



# NIOSH Dose Reconstruction Project Meeting On Paducah Gaseous Diffusion Plant Site Profile

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**Meeting Date:**

February 10, 2005

**Meeting with:**

PACE Local 5-550 and SPFPA Local 111

The meeting was arranged with union leadership and highly publicized locally. Of the approximately 200 people in attendance, the following chose to sign-in:

**Attendees:**

Name	Affiliation	Name	Affiliation
Eugene L. Caldwell	Allied Signal	Lloyd Brazell	PACE
Harold Russell	PACE	Cora Harris	PACE
Betty Rushing	PACE	Dennis Tyner	PACE
Debbie Paulson	PACE	Jesse Tyner	
Harold Robey		Mary J. Warren	
J.D. Armstrong		Jeanne Bone	
Avanell Hornsby		Rodney C. Smith	
Homer G. Bullard		Jay Stoll	SPFPA Local 111
Mike Kaufman	SPFPA Local 111	Fred Carter	
Ron Fowler		Joe Walker	Paducah Sun
Robert Pierce		Glenn Young	
Bernard Janselm		C. Woodford	
Barry Anderson		Chris Naas	
Frances Crawford		Sue West	
Ralph West		Cephus Robertson	
Billie Ellis		Cathy Pigg	
Cherry Lee		Don Valentine	
James E. Smith		Ira Myers	
Doris Myers		Fred Golightly	
Kenneth Collier		John C. Locke	
Steve Lewis		J.B. McGinnis	
Billy Feezer	Union Carbide	James M. Crews	IW Local 782
Trent Griffin	USEC	Charles & Dora Humphrey	Union Carbide
Herman & Mildred Englert	PGD Plant	Tom Emerson	PGD Plant
Charlie Baker	PGD Plant		

**NIOSH and ORAU Team Representatives:**

- Peter A. Darnell – National Institute for Occupational Safety and Health (NIOSH), Office of Compensation Analysis and Support (OCAS)
- Jay Maisler – Integrated Environmental Management, Inc.
- William “Bill” Murray – Oak Ridge Associated Universities (ORAU)
- Mark Lewis – Advanced Technologies and Laboratories International Inc. (ATL)
- Dawn Catalano – ATL



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### Proceedings:

Leon Owens, Coordinator of the Worker Health Protection Program for PACE Local 5-550, called the meeting to order at approximately 10:15 am. He thanked everyone for coming and said that the topic would be the Site Profile for the Paducah Gaseous Diffusion Plant. He announced that individual claims would not be discussed; but those people with questions about their claims should attend a reception at the union hall following the meeting because representatives from the Resource Center would be there. Mr. Owens encouraged attendees to ask questions and to take advantage of the opportunity for interaction with NIOSH. He added that this would be the most direct means to have worker issues considered in Site Profile revisions. He then introduced Mark Lewis to give an overview of the presentation.

Mr. Lewis also thanked everyone for attending. He explained that the Site Profile is a tool used by radiation specialists conducting dose reconstructions. Mr. Lewis said that he is a PACE member from the Portsmouth Gaseous Diffusion Plant, and understands the workers' point of view. The Site Profile is largely based on official government records, and workers' input is needed. He said the Site Profile can be changed with new information. Accurate documentation requires the institutional knowledge of the workers. Mr. Lewis then introduced Jay Maisler, the Team Leader of the group that prepared the Paducah Site Profile, and Peter Darnell, representing NIOSH.

Mr. Darnell explained that NIOSH is responsible for only the radiation section of the Energy Employees Occupational Illness Compensation Program Act (EEOICPA). The Department of Labor (DOL) runs the overall program and NIOSH performs radiation dose reconstructions. Mr. Darnell said that a good deal of the work is done by NIOSH contractors, and introduced Mr. Murray to give a more detailed explanation of the program.

Mr. Murray extended his thanks to all in attendance and expressed hope that they would find the presentation informative. He introduced the members of the Outreach Team and described each person's role. Mr. Murray said that Mr. Maisler's experience leading the development of the Site Profile for Paducah and Mr. Darnell's subject matter expertise would help them provide accurate answers to questions regarding the document. He also pointed out that both were there to listen to the workers' concerns regarding the site profile. Mr. Murray introduced Dawn Catalano, explaining that she would take notes for formal minutes. He added that the meeting was being recorded only for the sake of accuracy in the minutes and that no one would be quoted by name. The draft minutes would be forwarded to the union leadership for comments before they are finalized. Mr. Murray reiterated that the Site Profile is a "living document," subject to revision as new information is received.

Mr. Murray asked that attendees share handouts. He said that the complete document was available on the NIOSH website for anyone who had not received a copy, and that the large crowd was unexpected but welcome. He asked that questions and comments be held until the end of the presentation considering the size of the meeting.

Mr. Murray said that the main reason for the meeting was to discuss the Site Profile for Paducah, developed under the EEOICPA. He explained that all EEOICPA claims are sent to the DOL, and that NIOSH and ORAU only handle claims under Subtitle B for radiation-induced cancer.



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The law was revised in 2004, shifting responsibility for Subtitle E from the Department of Energy (DOE) to DOL and making it a federal rather than a state compensation program. Claims filed under Subtitle B are forwarded from DOL to NIOSH for dose reconstruction. Due to the volume of claims to be processed, NIOSH contracted the work to ORAU, who in turn brought several subcontractors on board to help with the effort.

The Site Profile is used as a handbook for dose reconstructors, providing consistent technical information for a specific site. This minimizes the need to interpret data, thus assuring that all claims are treated the same. New information is always considered and is used to revise Site Profiles in an effort to have the most reliable resource possible. For example, outreach meetings with labor representatives have resulted in revisions to the Hanford, Y-12, and Savannah River Site Profiles.

Mr. Murray described the five separate sections: the Site Description, which includes the work that was done, the activities and processes, and the possible contaminants present; the External and Internal Dose sections, which generally apply to workers who were monitored in dosimetry programs; the Environmental section, which is used mostly in estimating radiation doses for people who were not assigned dosimeters; and the Medical X ray section to assign doses from employer-required x rays. The external and internal doses are based on DOE records, but NIOSH and ORAU give additional dose with the environmental and medical in order to help claimants get a 51% probability of causation. The dose reconstruction result is sent back to DOL, which makes the final determination on whether the claim is awarded or denied. The Site Profile Team was established in 2003, and the document has been comprehensively reviewed by NIOSH.

Mr. Murray said that the Site Description provides an overview of the radiation sources and materials that are known to have been present in the plant. The plant began operations in 1952 and activities reported include enriching uranium as well as handling radioactive waste. There were known radionuclides, most prominently uranium, but technetium, neptunium, and plutonium were also identified.

The External Dosimetry section discusses the external dosimetry program, including sources of potential exposures, methods and practices used for monitoring, and the minimum detectable limits. Mr. Murray explained that the minimum detectable limits were considered in cases where the dosimeter readings were zeroes because the least amount of dose the badge would pick up (minimum detectable limit) was not reached. In such cases, a dose of half the minimum detectable would be assigned for each exchange period. Measurements were taken at Paducah for beta and photon exposures from 1952 to the present. Quantitative monitoring for neutron dose began in 1998.

For the Internal Dosimetry section, the Team looks at the same elements of exposure, but the dose is based on what is inhaled or ingested into the body, rather than absorbed from external sources. Whole body and lung counting are considered, as are the urinalysis results. The bioassay program started in Paducah in 1952. Measurements of gamma-emitting radionuclides using lung counters began in 1958, and whole body counting began in 1960.



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Mr. Murray explained that the Environmental Dose is used mostly for workers who were not monitored with dosimeters and bioassay. Site-wide monitoring for air concentrations is used as a basis to determine internal environmental doses, and materials in storage and waste pits are considered for external environmental doses. The external dose was measured using dosimeters placed around the site. Most workers had badges, but they were not issued consistently.

The Medical dose for employer-required x rays is included in the dose reconstruction and takes into account the frequency and the type of equipment used. X ray machines changed over time. The older ones gave higher radiation doses.

Mr. Murray emphasized the importance of making the Site Profile an accurate document. He said that the Site Profile can change when new input is received. Mr. Murray explained how to provide input on the Site Profile to NIOSH/OCAS. He also explained Paducah's status as a Special Exposure Cohort (SEC) site, and said that doses did not have to be reconstructed for the cancers covered under the SEC. Mr. Murray then opened the floor to comments and questions.

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### Discussion Session – Q/A

**Question:**

What is the reference for the percentages of feed materials used in the Site Description? It would be helpful if the number of pounds was included.

**Jay Maisler:**

The references are in the back of each section. Either poundage or percentage would work for the purpose of dose reconstruction. The Site Description is only used to provide background information; the Internal and External Dose sections go into greater detail on the feed materials.

**Comment:**

The Site Description is not in agreement with the Internal Dose Section in this regard.

**Jay Maisler:**

The Site Profile Team is still in the process of revising the document in order to fix any mistakes that might have been missed before.

**Question:**

The same section of the Site Description mentions “High Radiation Areas.” How is that defined?

**Jay Maisler:**

That is in accordance with Atomic Energy Commission (AEC)/DOE regulations that set the limits. The glossary in the back specifies that a High Radiation Area is an area in which the dose rate could exceed 100 millirems per hour within 30 centimeters from the source.

**Question:**

Is there data on workers who were exposed in that High Radiation Area?



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***William Murray:***

Anyone who went into the area was supposed to have a dosimeter according to Atomic Energy Commission (AEC) regulations. However, NIOSH and ORAU can't know for certain that people followed regulations.

***Jay Maisler:***

In a discussion about Missed Doses in Section 6.5, data from PACE is included regarding average and maximum doses that were given.

**Comment:**

The areas were not categorized in the late 1940s to early 1950s, and there was no requirement for dosimeters. That should be reflected in the Site Profile.

***William Murray:***

Claimants are called for extensive telephone interviews as part of the dose reconstruction process. During the interview, the claimant has the opportunity to discuss their personal work history including what parts of the plant they were assigned to, whether or not they were badged, and other specific issues pertinent to their claim. All that information will be considered in the dose reconstruction.

**Comment:**

Despite having been diagnosed with a non-functional thyroid in addition to skin cancer, my claim was denied on the basis of not having received a high enough dose. This is a travesty and contrary to the principles of this country. The definition of human rights violation is to knowingly cause death or harm to citizens. In this sense, the U.S. Government is guilty of violating the human rights of the workers in the plants. Dose reconstruction should not be necessary – the workers were not made aware of the dangers and the Government owes them compensation for that alone.

***Leon Owens:***

One goal of this meeting is to help the Team enhance the Site Profile for more accurate dose reconstruction. Your input is appreciated.

**Question:**

The source expert for the Paducah Site Profile had performed some contract work at the site. A conflict of interest exists in using this person's work in the document.

***Peter Darnell:***

NIOSH is aware that the person mentioned did contract work in the past, but it is not confirmed that she authored the report. The documentation was thoroughly reviewed to ensure its appropriateness for inclusion.

**Comment:**

Table 6-1 was taken from a previous report. What was the source for the information presented?



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**Jay Maisler:**

References for the table are provided at the end of the section. Mr. Darnell has the specific documentation used, although it may not be public information. Mr. Richard Miller was also provided with this information.

**Question:**

Why was the general value at the Cascade Building zero, but other buildings that were also cascades show a value?

**Peter Darnell:**

That would be something NIOSH and ORAU would have to look into in more detail.

**Question:**

How can I get my claim forwarded from DOL if they haven't sent it for dose reconstruction yet?

**Peter Darnell:**

NIOSH has no knowledge of any claims until DOL verifies employment.

**Question:**

Dose reconstructions were completed before the Site Profile was approved. How can the dose reconstructions be accurate if the Site Profile was not complete?

**Peter Darnell:**

Under Title 42, an efficiency process is used to expedite claims. If a partial dose reconstruction shows a high likelihood that the probability of causation will be 51% or higher, it can be completed. Conversely, if there seems to be very little possibility of reaching 51%, the claim can be denied. The assumptions are based on the upper bound maximum credible dose coming out to less than 50% in accordance with general physics knowledge of radioactive material. Documentation is not connected to any specific site, so the maximum credible dose does not have to come from the Paducah Site Profile.

**Question:**

Cesium pellets were found in the plant parking lot, but it was not noted in the Site Profile. This was documented in the mid 1990s.

**Peter Darnell:**

NIOSH and ORAU did not have this information but it will be considered in revisions of the Site Profile.

**Comment:**

Employees were specifically instructed to remove their badges when handling hot materials.

**Peter Darnell:**

This is something heard very often at Site Profile meetings. Individual dose reconstructions take this practice into account when the claimant mentions it in the phone interview.

**Comment:**

The use of the Site Profile is redundant and does not help claimants in any way. The Site Profile only represents incorrect, inaccurate, and incomplete information provided by DOE.



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**Peter Darnell:**

NIOSH and ORAU use information from all sources available, not only DOE records. Site Profile meetings are held with the intent of both informing workers about the process and gathering information that may otherwise not be found.

**Comment:**

PACE and the University of Utah did a research study indicating that electronic records from the plant were filed containing errors. The Site Profile does not show any verification of the records, particularly of the external dosimetry. Did NIOSH look at any paper records to verify the accuracy of these electronic records?

**Peter Darnell:**

NIOSH goes to the site to pull the paper records, performs data capture, and then forwards them to DOL. Electronic files are only part of the data NIOSH uses as a source.

**Question:**

According to a memo prepared at Paducah in July of 2000 regarding the quality of radiation dosimetry records, there were 765 records that had inaccurate dates of intake of 1919 that actually were from the summer of 1999, and all of the internal doses that were calculated from those records were in error. They also found 53,597 records that had inaccurate sample numbers due to data migration problems. If you wanted to go back to paper files of these records, it would be difficult to match them up. How are problems with the database reconciled? Also, recently declassified documents show that exposures in the C-410 Building in 1972 were 9-1/2 rads per hour for beta-gamma. In fact, in the C-410 building they have found beta-gamma levels as high as 230 rads per hour. Have you encountered upper bound estimates of 230 rads for workers, and if not, how do we know NIOSH and ORAU are not underestimating the maximum potential dose?

**Peter Darnell:**

I don't have the Site Profile memorized, so I don't know precisely what information was used to determine the doses. The current process uses available dosimetry records... (*Mr. Darnell was interrupted by the following comment*)

**Comment:**

If you're relying on personnel records kept by the plant, there is a major lack of credibility. No one here believes that any reliable record-keeping has been done here at Paducah.

**Peter Darnell:**

This is a common problem we encounter when reconstructing doses for a Site Profile. Many workers were not monitored properly. Initially, NIOSH must rely on official dose records until other information is available. Please submit these comments in writing directly to NIOSH.

**Comment:**

Between 1957 and 1992, the workers were not monitored for transuranics because they were worried about the union's demands for hazardous duty pay, as well as adverse publicity. The workers at Paducah were central to getting the EEOICPA passed so they are intimately familiar with the issues involved. But the scandals here at Paducah have caused us to be very



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skeptical about the lack of credibility of the data that has been compiled to calculate the dose reconstructions for the Site Profile.

***Peter Darnell:***

These are very emotional issues – everyone here is aware of the Paducah scandal. That is the basic reason Paducah qualified for the Special Exposure Cohort. NIOSH and ORAU are trying to do the best we can with the data we have. The Site Profile exists as it is because of the Executive Order directing NIOSH to go forward with the existing information.

**Question:**

Another memo said that film badges were dumped in the landfill. What does NIOSH do to make up for that lost information?

***Peter Darnell:***

Please be sure to submit information of this nature to NIOSH in writing. The information you provide regarding the actual doses you received will be instrumental in changing the Site Profile to the workers' advantage.

**Question:**

Workers were exposed to neptunium at a rate of 356 rems to bone per year in Building C-400. There was a 90% concentration of neptunium in the air. The draft Site Profile only assumes a fraction of that concentration – a mere 20%. Missed doses do not come anywhere near the reality of what people were exposed to. Why is this?

***Jay Maisler:***

The Team will review all information provided to correct the document. It is possible that during the broad technical review something could have been missed or overlooked. The Site Profile is always subject to revision.

**Question:**

Some of the data used in the Site Profile was taken from an earlier report that was written by a member of the Site Profile Team. It is not likely a person would contradict their earlier work, whether it was correct or not. A conflict of interest is created by this situation.

***Peter Darnell:***

Conflict of interest depends on which dose reconstruction a person works on. If the person doing the dose reconstruction is not gathering data for the Site Profile, there is no conflict of interest to calculate dose for a worker at that site. There is only a pool of about 150 health physicists who work on the Site Profiles and dose reconstructions.

***William Murray:***

Based on concerns such as this, the conflict of interest policy was extended to include people who write the Site Profiles. The issue did not come up when the work first started on the Paducah Site Profile. There were already 15 Site Profiles underway when NIOSH and ORAU started looking at this concern.

**Comment:**

Legal distinctions don't help claimants. People don't want the same person who authored documentation used in the Site Profile doing their dose reconstructions.



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**Jay Maisler:**

To clarify this issue, the person in question does not work on dose reconstructions.

**Question:**

The PACE/University of Utah report should be used but is not included in reference to levels of exposure. The report ranks potential exposures, but notes that this information should not be used for individual needs, such as dose reconstruction. With that in mind, should summary data be appropriate for dose reconstruction?

**Peter Darnell:**

The section with that reference is only giving an overview, but Section 6 gives more specific and detailed information. Individual dose reconstructions are calculated based on specific information from the site.

**Question:**

Can information be used in the Site Profile without validation?

**Peter Darnell:**

The Site Profile was only recently published, and the information is still subject to revision if an error is found. Comments need to be submitted in writing to NIOSH to point out any potential inaccuracies or additional information that would add validity to the document. Alternate methods of dose reconstructions, such as the use of nuclide concentration, can be used to develop upper bounds. If a claim is given a high dose based on the type of site, a dose reconstruction could be accurately completed.

**Question:**

The presentation Mr. Murray gave indicated that occupational environmental dose is given for unbadged workers. However, the Site Profile does not address the issue of hot equipment coming in from other sites like Oak Ridge. Anything that is mentioned only goes back to 1952; materials were brought in earlier – at least 1951, but there's no way to even speculate on it without it being brought up in the Site Profile.

**Jay Maisler:**

These concerns have recently been brought up to the Site Profile Team, who are now gathering information to update the Site Profile.

**Question:**

Will you confirm or deny the allegation that contaminated equipment was brought to the site?

**Peter Darnell:**

That is something NIOSH does not know about, so any comment would be ill-advised.

**Comment:**

Why did NIOSH wait so long to make an attempt to get worker input? If it had been done earlier, there is a good possibility that more people would have received compensation before they died. I personally did not know about my exposure history when I was diagnosed with cancer in 1998. The DOE document is misleading, especially in regard to the urinalysis program. The samples were usually taken after long weekends in the 1970s, so they would be less indicative of the true dose received. Likewise, Chemical Operations scrubbed the



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walls down before installing monitors – the real dose will never be known. Are chemical reactions considered with the radiation dose?

***Peter Darnell:***

Standard procedure includes back-calculating the urinalysis with the understanding that the kind of thing you described was common. The clearance time from intake is also considered; the health physicist can take the measurements recorded and back-calculate based on clearance time for a more accurate dose.

NIOSH will respond to your other questions after an evaluation of your claim.

**Comment:**

The cancer program that was set up in the community was a great help; thank you for your involvement in that. My phone interview was not as helpful in getting my claim approved though. There were too many instances and experiences that could have contributed to my dose to remember them all. The best way to handle that would be to hold a meeting with workers and NIOSH representatives where everyone could be deposed.

Radiation badges that were intended to measure dose in ten minute intervals were used for full shifts. Records have been destroyed. The Federal government knows all about it but will never let that information come out.

**Question:**

Have the authors of the various sections of the Site Profile compared urinalysis samples to air samples for a more accurate overall assessment of the level of contamination?

***Jay Maisler:***

Data had to be made available in order for NIOSH and ORAU to conduct such a comparison. The plant may or may not have also looked at this.

**Comment:**

Workers were instructed not to wear the film badges so they wouldn't be ruined by the over-exposure.

***Peter Darnell:***

Not much was known about radiation at the time the operations began. Historically, the government did not know the kind of damage that could be caused by exposure. Protection practices that were implemented in the early 1950s were considered sufficient at the time. It was generally believed that radiation was not particularly damaging. Science just didn't know any better during the infancy of the program.

The DOE probably did not tell everything they learned, and NIOSH is working to find all documentation that will help with the Site Profile.

**Comment:**

Records simply do not exist – the DOE and contractors either did not keep records or they destroyed what they had when they realized the potential danger to the workers. Secretary of Energy Bill Richardson spoke in Paducah and openly admitted that the DOE knowingly put workers in harm's way.



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**Question:**

When questions are submitted to NIOSH, what is the turn-around time? When will the Site Profile Team make revisions?

***Peter Darnell:***

There is no definite timeframe. It depends on the amount of time needed to research the question and the time it takes the Program Officers to prepare a proper response.

***William Murray:***

In the past, the Outreach Team has taken comments back to NIOSH regarding the concerns expressed in these meetings. The questions and concerns are addressed and the Team sends information back. We can do a return trip for discussion of the revisions to the Site Profile, but I don't know the timeframe.

**Comment:**

Worker advocates' biggest concern is the dose reconstructors' dependence on the Site Profile for non-SEC cancers.

***Peter Darnell:***

The formal process that NIOSH follows includes review of claims that may be affected positively by new information that is added to the Site Profile. There is a Program Evaluation Report completed for all revisions. NIOSH will look at denied claims against the new criteria. All health physicists get the reports even if there is not necessarily enough difference to do a new dose reconstruction.

The Site Profile Team leaders can take information from today's meeting back for immediate re-evaluation. There has already been useful information brought to our attention today that will be a topic for discussion.

**Comment:**

There is always an emphasis about the Site Profile being a living document at the Outreach meetings. If the Paducah Site Profile is revised based on information gathered from workers, will all the claims be reviewed to consider the possible benefit?

***William Murray:***

Yes, especially if the claim was close to 50%. The nature of the information will provide a better idea about how much it will impact claims.

**Comment:**

There have been comments and information submitted to NIOSH regarding inconsistencies and inaccuracies in the Site Profile already. So far there is no evidence that the information has been incorporated into the documents, so people are quite skeptical in general.

**Question:**

According to Section 2.3, there were two cascade upgrades – one between 1958 and 1962, the other between 1973 and 1981. This would cause a higher potential for exposure. Has NIOSH defined these exposures?



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**Jay Maisler:**

Assumptions were made in the first draft of the Site Profile based on the information that was available at the time. Your comments will be addressed and considered when revisions are discussed.

**Question:**

The values used on table 5.4 were the default maximum values – were previous concentrations considered?

**Jay Maisler:**

That is something that would need to be looked into specifically.

**Question:**

Was any other data considered in establishing the maximum values?

**Jay Maisler:**

Information such as that included in general incident reports was included. PACE also developed a great report, but it would have to be confirmed specifically that the information was included. The Site Profile Team will follow up on this.

**Comment:**

The information for the gap in Section 6.1 can be taken from data in the PACE/University of Utah report.

**Peter Darnell:**

Please submit that to NIOSH in writing. A formal follow-up process will ensure that the information is considered and that we can answer appropriately

**Comment (Moderator):**

DOL will be holding public meetings on March 29 and 30. They will be able to discuss changes in the program regarding Subtitle E, and will also be able to answer questions specific to individual claims.

Mr. Murray asked if anyone else had any questions or comments. He thanked everyone for their participation. He stated that the information was appreciated and that any additional comments should be sent directly to NIOSH in writing. The meeting was adjourned at approximately 12:45 p.m.