



# NIOSH Dose Reconstruction Project Meeting On K-25 Site Profile

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## Meeting Date:

April 6, 2005

## Meeting with:

PACE Local 5-288 and International Union

## Attendees:

Floyd Oliver	PACE Local 5-288
Tom Moser	PACE Local 5-288
John Steward	PACE Local 5-288
Dennis Pennington	PACE Local 5-288
Wesley Howard	PACE Local 5-288
Ben Gaylor	Retired
Bruce Lawson	PACE Local 5-288
Herman Potter	PACE International

## NIOSH and ORAU Team Representatives:

LaVon Rutherford – National Institute for Occupational Safety and Health (NIOSH), Office of Compensation Analysis and Support (OCAS)

Richard “Dick” Toohey – Oak Ridge Associated Universities (ORAU)

William “Bill” Murray – ORAU

Melissa Fish – ORAU

Vernon McDougall – Advanced Technologies & Laboratories International, Inc. (ATL)

Mark Lewis – ATL

Jay Maisler – Integrated Environmental Management, Inc.

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## Proceedings

**Note: The ORAU Team attempted to record this meeting. However, there was a problem with the audio recorder, and we were not able to record the entire meeting. These minutes were compiled to the best of our ability from the notes of people who attended the meeting.**

Mark Lewis opened the meeting at 10:00 a.m. He introduced himself, explained his role in the worker outreach efforts, and thanked everyone for attending the meeting. Mr. Lewis emphasized the need for labor input into the EEOICPA process. The other participants then introduced themselves and provided a brief background of their work history.

Mr. Lewis stated that an audio recorder was being used to help accurately capture the concerns and issues that were voiced at the meeting, but that comments would not be attributed to individuals by name.



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LaVon Rutherford stated that NIOSH is seeking worker input to make the K-25 Site Profile as complete and accurate as possible.

Bill Murray indicated that the purpose of the meeting was to discuss the Oak Ridge Gaseous Diffusion Plant (K-25) Site Profile, to describe how the K-25 Site Profile will be used, to document the concerns and issues raised by the workers, and to answer any questions that people might have. Mr. Murray emphasized that the most important aspect of the meeting is getting worker suggestions and information that will improve the K-25 Site Profile.

Mr. Murray told the group that the K-25 Site Profile team was established in January 2004 and led by Jay Maisler. The K-25 Site Profile has been through a thorough review process and has been approved by NIOSH. It can be viewed on the NIOSH website:  
[www.cdc.gov/niosh/ocas/ocastbds.html#k25](http://www.cdc.gov/niosh/ocas/ocastbds.html#k25).

Mr. Murray explained that the site profiles include five sections: Site Description, External Dosimetry, Internal Dosimetry, Occupational Environmental Dose (primarily for workers not in a dosimetry program), and Occupational Medical Dose (for both monitored workers and unmonitored workers). Mr. Murray added that by including the environmental dose and the medical dose, the dose reconstructions are claimant favorable.

The Site Description section of the K-25 Site Profile provides an overview of the facilities and activities at K-25 from 1945 to 1987. It documents the radioactive materials and radiation sources at K-25 and identifies potential sources of radiation exposures at the site. It specifically includes information about the uranium enrichment process, radioactive material storage facilities and waste handling, the Atomic Vapor Laser Isotope Separation project, and the specific radionuclides at the site (uranium-234, 235, and 238; americium-241; neptunium-237; plutonium-238, 239/240; and technetium-99).

The External Dosimetry section includes information regarding sources of exposure, methods and practices used by the dosimetry program, whether or not adjustments to recorded doses were made, and minimum detectable levels. Mr. Murray pointed out that the minimum detectable levels are important because they indicate the minimum sensitivity of a dosimeter. If a worker has zeros recorded in their dose records, often a portion of the minimum detectable level will be added as missed dose. This is one way that NIOSH makes the dose reconstruction claimant-favorable. The K-25 External Dosimetry section includes information regarding the beta and photon dosimeter technology used from 1945 to 1988 and the neutron dosimeter technology used from 1951 to 1988. Also included are the documented calibration procedures, badge exchange frequency, workplace radiation fields, and the workers' locations around the radiation sources.

The Internal Dosimetry section includes information on the methods and practices used at the site, the sources of exposure, the minimum detectable activity for whole body counting and urinalysis, and reporting levels. Mr. Murray added that the minimum detectable activity for internal exposure is used in the same way that the minimum detectable level is used for external exposure. At K-25 the Bioassay program started in 1945. Urine was tested for uranium.



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Radioactive materials inside the body were measured using a lung counter in 1958 and from 1965-1995 and using a whole body counter from 1960-1980.

Mr. Murray said that people who were not in the monitoring program could still have been exposed to radiation at the site due to radioactive materials in the air, radiation sources in the buildings, and radioactive materials in the work environment, e.g., cylinder yards, storage areas, and waste pits. Site-wide monitoring data are used to determine the environmental external dose for unmonitored workers. Based primarily on dosimeter readings around the K-25 site, the average annual exposure rates were 0.0074 to 0.0105 mR/h. The annual exposure rates are used to assign environmental external dose to the workers. The same is true for environmental internal dose: The annual intake of radioactive material is calculated from the average annual air concentration. The primary radionuclides at K-25 are uranium-234, 235, and 238, neptunium-237, technetium-99, and plutonium-238, 239/240. In assigning these environmental doses to the reconstructed dose, NIOSH is being claimant-favorable.

Mr. Murray explained that NIOSH also adds in medical radiation dose from employer-required x rays. When calculating the medical dose, the frequency of employer-required x rays is considered as well as the type of x-ray equipment and techniques that were used. The x-ray equipment changed over time, and older equipment gave off more x-ray radiation which resulted in higher worker doses.

In conclusion, Mr. Murray said that developing a site profile is an important task and that the site profiles can be changed based on worker input. He provided a few examples of site profile documents that have changed based on worker input (Iowa Army Ammunition Plant, Hanford, Savannah River, and the Internal Dose section of Y-12). Comments on the site profiles should be sent directly to NIOSH. Mr. Murray provided the mailing address, email address, and fax number for NIOSH.

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### Discussion Session

#### **Comment:**

Why didn't you have someone who worked at K-25 help write the K-25 Site Profile?

#### **Bill Murray:**

Having someone work as an author on a site profile when they are directly connected to the site would be a conflict of interest, and ORAU has a Conflict of Interest Policy in place which prevents this.

#### **Comment/Question:**

Workers should have more input into the K-25 Site Profile. How many workers were consulted when preparing the first draft of the K-25 Site profile? Why weren't the workers contacted when NIOSH began working on the K-25 Site Profile? How could you get data without talking to the workers?



**Bill Murray:**

The Worker Outreach program did not start until a year ago, after some of the site profiles had been started. Because of this we have taken a multi-phased approach. For the sites where work on a site profile has started, we are scheduling rollout meetings. For the sites where a site profile has not been started, we are going to those sites and asking for input at the beginning of the process. For sites that do have a completed site profile, the revision process is always in place. The NIOSH/ORAU team can always return to talk to workers and former workers, and make revisions to the site profiles as needed. There are numerous sites that we are trying to get input from, and we are playing catch up with this process.

**Jay Maisler:**

As to where we got the data, the NIOSH/ORAU team had minimal information available to us because we did not have access to the K-25 vault. As a result, we had to rely on the reports that were made available, in addition to information from the Portsmouth and Paducah Sites. We used the limited data that were available to put together the best document that we could. This is why the worker input is crucial. Worker information can help us improve the K-25 Site Profile. However, it is important to understand that we did use claimant-favorable assumptions when data was not available.

**Comment:**

Using data from Portsmouth and Paducah to write the K-25 Site Profile is not appropriate. There are huge differences in the percentages of enrichment. It is also important to remember that K-25 was more experimental than Paducah and Portsmouth.

**Comment:**

I remember traps and converters starting on fire. Men died in their 40s and 50s due to exposures working at K-25.

**Comment:**

There were secret military operations at K-25. It cannot be classified only as an enrichment facility.

**Comment:**

The Uranium Mass Balance Report only considered production/process buildings.

**Question:**

What was the delay in getting the vault open?

**Dick Toohey:**

The National Nuclear Security Administration (NNSA) needed to recognize security clearances.

**Comment:**

I can't see the security problem or the time delay.



**Dick Toohey:**

The data capture process requires that security cleared people go into the vault. Once inside, the people doing the data capture literally page through boxes of material that must be reviewed. Just getting into the K-25 vault caused a huge delay.

**Jay Maisler:**

Getting into K-25 has taken months. At first we were told that we had to be escorted; from there the story progressed. We have finally removed the barriers to gaining access to K-25 documents.

**Comment:**

The J Lab Facility had a Plutonium Program which processed plutonium.

**Comment/Question:**

We know that there were specific operations occurring throughout the gaseous diffusion plants (K-25, Paducah, and Portsmouth) that would be useful to the dose reconstructors. Some areas had different ratios. If you get this type of information and it is verified, will the site profiles change to reflect the new information?

**Bill Murray:**

Yes.

**Comment:**

Transuranics plate out in various stages of the cascade. The Operational Report from Portsmouth only checked for UF<sub>6</sub>, not for solids. There would be different transuranics depending on where you are cutting into the system. Different ratios affect exposures

**Comment:**

Workers are very concerned that NIOSH is only looking at data that are being provided directly to them. We have heard countless stories about workers who were removed from a job because their badge readings were so high. However, when these same workers got their badge reading reports back, they had zeros. In addition to the false zeros, many workers cannot locate their medical records. This all seems like a cover-up.

**Question:**

Have any correlations been made between urinalysis and air samples?

**Dick Toohey:**

Validation of urinalysis data is something that is on our list to do. Validation of urinalysis data varies widely site-by-site. Trying to figure out which air sample goes with which urine sample is difficult. We could do a broad brush approach, but that does not tell us much. The NIOSH/ORAU team is also trying to develop a job exposure matrix, but we are currently struggling with how to index different job titles.

**Comment/Question:**

I am an operator and I go into different areas of the K-25 site. There is no sample data for the last seven years. How do I know what is happening to me?



**Dick Toohey:**

If the exposures are chronic, the radioactive material will build up in your body. Without samples, there is a problem.

**Jay Maisler:**

DOE requirements regarding who should be in a dosimetry program have changed over time.

**Comment:**

I worked 20 years before we started participating in urinalysis programs. One co-worker of mine, who worked in Building 1131 at K-25, had a badge with such a high reading that they recorded his badge results as a zero. They accused him of sticking his badge in a bucket of uranium fluoride—he did not do that.

**Comment:**

Some of the greatest minds put K-25 together. Some of those minds have admitted that they know people were overexposed to radiation due to the Monday morning cascade ‘burp’ and the near-criticalities. They acknowledge that they are alive because, unlike most workers, they knew how to protect themselves.

**Question:**

Regarding external dosimetry, has there been any validation between personal thermoluminescent dosimeter (TLD) badges and area monitoring badges?

**Jay Maisler:**

There is an absence of area monitoring from previous years.

**Dick Toohey:**

Assume that a worker who has had consistent TLD readings that follow an upward trend on a graph suddenly has readings that are low. In most cases, the dose reconstructors are instructed to assume that those lower dosimeter readings are not correct. They will extend the line on the graph. This results in the worker being assigned a higher dose than indicated in their personal dosimeter records. We are also in the process of analyzing co-worker data. This means that we are trying to apply co-worker monitoring data to claimants who do not have monitoring data available.

**Comment:**

Documented calibration procedures, instrument types, and monitoring frequencies for the K-25 site would help out with the dose reconstruction calculations.

**Comment:**

Getting a logbook that a shift Superintendent kept would be very helpful. However, many of the logbooks are contaminated. The Union Carbide logbooks would be accurate but the logbooks belonging to Lockheed Martin have been sanitized.

**Dick Toohey:**

We looked at logbooks for Los Alamos National Laboratory.



**Comment:**

It is important to remember that DOE told its contractors that they did not want to know about any exposure problems.

**Question:**

Have you seen any procedures regarding the TLDs for K-25?

*Jay Maisler:*

We have not seen any.

**Question:**

Page 5, Section 2.2—References “characterization studies to date,” what are these characterization studies?

*Jay Maisler:*

I will follow up on that and see what was referenced.

**Question:**

On page 6, Activity Ratios—are those from the Recycled Uranium Report?

*Jay Maisler:*

I believe that is where we got the information.

**Comment:**

Page 7, Section 2.2.2—References “characterization studies.” I think that you are referencing one survey and basing all of your information on that one survey. Please find out if this is the case.

**Comment:**

The External Dose section of the K-25 Site Profile does not mention slow cooker effects.

**Question:**

Was everyone monitored at K-25?

*Jay Maisler:*

I do not know the overall quantity and quality of monitoring data for K-25 but I can find out.

**Comment:**

Many K-25 workers do not trust any of the records (whole body or dosimeter). TLD badge practices varied and some badge readings were deleted. For example, there was a worker who worked in one of the hottest places in K-25. Eventually he was pulled out of his specific job and was not allowed to work around radiation for the rest of his life.

**Comment:**

K-25 did not seem to care how radioactive materials were handled or transported.

**Comment:**

There was a Deposit Removal Project that took place at K-25 in which highly enriched uranium deposits were removed. I am not sure if this is noted in the K-25 Site Profile or not.



**Comment:**

NCS documents as well as other references could provide another source of validation for K-25 data.

**Comment:**

Building 1401 had a compressor shop and a converter maintenance shop. The southwest corner had ovens that recovered highly enriched uranium from converters. I believe that Building 1401 had to contain transuranics. I checked vent stack information and found out that 58 pounds of uranium-containing material were removed from one vent stack in a single 24- hour period.

**Comment:**

Building 1000 performed barrier experiments and tests that we can't talk about here because part of the process is still in use.

**Dick Toohey:**

We can arrange for a classified interview.

**Comment:**

After dark, the incinerator in Building 1421 was used to burn anything and everything (rags, clean up materials from spills).

**Comment:**

Building 1405 was a High Temperature Laboratory and I have been told that lots of highly enriched uranium was used in that building.

**Comment:**

The 131 Pipe Shop Maintenance building rebuilt parts. Parts were robbed from the K-25 building itself and used throughout the plant and then machined in Building 1401.

**Comment:**

Building 631 was the "Test Loop" Tails Withdraw Facility.

**Comment:**

The sanitary water system was crossed with the fire water system resulting in the sanitary water containing strontium and cesium.

**Comment:**

There was beryllium all over K-25.

**Comment:**

K-25 management lied when they said that there was no cyanide in the plant because they actually had permits to burn it.

**Comment:**

The K-25 Site Profile does not discuss vaults. We had hot vaults at K-25.



**Question:**

Section 6.5.3—Are there any other data sources available regarding neutron exposure before 1989? Has there been any attempt to correlate information?

**Jay Maisler:**

No correlation has been made due to lack of records.

**Comment:**

Paducah was in denial about neutron exposures.

**Comment:**

DOE will only admit what you can prove.

**Jay Maisler:**

Did anyone keep individual logbooks of where you were working?

**Answer:**

No.

**Comment:**

The RaLa operations at Oak Ridge National Laboratory resulted in radioactive iodine being sprayed and the wind carrying the iodine to other places, likely to K-25.

**Comment:**

The Blair Gate/Gallaher Gate Monitoring Stations kicked on once a week for 24 hours. This could have been done on Sunday when there would have been less to monitor.

**Comment:**

A word of caution regarding using environmental data for validating – the environmental badges did not pick up neutron exposures because there was no phantom in place, so no whole body dose could be measured. Neutron monitoring was not being done as properly as it should have been.

**Comment:**

Workers question whether instruments were calibrated correctly, so please check into the procedures used, especially for cesium-137.

**Comment:**

Section 6.5, Page 13—approaches for estimating missed dose. What source document did you use for Tables 6.4 and 6.5? Has this been validated against source records?

**Jay Maisler:**

I will check. I do not see a reference listed for that.

**Comment:**

Five of my working partners and I all had prostate cancer. I understand that if you are a male and you live long enough, you will develop prostate cancer. However, there are huge numbers of men with prostate cancer at K-25 who are in their 40s and 50s. This cannot be a coincidence and it is likely related to the chemical and radiation combination. DOE has killed.



**Comment:**

Many men who worked with the centrifuge process developed bladder cancer. Also, the centrifuge process will be starting again.

**Comment:**

The bladder cancer survey was not accurate for the people who worked at K-25. Person after person has said that they worked in the centrifuge process and that they have bladder cancer. The data from the survey are skewed.

**Dick Toohey:**

Remember that bladder cancer is part of the Special Exposure Cohort.

**Comment:**

Yes, but it all goes back to the validity of surveys; and what is found at this site will be applied to sites that are not Special Exposure Cohort sites.

**Comment:**

There were a lot of system breaks with the Toxic Substances Control Act (TSCA) Incinerator. For example, one employee was told that the system was depressurized when it was not. Another employee was never told that he was in contact with transuranics until after his exposure.

**Comment:**

A classification officer at DOE asked me what was being burned in the incinerator but was not on the log. DOE should know. Why would he ask me that?

**Comment:**

Remember that time is not on your side for this site. The plant is closing down. Also, many of the workers are dead or will be dead soon.

**Dick Toohey:**

Our first priority is clearing out the backlog of claims.

**Comment:**

We will be submitting all of our comments in writing to NIOSH.

Mark Lewis concluded the meeting at 11:30 a.m. and thanked everyone for a productive meeting.