.

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## Screening for Airborne Tritium

- The situation could change if releases consisted of a greater fraction as tritium oxide than has been considered here.
- Tritium release events before 1967 are described in numerous scattered documents, but release totals have not been compiled that would support evaluation of off-site exposures.
- Airborne tritium releases before 1967 represent a notable data gap.

If there are any other operations in which tritium was converted to oxide to any significant extent, that would be an important factor.

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## Screening for Airborne Uranium

- Uranium, at various levels of  $^{235}\text{U}$  enrichment, has been used in a variety of applications at LANL.
  - As fissile material and "tamper" in weapons
  - In liquid and solid forms as nuclear reactor fuel
  - In explosive testing at Los Alamos (between 75,000 and 95,000 kg expended 1949-1970).
- NCRP Report 123 screening was performed for releases for 1972, when LANL reported 1,200  $\mu\text{Ci}$  of  $^{234}\text{U}/^{235}\text{U}$  released at TA-21.

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## Screening for Airborne Uranium

- Exposures were evaluated at townsite apartments about 1,460 m distant.
- Considered inhalation, immersion, irradiation from contaminated ground, and consumption of contaminated soil and vegetables.
- Yielded a screening value of  $1.7 \times 10^{-6}$  Sv (0.17 mrem), well below the limiting value.
- The uranium release reported for TA-21 for 1972 does not warrant high priority.

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## Screening for Airborne Uranium

- Screening was also performed for depleted uranium released at TA-3 in 1973 (640 kg = 0.211 Ci).
- Nearest residences were at the Western Area, ~1,040 m from the Sigma Complex.
- The screening value of  $4.4 \times 10^{-4}$  Sv (44 mrem) exceeds the screening criterion.
- This indicates that further investigation into potential health risks might be warranted.

# screening

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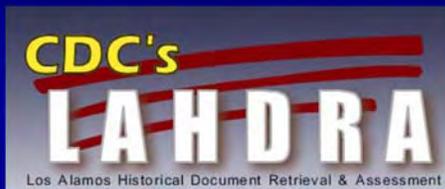
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## Screening for Airborne Uranium

- Screening indicated that enriched uranium releases do not likely warrant high priority, but that releases of depleted uranium might warrant further investigation.
- *However*, none of the screening evaluations considered releases from earlier in LANL's history.
- Earlier uranium releases might have been much larger than those from the 1970s forward, for which effluent data have been summarized.



## Summary of Findings

- Operations of particular importance
  - Airborne plutonium releases 1944-1959
  - Airborne beryllium releases
  - Public exposures from the Trinity test
- Operations of potential importance
  - Airborne tritium releases (before 1967)
  - Airborne uranium releases (before 1970s)



We welcome your comments!



In closing, we welcome your comments.

## Summary of Public Comments and Questions

Cathie Sullivan: I'm representing Dr. Ken Silver, who couldn't be here tonight. I will read a statement from Ken:

Dear friends in New Mexico: The struggle to remove the cloak of secrecy from past emissions of radioactive and toxic substances into the environment by LANL needs to continue. The LAHDRA report is an important work-in-progress. While it contains useful information— especially on past releases of plutonium into the air— the report came up short in several respects. The report ignores the July 1969 incident in which levels of radiation went sky-high in the hot cell at DP West's Room 401. Monitoring reports I obtained in 1996 under the Freedom of Information Act had the hand-written notation "these figures should not be recorded on yearly report." That is a data gap that needs to be addressed. Regarding the document retrieval process, the project team was unable to retrieve a number of reports in the series of Health Division progress reports. However, former LANL employee Lynn Tremor filed a FOIA request that yielded several report copies that I will hand to Dr. Widner. This raises the question of how hard LAHDRA really pushed when LANL told them that documentation was missing. The Health Division annual progress report for 1963 and 1964 are still missing. The FOIA documents do not contain a smoking gun, but the time frame of the 1960s is of interest because of the excess of adult thyroid cancer in Los Alamos that began in 1988. There were also four cases of childhood thyroid cancer, an extremely rare cancer. The latency period for adult thyroid cancer is 10 to 20 years, so looking for records in the mid 1960s with a spike in cancer in 1988 makes perfect sense. For thyroid cancer in children, the latency period is about 5 years, so the time window that would explain the epidemiologic data begins in the 1960s and runs to 1978.

Tom Widner: I look forward to meeting with Dr. Silver again. We are making plans to meet soon to discuss his comments. In our draft final report, you'll find a detailed listing of the hundreds of Health Division reports that we found. We did add significantly to the collection that is publicly available. We did not go to the Lab and say 'give us your Health Division reports.' We had access to the document collections and we systematically looked through what was there. We have tried to find more information about the high radiation levels in DP West Room 401 documented in document excerpts that Ken has shared. Documents we have reviewed and interviews we have conducted have not yielded information that explains those radiation levels. We are not able to answer all the questions that have come up, but I believe the documents we have assembled will answer many of them once they are more closely examined.

Michelle Jacquez-Ortiz: Good evening, I'm Michelle Jacquez-Ortiz with Senator Tom Udall's staff, and we would like to request that Dr. Silver be included as a member of the peer review panel for the draft report. Dr. Silver is an associate professor of environmental health sciences at Eastern Tennessee State University. His dissertation at Boston University School of Public Health was on historical emissions from Los Alamos. Dr. Silver earned his undergraduate degree in chemistry from the University of Massachusetts at Amherst, and a Master of Science degree in environmental health from Harvard University. He has worked very closely over the last 10 years with the LANL claimant community members who have first hand knowledge of the activities described in the LAHDRA report. We think he is well qualified to serve on such a panel and frankly we think we would offer a sense of balance to the current panel.

Phillip Schofield: Hi, I'm Phillip Schofield, a former LANL worker. I told Ken that I would read some of his comments:

In the beginning of the CDC's document discovery project, we asked- why do monitoring reports from TA-21 carry the notation "these figures should not be recorded on yearly report" alongside large numbers in July 1969? LAHDRA'S report recycles an official lie that Room 401 was not in use in 1969. Grade: F. Is this to conceal a major environmental release? The report shows that I-131 emissions from Room 401 hot cells were a concern a few years earlier. We asked- what source terms are associated with E.R. Graham's finding of I-131 in grass clippings, at levels greater than regional background, near Omega West Reactor in 1962? Grade: Incomplete. E.R. Graham's 1963 report is not referenced. The LAHDRA team appears to have been constrained from developing their own estimates of radioactive emissions, source terms, for radioactive iodine and fission products. Prioritization of these air emissions is based solely on the Lab's own monitoring data. For fission products like radioiodine, Graham's data could provide an independent check on estimates of air emissions, as was done for plutonium in soil. LAHDRA needs to dig out and analyze every scrap of environmental monitoring data that is relevant to thyroid cancer in the community, a leading public health concern.

We asked- are stack releases from DP site of 1.4 to 1.8 curies of plutonium for the years 1951,1952, and 1953 accurate? How can these numbers be reconciled with published reports of only 1-2 curies of plutonium released into the air from DP Site in all of 1948-1989? The draft final report states that airborne plutonium emissions in the early 1950's may have been 100 times greater than officially reported by LANL. Grade: A. The LAHDRA team did a nice job of trying to reconcile the new big numbers with concentrations of plutonium in soil and human tissue. The screening level assessment (Chapter 18) suggests a basis for proceeding to the next phase of a dose reconstruction.

We asked- did LAMPF ever produce kilocuries of radioiodine isotopes, as suggested by a 1970 planning document? The LAHDRA report discusses mixed activation products released from LAMPF/LANSCE, but does not address releases of specific radionuclides produced—or overproduced—for medical purposes. Grade: Incomplete. According to the report, chemical processing of medical isotopes could have occurred in the hot cells at Technical Areas 53, 48 and 3. The kilocurie quantities of iodine-123 cited in a LAMPF planning document represent one of the largest potential inventories of radioiodine isotopes ever published by LANL. The LAHDRA team was able to locate extensive documentation of activities at the accelerator. But they have not looked closely at releases of isotopes produced for medical purposes. No stone should be left unturned in characterizing potential sources of radioiodine isotopes, because of the major public health concern of elevated thyroid cancer in Los Alamos County in the late 1980s and early 1990s.

We asked- were there leaks from the iodine production loop at Omega West Reactor in 1992 or earlier? Grade: C. The LAHDRA report reveals "at times the reactor was operated essentially around the clock on an 'iodine production loop schedule'" to produce iodine-125. The LAHDRA report does not analyze contradictory internal lab memoranda from 1992-3 about whether a "rabbit" ruptured in a hood leading to a vent stack. Such a rupture could have released I-125. The LAHDRA report appears to lump together the I-125 production loop with the Molten Plutonium Burn-up Experiments of the mid-1960s, and the off-site implications of the latter's experimentally-induced failures of fuel capsules are not discussed.

We asked- were the Sheba critical assemblies ever operated at a large number of fissions without holding tanks to allow the decay of large quantities of radioiodines? Were the shut downs of the Los Alamos Critical Assemblies Facility related to health and safety concerns? Grade: F. The LAHDRA report does not address work with critical assemblies later than 1972. The word "Sheba" does not appear in the report. Short-lived, higher isotopes of radioiodine would have been produced by the Sheba assemblies in quantities of tens of thousands of curies, according to documents obtained in CCNS's lawsuit under the Clean Air Act. Repeated critical experiments conducted without holding tanks would have sent clouds of radioiodine isotopes over populated areas. Prior to its relocation for reasons related to terrorist threats, TA-18 had a history of periodic shutdowns. The LAHDRA report sheds no light on these issues.

Does the inventory of 3,250 curies of I-131 at Target Cell #4 of the Weapons Neutron Research Facility represent reality or an exaggerated "worst case"? How much was emitted via the stack? What processes generated I-131? And for how many years were these processes carried out? Did Los Alamos scientists bombard uranium and thorium targets as large as 2,000 kg at LAMPF in the 1980s, as planned? If so, were significant quantities of fission products generated and released? Grade: C. The LAHDRA report confirms that WNR conducts research on bombardment of targets of high atomic number, using beams of neutrons and protons. However, it provides no information on inventories of releases of specific isotopes associated with this work. The LAHDRA report is informative on the research conducted at WNR, but does not speak to any of WNR's environmental implications other than the overall emissions of mixed activation products from the linear accelerator.

There is a sign-up sheet outside this meeting room. We are looking for people who have background information on TA-48, CMR, and the Meson facility, in relation to what isotopes may have been used, health physics practices, and shielding that was in place. Sanford Cohen & Associates is going to have some investigators here working with the Advisory Board on Radiation Worker Health. They are trying to find documents on these topics to take back to the board for our deliberations. Thank you.

David Garcia: I am from just north of Española. Is LAHDRA planning on doing additional workshops in the communities to the north of Los Alamos? Is there a model that your group is using to calculate the threats of multiple exposures over a long period of time?

Tom Widner: It is very difficult to address potential health effects of combined exposures. What we typically try to do is identify the areas where there have been opportunities for combined exposure. Detailed estimation of public exposures, beyond a screening level, is beyond what we've been able to do so far on this project.

Charles Miller: That is a very good question. Adding up multiple exposures from radionuclides and chemicals is very difficult to do. If there were to be future work, that is one area that would be considered. I don't know of an 'off the shelf' methodology that would do that.

Unidentified member of audience: You said that you guys were only responsible for information gathering. Who would we contact to find out who calculates the risk assessments of these dosages, and is there a way of measuring what are acceptable doses considering variables such as age, weight, gender, and proximity? I've been reading about "reference man," and that's a way of determining what have been acceptable releases to this day. Is that still continuing?

Charles Miller: The type of information that you are suggesting needs to be calculated would be part of a larger, follow-on study. It was not part of the work done so far, which only went as far as prioritization and screening. There are methodologies that are being developed to address the variables you are talking about in terms of different ages, genders, weights, etc. Those are in the process of being developed now, so you don't have to use just the standard man that is often used traditionally for worker studies and the like. So that could very well be part of future work, if the decision is made to go forward and if the resources become available. But that would be in the follow-up work, not what was done here.

David Garcia: Will you hold additional workshops in communities to the north of Los Alamos?

Charles Miller: If there were determined to be a need or desire for workshops in those communities, we would be happy to respond. We have held meetings at various times in the past and offer to do more. There didn't seem to be a lot of interest or need. If that has changed, and there is a group that would like to have a meeting in one of those communities to the north, we would be happy to come back out and meet with you.

Unidentified member of audience: Who is doing risk assessment for the LANL releases identified by the LAHDRA team?

Charles Miller: Right now, nobody is. If you feel that a risk assessment needs to be done, that is one of the comments that you should send to us and we will take that under consideration. If you have issues like that, which you think need to be addressed that have not been addressed at this point, I need to know that. Let us know, and we'll see what we can do from there.

Joni Arends: I am with Concerned Citizens for Nuclear Safety. Thank you all for coming out tonight to hear this very important presentation by the CDC. I wanted to thank Tom Widner and Dr. Miller for all of their work over the past decade to continue this project. It's very nice to meet the peer reviewers. If we move forward with a dose reconstruction, which CCNS believes that we need to do, how much expertise does the peer review panel have with regard to addressing small rural populations? We believe that if that expertise is not on this panel, then someone with that expertise needs to be part of this process, maybe somebody from Clark University. And we are concerned about gender equality on the peer review panel. We think we need some women, some people of color. We need to have some diversity to reflect northern New Mexico.

Charles Miller: Joni, let me address both of those questions. The peer review panel is a group of people who are providing us with their individual advice to specific technical areas, so if there are people who have specific expertise we want comments from everybody. The peer review is not restrictive, and the panel is not a formal advisory committee. They are not providing controlling input at all. All comments we are receiving will be considered. And if there are comments from other folks who have expertise in particular areas, we need to take a look at that and see where we go. We tried to find experts that we needed in terms of specific areas. The problem is, quite frankly, in terms of experience in health physics, radiation specialists, there are not many minorities or women in the world. We contacted some, but they simply were not available for the panel. Anyone that you can identify that you would like to have comment, please ask them to submit their comments.

Joni Arends: I'm recalling the cold night in Taos in 1998, when this project started, and there was a lot of discussion from a lot of different people from northern New Mexico, talking about the need for diversity in all of this. And so, we will provide you with names of people. We don't need just people with radiation experience, we need people with chemical experience, we need people synergy experience. We think that there are some people out there and if you could share the names of the people you contacted, especially women, we think that is very important.

Irwin Rivera: *<Comments in italics translated from Spanish> My name is Irwin Rivera. I am from the Mercedes here in the north. I also have Mesclao (sp?) blood from the Pueblo of Taos. I have some questions and I bring some advice. You have to put this information in the languages of the people here. Not just in Spanish, but in Tewa too... and the languages of any of the other pueblos that surround the Jemez Mountains. My point is, yes I am bilingual, but this information isn't. We have a state constitution and I'm very grateful we have a representative of Senator Tom Udall's office here. He knows the situation in New Mexico and the laws. You're missing the point, to get this to the people that need the information the most. I want to take a couple of points from Mr. Garcia, and from the woman who spoke from Concerned Citizens. All the impact is just to the environmental releases and contamination. Even before the first building was built, even before they started the experimentation, there was impact upon the local community. My children are heirs to one of the original Pajarito plateau homesteaders. You don't even mention it on the maps, it has been obliterated from history. They were forced, some of them at gunpoint, to leave their homesteads. The historical trauma that this inflicted continues to this day, and historical trauma— call it post traumatic stress syndrome or whatever terminology— is measurable, is an issue of liability, and needs to be studied equally to those that were exposed to plutonium, tritium, or anything else. There is devastating impact to the social ills that came out of Los Alamos, which include the racism, and the division that continues to this day. It's unfortunate, we still have people on the hill, and the people in the valley. With the adults there is separation. My advice- listen to the young people through their graptas that are not going to buy into our generation's racism and are starting to talk to each other and have shared common concerns for a common future for the next generations. We can't put it into the language of the people and address the rest of the impact that Los Alamos had, beginning with the forced relocation, and then what occurred after that. If you think it has no impact, or that it's outside of the realm of the CDC, in the work I do for suicide prevention, I get my statistics from the CDC. I remind you, the Pojoaque Valley, not more than just a few years ago, had the highest statistical suicide rate in the nation. Santa Fe has hit number one in the nation in 1996. We haven't left the top ten. I'm saying that there are social impacts and other things that need to be equally evaluated and addressed to remove these equally damaging impacts that we still have to, in 2009, remind people for gender equity, about the issues of diversity, to remind you in one language other than English still to this day, after this many hearings. And so, I don't want to put you in the same category as what we've had to deal with at Los Alamos, we had a great deal of hope. But, if you're continuing this kind of practice at the exclusion of those communities most impacted, those communities that have the longest and deepest roots in this area, then I'm not sure who is listening. <Comments in italics translated from Spanish> In those communities that have the longest and deepest roots in the area, I am not sure who is listening. And it doesn't matter what language— if one doesn't want to listen, it doesn't matter. If you don't understand, it's one thing. If you don't want to hear, that is another. If you need cultural interpretation, we'll do that after the meeting.*

Susan Rodriguez: My name is Susan Rodriguez, I'm here with my husband, and we belong to Citizen's Action down in Albuquerque. Right now, we're very concerned about what the mayor of Albuquerque is planning to do. Already, 10% of our drinking water comes from the river. My husband is a specialist in aerial photography and he makes maps. All the water coming out of Los Alamos is going into the Rio Grande. They say they're going to clean it up. I've had people say "it goes into the Cochiti and that's a filter, so don't worry." To me, that's totally unbelievable. I'm very much concerned that very soon instead of 10% it's going to be 50% and right after that because they are building so much in Albuquerque, we don't have enough water in the aquifer they're going to have to drink 100% of our drinking water will be from the Rio Grande. Point 2 is that you have Los Alamos, you have Sandia Labs in Kirkland [Air Force Base], there is a permit every 10 years. We have a permit here and in Albuquerque which allows Sandia to openly burn 200,000 lbs of hazardous waste. And each year at Kirkland Air Force Base they are legally allowed to detonate up to 18,000 lbs of explosives waste each year. The exact chemical concentrations that are released into our atmosphere are unknown, but at present Kirkland is licensed to release flammable petroleum solvents, cyanides, perchlorates, and mercury, lead, benzene, TCE, and many other toxic substances. Gases and fine particles released have been linked to a variety of health problems including asthma, cancer, hormonal changes, skin disease, reproductive issues, and immune system suppression. I've lived there for 20 years, my daughter is now 20. I've always heard big booms, I call the city and they never tell me, once they told me to call the base, I call the base and I

got nowhere. This came from our peace and justice center, which I got in April, and I read it and it said who I should contact, and every chance I get at public meetings I read this- people don't know, people don't give a you-know-what, unless I come down with cancer or if they have some kind of health care, which I do have health care, I have something happening with my throat. I've gotten nowhere with it. I am just really afraid of all this, and I don't know where this is going to go. If you're looking at Los Alamos you have to look down at Sandia there, the mixed waste dump down there, which they have wanted to just, it's not even lined, and they've been dumping things down there from whenever they started, and now they want to put some dirt over it, some plastic over it, and say that's it. That will be a precedent for other mixed waste dumps around the country if they allow that to happen. The other situation is that they have something called yard holes. They have this information, which a lot of it is public, and our own governor, our great democratic governor, has not even, Ron Curry had to be sued to open up some public information which we paid for with our taxes. There are boxes and boxes of that information, and my husband has tried with the man who has now head of Citizen's Action, his name is Dave McCoy, he's an environmental lawyer, we tried to take a look at that and tried to put it in some type of order so we know what's going on. But, they are stalling, they are dribbs-and-drabs, letting the public know, they are throwing us a whole bunch of information to where it's very hard to find out what's really there. Do you have any comment about that? Thank you.

Charles Miller: You've raised a number of issues that need to be addressed by city, state, and local officials. Let me point out that I'm not going anywhere, but it is getting late. If you need to leave, I understand, we're going to be around awhile. If you have not done so already, please make sure you sign up on the sign-up sheets, but I just want to point that out.

Marian Naranjo: Good evening, my name is Marian Naranjo. I'm founder and director of Honor Our Pueblo Existence [HOPE], a community based organization from Santa Clara Pueblo. I've been involved with this LAHDRA project since its inception, and I would like to thank you Tom and ChemRisk for your hard work, and yes we do have a long way to go. I would like to take this opportunity as a comment to make a request of CDC. Since CDC is a governmental agency, and Los Alamos is located in our ancestral homelands, that you can please make that relationship. Make it a point to meet with the surrounding tribal leaders for input into the introduction to this final report. It's most important that in any of these final reports where Los Alamos is considered that the historical relevance of the sacredness of the Jemez Mountains and the impacts that this government agency had done over the last 65+ years. Thank you.

Unidentified member of audience: Who's here from CDC? What's your title?

Charles Miller: I'm Charles Miller, Chief of the Radiation Studies Branch.

Unidentified member of audience: Okay. I spent 12 years on some of your boards there, Board of Scientific Counselors, ATSDR, and one of the CDC radiation committees that was established in the early 1900s. Some of the questions that were asked tonight, that were asked by some of us on the boards, as committee members there and whatnot, in the community, one of the key questions we asked and continue to ask is why can't we come up with some sort of cumulative impact study that does this. We're talking here this evening, the gentlemen was making his points, talking about tritium, plutonium, all the 'isms' up there, and each one of them is impacting my health, my life, my children's lives, and those of my ancestors. We've lost how many people. I was sitting on the Board of Scientific Counselors when John Glenn at 80 years old went up in the spaceship, and all the scientists around me said "oh, now we're going to be using this 80 year old man as a test sample." And when I was asking for cancer studies to be done among my people, they told me "you have to have 100,000 people." And here, all of the sudden, one white man, blue-eyed boy, goes into space, and they are going to use him to judge my health in the future with that thing. You're wrong in using that blond-haired, blue-eyed, 55 year-old guy as your medium for testing because women at that same age or younger have different categories, different ways and means by which they are impacted, by which they collect pollutants in the air. You need to change that. We've been trying to change that for 20 years now, and it hasn't happened. The other thing I want to say is to our congressional delegation, of one who is here and to you, sir, representing the administrator in this room tonight, I am formally requesting of you, and the delegation to the state med school, to commission a baseline health study going back to 1939. I know from other sites that there is information out there of environmental impacts that were put away and have been classified to this day. We can get those declassified under this president. President Obama can get them declassified. Then we'll know what impacts we have. My father's remains were used in the plutonium study that was done between 1960 and 1972 or 1980. I know that parts of him were taken. We did not file suit to address those issues. But it is something that you do. The young

lady from Santa Clara made a bold statement. But I'm going to make one that's even bolder. If this country can give trillions of dollars to a nation state that was recreated after WW II and continue to support its mission and its activities, this country has been supporting a religion, and yet LANL sits on my ancestral grounds, which is the holiest land for my people, the Tewa People of San Ildefonso. Why aren't you doing the same thing for us? Yet you want to destroy us, and our spirituality, and the spirit of things that are there, while you are supporting someone else across the ocean. Answer me those questions when you can or when you ever will. I asked Senator Dominici when he was in office the same question. I said 'why are you doing this to me, to my people, a thousand of us? Why are you doing this to us?' Out of 1,000, we've had 139 cases of some of the rarest forms of cancers that have not even been identified. I had one of my cousins, died at 21 years old. At 18 she got diagnosed with some type of bone marrow cancer. Went to Johns Hopkins, went all over the country at the government's expense to find out what was going on, because her mother worked up there when she was being carried in the womb. These are the things that we look at. This is what we want you to do. I don't care about that study, that study is flawed. I see it as a flawed study because its done by contractors. Its not done by the people going out here, getting the grant, and coming out here and hiring somebody to do the work. There is a lot of things that are wrong with that. You look at their environmental surveillance reports from the 1970s to 1992 and you'll find that there are a lot of discrepancies. That tells you a lot of things. For your information, I'm also a former governor of the Pueblo, I'm also the first person there to have set up the environmental department, oversight for the LANL, and the Los Alamos pueblos project. And I've been at the secretarial level under a couple of presidents under commissions and committees. So, I'm asking you this because I know that you have the capability, and the ability to do that. I'm asking specifically of senator Udall at this point in time to step in with some sort of legislation so we can get a true baseline study of our health impacts, the problems we have, and to direct CDC and the US Health Department to start looking at cumulative effects of all the chemicals that are there. 900 chemicals, plus that go into the development of a nuclear weapon. Those are the things that I worry about because my grandchildren are here, I want to make sure that my great great grandchildren are going to be here. The generations to come on to the seventh generation. I'm tired of hearing your people say we're going to do this or we're doing this or we're trying to figure out what's gone on. We all know what's gone on, it's been a big cover up. I could go on and go on and go on. The academy of science, when I was a 7th grader, the academy of science teacher told me that we were getting new oxygen from the trees. The wool wasn't pulled over my eyes because my grandfather already told me trees are filtering the air, they aren't creating more oxygen. The air you breathe is not being recreated. You can pull the wool over us, but we're not as uneducated, uninspired, but our oral histories go way back to time immortal. Thank you.

Tom Widner: I have a quick comment. I know some of you are filtering out. If you haven't had a chance to look at the posters we have displayed, there are reduced size print-out copies if you'd like to take one with you and look at your leisure, I just want to make sure you knew those were there. Thank you.

Ana X Gutierrez Sisneros: Hello, my name is Ana X Gutierrez Sisneros. I'm a nurse in the Española Valley. I'm very concerned about the health effects of Los Alamos, but what really struck me was that plume of the Trinity site. I had talked to my family about this before because 25 members of my family have died of cancer as of today. When I saw the plume, the plume floated exactly to where my relatives are dying. That is, the Salinas Tiwa and Piro Pueblos, that land was stolen from us actually— the Abo Land Grant and the Alamillo Land Grant. Not only was our land grant stolen, but our health was stolen also. I had never seen the plume as you showed it up there, so I'm thankful that you showed me that. I'm looking at the report to and it just really struck me very hard. It really hurts my heart to see. Thank you!

Jeanne Green: Hello, I'm Jeanne Green from Taos, and my question is are you going to be gathering and including CDC statistics on various cancer rates in local communities, current and historical, and if not, why not?

Charles Miller: Looking into that kind of information could potentially be part of any type or some type of follow-up study. That would not be part of this study but could be part of an additional follow-up study.

Andrew Evaskovich: My name is Andrew Evaskovich and I have a three part question that deals with funding. Since we have a representative from Senator Udall's office and we also have a representative from a Congressman's office here, what was the cost of this project, and what would it cost to complete it as far as doing the dose reconstruction portion of it? And I understand that CDC has some records that are in Atlanta that are slated to be destroyed – what would the cost be to have those transferred here, because I know there's some interest in opening up another reading room that's not in Albuquerque that would have easier access?

Charles Miller: This project I believe, over the cumulative time, was somewhere on the order of ten million dollars. There is a set of paper copies in Atlanta. A decision has not been made about what to do with them. If there is a repository that would like to have them, that would be fine. Keep in mind that they are all available electronically, so there is no information that is being destroyed. There is already a set of paper records at the University of New Mexico. To take those document copies would require somebody to accept responsibility for them and to maintain them. That takes up space, and that means money for somebody. What would it cost to do a follow-up? I don't know, as it depends on what exactly we would have to do. Based on previous experiences, from previous dose reconstructions, it could cost several times what we've spent so far. It depends on how far we go. You could parcel this out very different ways, so until we decided on what we would want to do, what the communities and the government would want to do, I can't answer that question exactly. Like I said, we spent ten million so far, it just depends on what we'd be doing exactly.

Sheri Kotowski: Thank you. My name is Sheri Kotowski, I'm the lead organizer for the Embudo Valley Environmental Monitoring Group, and we've been monitoring for radioactive emissions, airborne radioactive emissions, and monitoring soil produce and water in the Rio Embudo watershed for six years. I'd like to thank the CDC for continuing and following through with this project and really just say how important it is for the dose reconstruction to take place. It's really something that Los Alamos owes historically to the people of northern New Mexico. I just can't stress that enough, you look around and there are so many impacts, health and environmental, social, economical, and this is something that is owed historically to the people of northern New Mexico, all of us. Thank you.

Holly Beaumont: I'm the Reverend Holly Beaumont with the New Mexico Conference of Churches, and another board member is here— Pam Gilchrist. We serve over 800,000 Protestants and Roman Catholics across New Mexico, and we have been involved in the issues related to LANL since 2007. We've been working closely with, and mostly learning from, Concerned Citizens for Nuclear Safety, from HOPE, and from the Embudo Valley Environmental Monitoring Group. I would just thank you for what you are doing, this is very important, and just to let you know we are throwing our full weight and influence behind this effort for restorative justice in New Mexico. Therefore, all aspects of the impact of LANL need to be considered: environmental, economic, health, community, spiritual, emotional, all of this or we will not achieve true justice. I would ask you to please listen very closely to what Senator Udall is asking for and what others have in terms of the composition of the peer review panel. Thank you.

Jay Coghlan: I'm Jay Coghlan with Nuclear Watch New Mexico. I'm mostly interested in subsequent steps. If I understand the fundamental conclusion of the assessment so far, it is that enough information exists to go ahead a dose reconstruction. I realize that the CDC has to be somewhat guarded about what it might say, but I'd like to see the CDC be a bit stronger and proactive and actually come out and make a recommendation that a dose reconstruction ought to take place given that it appears that sufficient information exists. Just the finding that it looks like plutonium releases at Los Alamos have historically been greater than Savannah River, Rocky Flats, and Hanford combined, I mean I just find that very compelling. So, my related question becomes, first of all, could CDC outline the subsequent steps so that we have a clear understand of it. At the same time, make clear what political budgetary bureaucratic barriers might be in the way, and then finally I would ask you to close on how we citizens could possibly help encourage and bring to fruition a dose reconstruction.

Charles Miller: Let me answer the last part of your question first. Participating in this process, such as being here tonight and making your wishes known, is an important part of the process. CDC has not made any recommendations based on this report at this time because we haven't had a chance to look at it. You are correct and you've said what the report says. We're looking at it right now, maybe there are others that have other opinions, that the methods that were used in the report were correct or not. I want to find out if there are differences of opinion, someone may come up and say wait a minute, the way they did that was wrong and it wasn't really that high. That's what we are reviewing right now. This process that we are in right now is to bring all this information out in public view to get peoples' and technical opinions about what it says before CDC can make any recommendations or decisions about what should go forward. At that time, then I could outline what steps we could do, I can have some idea about what the cost would be since I don't know those steps right now, then we could talk about what the barriers might be in the budgetary process we might have to go through. We're just not there yet at this point, and we'll be coming back to you with those ideas and see where we can go, if that's something we decide we need to do.

Joni Arends: So, Dr. Miller, you know what would be terrific, is if DOE would come out with a statement that said “we support a dose reconstruction at Los Alamos.”

Unidentified member of audience: I was wondering, these studies went up to a certain time period. Has there been any information on the contaminants released from the Cerro Grande fire in the areas that were burned, and what was released from that?

Charles Miller: I don't know of any right off the top of my head. I think there were some studies that were done I just don't know the details of them at this point, I don't know if Tom is aware of some of those reports or not.

Tom Widner: Yes, we are aware of several of reports on that topic that have been done. We haven't examined those closely ourselves yet, but we did speak with the panel today and that is an area where measurements were made after the fire and the measurement of the ash might be an area that warrants a closer look. You're right, that is one area that could probably be looked at closer if further work is pursued.

Unidentified audience member: I guess one more question on that, why was it up to a certain time period and not continual?

Tom Widner: We did not exclude any operation. We basically did look up to the current day. Some of our assessments might have had the cut-off of 1996 but after that time period the releases are so much lower than what they were in the 1940s, 1950s, and 1960s that it really warrants us focusing on the earlier eras from our standpoint. We did not exclude any modern day documents because of their recent origin. The volume of documentation nowadays associated with environmental monitoring is orders of magnitude greater. After 1970, the Lab really kicked up the environmental monitoring and the documentation associated with it. You might see a cut-off date through 1996 for some of our prioritization or screening, but we have not excluded any documents based on their recent publication.

Unidentified audience member: It just seems that any amount of release is unacceptable, there shouldn't be an amount that's deemed, well we don't have to worry about that.

Tom Widner: Right. We've been asked to prioritize which ones were likely most important, and it appears that those occur in the earlier eras. We're not excluding, we're not closing the door— that's not our job, but we're trying to point towards those that appear to be highest.

David Garcia: In your PowerPoint presentation you presented that the majority of data collected was documents. On the other side of the screen you had interviews. What I'm interested in knowing is- are there transcripts of the interviews? What is the process in which this material was collected? I noticed when you were talking about the trinity site, you were mentioning names of people that were talked to, and we actually heard voices coming out of those stories, but when you were talking about Los Alamos there was an absence of anybody's voice coming out, and that's one of my questions.

Tom Widner: I probably didn't emphasize that enough. We did conduct many interviews of past workers, current workers, members of the public around here, around New Mexico, and around the Trinity site, I didn't emphasize that enough I believe, but we also supported Peter Malmgren in his “Los Alamos Revisited” oral history project. We have over 100 interviews that are documented in our database including those done by Peter Malmgren who lives in Chimayo, I believe. Interviews were definitely an important part. We finally were able to locate individuals who worked in D building early this year and they were very useful interviews. Yes, that was a very important component. In some cases, we put summaries of the interviews in the database, sometimes people asked that we not do that but in many cases we have interviews and we do have a little bit of a backlog of more interviews that we've done that we are going to add summaries to, but we like to give the people an opportunity to review our summary for accuracy before we release it publicly.

Charles Miller: Our crowd seems to be dwindling. As I said, we will be around awhile, but I want to thank all of you very very much for participating in this very important process.