

**TESTIMONY OF SAM RAY  
BEFORE THE  
COMMITTEE ON GOVERNMENTAL AFFAIRS  
U.S. SENATE  
MARCH 22, 2000**

**REGARDING HISTORICAL WORKING CONDITIONS  
AT THE PORTSMOUTH, OHIO DIFFUSION PLANT AND REMEDIES NEEDED TO ADDRESS THE  
HEALTH OF DOE NUCLEAR WORKERS**

I am Sam Ray, a former uranium enrichment worker at the Portsmouth Gaseous Diffusion Plant in Portsmouth, Ohio. I reside at 128 Overlook Drive, Lucasville, OH.

I was hired in 1954 and worked as a production operator and instrument mechanic. In May of 1994, I was diagnosed with a rare type of bone cancer: chondrosarcoma. As a result, I had to have my larynx removed. At that point, I had no option but to take a disability retirement. My understanding is that there are two things that can cause my type of cancer. One is Paget's Disease, which I didn't have, and the other is radiation exposure, which I did have. I have never smoked a day in my life. It is well documented that certain uranium compounds are bone seekers.

Your Committee's hearing is especially timely. The Administration has proposed legislation to compensate workers nationwide from beryllium, and a remedy for radiation-related cancers at the Paducah Gaseous Diffusion Plant in Paducah, Kentucky. However, uranium enrichment workers exposed to radiation at Portsmouth and Oak Ridge were left out of the Administration's bill. We hope you will make sure Portsmouth and Oak Ridge workers are not left out of the final legislation. I believe my testimony illustrates how we toiled under conditions no less hazardous than Paducah.

**1. PORTSMOUTH FAILED TO PROVIDE WORKERS WITH ADEQUATE PROTECTION FROM RADIATION, HEAVY METALS & TOXIC CHEMICALS**

In prosecuting the Nation's cold war mission, workers at Portsmouth were kept in the dark about the hazards they faced. Information was provided based on a "need to know" basis--and production imperatives determined what you needed to know. Even to this day, we don't know what we confronted. For example, when we started feeding irradiated recycled uranium back into the process system, we never knew we were introducing contaminants (e.g., technetium, plutonium, neptunium, etc.), nor were we adequately protected. Today we are still learning about the extent to which transuranic elements, such as plutonium, were part of the working environment.

**A. THE PORTSMOUTH OXIDE CONVERSION PLANT (705-E) CAUSED NUMEROUS INTERNAL RADIATION DOSES**

Portsmouth operated a facility that converted highly enriched uranium (HEU) oxides into feed material from 1961-1978. Much of this HEU oxide (87% enriched) was shipped in from the Idaho Chemical Processing Plant, and processed in the 705-E building.

A good friend of mine, Robert Elkins, worked in the oxide plant from 1962-65. By 1965 he was placed on permanent work restriction due to high internal body counts of radiation. He had enriched uranium, technetium-99, neptunium-237, potassium and cesium in his body. When he retired in 1985 he was still on permanent restriction, a situation that confronted many other oxide plant workers. In the 15 years since retirement, the plant management has never contacted him to check on his health or suggest that he receive post-retirement monitoring.

However, Mr. Elkins was contacted by an individual from Hanford, WA (presumably the transuranium registry) who wanted to pay him \$500 for his body so the government could study what happened to the radiation in his body after he passed away. He wife was also offered \$500.

They both declined the offer. It appears that the government is more interested in what happens to Mr. Elkins after he is dead than what happens to him while he is still alive. If the Congress is funding this kind of effort, perhaps it could reorient the Department of Energy's priorities toward caring for the living.

Mr. Elkins' over exposures to radiation were not the exception, it appears. A 1985 DOE report states(1): "*the oxide conversion facility was not able to maintain adequate containment of the radioactive materials during operating periods.*"

*"As such, the decision was made in the 1977 time frame to shut down that facility pending modifications to provide adequate containment measures. These modifications were never funded, and the facility has not operated since."*

In vivo body counts (a relatively insensitive method of measuring the amounts of radiation in the lung) taken after 1965 found eight employees with radiation counts above DOE's 15 rem lung standard and two employees had more than 7.5 rem (half of DOE's standard). Since 1972, another 7 were found with more than 7.5 rem(2). Of the 17 employees listed above, 11 had worked in the oxide conversion facility. This number of overexposed workers actually measured and reported by Goodyear Atomic underscores the point that workers in the oxide conversion facility were subjected to uptakes of excessive levels of radiation.

## **B. NEUTRON DOSES WERE NOT MEASURED BETWEEN 1954 AND 1992**

The Portsmouth plant's radiation dosimetry programs have been woefully inadequate. For example, NIOSH discovered that between 1954 and 1992 the site never measured for neutron exposures. Worker dose records, consequently, do not exist for neutrons. "Slow cooker" effects from the concentration of uranium deposits in the cascade causes neutron emissions. Workers called in to clean out "freeze ups" of uranium inside of the cascade would be particularly at risk from neutrons, but there are no recorded doses to document these exposures.

## **C. WORKERS INGESTED TECHNETIUM-99-A BETA EMITTER**

Technetium-99, a fission product, was introduced into the cascades from recycled uranium reactor tails, most which had been first processed at Paducah. Worker urine dose records from CY 1976, 1977 and 1978 indicate that 27% of the chemical operators at Portsmouth tested positive for technetium-99 (66% tested positive for uranium)(3). In vivo lung monitoring established that 2 of the 45 maintenance mechanics had positive confirmed doses of technetium-99 to the lungs. Curiously, 563 mechanics were tested for uranium over a three year period, but only 45 were tested for technetium-99 or neptunium-237. Depending on whether the Tc-99 was in a vapor or solid form, special personal protective equipment (such as supplied air respirators) was required, but not provided until the early 1980s. One pregnant worker had a calculated dose 800 millirem to the fetal thyroid(4) of her 10- 11 week old fetus, providing further evidence of inadequate worker protection. Amazingly, between 1954 and 1993, the site had no technical basis document for rad protection, which would have included the protocols for conducting a monitoring program for transuranics.

## **D. CONTAMINATION CONTROLS WERE NON EXISTENT OR WOEFULLY INADEQUATE UNTIL THE 1990S**

When I was hired in 1954, process operators were not allowed to wear coveralls or safety shoes. If clothing became contaminated, we took this contamination home with us on our clothing and shoes. To my knowledge, all crafts (such as electricians, maintenance mechanics, etc) were allowed to wear coveralls and safety shoes. Some were mandatory. Sometime in the 60's, coveralls became optional for process operators; however, it wasn't until the 90's when contamination controls were implemented that they became mandatory. In reality, they should have always been mandatory.

## **E. DOSE RECORDS HAVE BEEN 'ZEROED' OUT OVER LIABILITY CONCERNS**

As others will testify today, management directed that a guard's radiation dose records be "zeroed" out after he had an uptake and was hospitalized, because of the concern that he would bring a worker comp claim. We have no idea if this was an isolated case or a regular management practice.

#### **F. RADIATION DOSES WERE ARBITRARILY "ASSIGNED" (INSTEAD OF BEING COUNTED)**

OSHA was called into Portsmouth after complaints filed by the Oil, Chemical & Atomic Workers Union (OCAW) and the Guards union questioned the accuracy of radiation doses. Management directed that doses be administratively "assigned" when the health physics staff had trouble reading dose badges. One practice involved pinning a dose badge to the wall and running a scanner over it and assigning this dose to any person whose dose badge didn't read out on a scanner. A settlement of this OSHA complaint resulted in a reconstruction of doses between 1993-1995. While management was generally conservative in assigning doses, at least 103 doses were undercounted. We have no idea how far back management was simply administratively "assigning" doses, instead of counting them.

Historically, the Health Physics program did little to investigate high radiation doses, based on the philosophy that high doses were unlikely. Whenever high dose readings were found on badges, they were determined to be equipment failures and summarily discarded. DOE has historically claimed no responsibility for the deficient health physics program and poor record keeping.

#### **G. CHEMICAL OPERATORS WERE OVEREXPOSED TO MERCURY AND ARSENIC**

Between 1981 and 1990, decontamination workers in the X-705 (decontamination process) building were exposed to mercury at up to 175 times the OSHA threshold limit values, largely from open vats of solvents. A 1990 DOE investigation found "workers were exposed at least once per shift, after sodium hydroxide was added tanks" and that Martin Marietta's plant doctor trivialized the hazards of ingesting mercury in discussions with affected employees.(5)

Arsenic contaminated feed was fed into the Portsmouth cascades in the late 1980's. Arsenic migrated towards copper instrument lines causing them to plug up. In 1993 after the presence of inorganic arsenic was confirmed, NIOSH conducted a health hazard evaluation. Air samples detected arsenic in excess of OSHA limits.

#### **H. RESPIRATORY PROTECTION DEPENDED ON V-MI-ERA GAS MASKS FOR MANY YEARS AND CONTAMINATION WAS WIDESPREAD**

I worked at the Extended Range Product (ERP) station on and off for a number of years. On one occasion while connecting the production process into an empty cylinder, the copper tubing pigtail ruptured. Although I immediately valved off the system, the room was filled with a thick fog of uranium oxide gases. I donned an army assault mask for protection. After the all clear signal, management sent me to the hospital for urinalysis. Today, we know that you should wait for 3-4 hours to give the material time to get into your system before urinalysis. For that reason, my dose records from this accident is going to be suspect, at best.

Indeed, until the mid 1970's, our respirator protection consisted of World War II army assault masks. It was years later that we learned that these were not adequate to block radionuclides or toxic chemicals.

In the late 50's and early 60's we had big layoffs. Prior to this layoff, the lab took samples to make sure process gases were reduced to a safe level before opening up the process equipment for maintenance work. In the process buildings, operators had to take over the work of lab technicians. Previously, the lab techs used bulb samples that would be taken to the lab and analyzed. The new system consisted of pulling a sample through a tube of salicylic acid (white powder). If the powder didn't change color in three (3) minutes, then it was assumed the system was <10 ppm UF<sub>6</sub> (commonly called a "negative").

We now know this was never an approved method, and there wasn't adequate research. In turn, we put maintenance crafts and others in harm's way when we issued a hazardous work permit stating that system was at a "negative".

## **L WORKERS WERE KEPT IN THE DARK ON CONTAMINATION CONTROLS**

Early on, we were told that the buildings would be so clean, we could eat off the floors. In reality, some eating areas became so contaminated that management had to build designated lunch rooms that were surveyed on a regular basis and kept clear (1980's).

Due the lack of a contamination control program, certain buildings were becoming more contaminated. For example, leaks from the ERP station had spread contamination in the X-326 building. Compressors would malfunction and process gases (UF6) would leak to the atmosphere. On ONE occasion, it was so bad that it looked like a fog moving up the building, which is approximately V2 mile long. I became personally aware of this contamination problem when working as an instrument mechanic, because we had to work in areas that we knew or suspected were contaminated. I often felt we should have surveys, but at the time it was a hassle to get your supervisor to request a survey. Today, the story is different.

We have had many small releases which were never reported, as well as documented large releases. In side of the withdrawal room we a major release. There were green "icicles" hanging in the room from crystalized uranium hexafluoride. Management had declined to install safety measures to prevent this release.

Goodyear Atomic issued a *Health Physics Philosophy as a Guide for Housekeeping Problems in the Process Areas*, which it distributed to all supervisors on August 27, 1962. While management assured workers there was no hazard at the uranium enrichment facility in Portsmouth, Ohio, it warned supervisors:

*"We don't expect or desire that the philosophy will be openly discussed with bargaining unit employees. Calculations of contamination indices should be handled by the General Foreman and kept as supervisory information in deciding the need for decontamination."*

Until the 1980's, there were few or no personal radiation monitors (frisking devices). This technology was available, but apparently for DOE the cost outweighed the risk. In the 90's, this all changed. Today, in certain buildings and areas, you have to monitor clothing and shoes whenever you leave the building to make sure you aren't tracking radiation into clean areas or off plant site. Primarily, the problem lies in the first 35 years. What were the former workers exposed unknowingly or perhaps even knowingly? We know that they are having many health problems, such as cancers and respiratory problems, and in numbers far greater than would be expected.

## **2. INSPECTIONS WERE INFREQUENT UNDER DOE'S SELF REGULATION**

A July 1980 Comptroller General report, *Department of Energy's Safety and Health Program for Enrichment Plant Workers Is Not Adequately Implemented* (EMD-80-78), found that DOE's Oak Ridge Office, which had oversight responsibility for health and safety, had not conducted a safety inspection at Portsmouth for 3 years and was not adequately responding to worker safety complaints. Unannounced safety inspections were supposed to occur annually at each plant, but even when they were inspected, the Oak Ridge Office "does not, as part of an inspection or any other visit to an enrichment plant, monitor for radiological contamination." Oak Ridge explained the absence of inspections on a staff shortage, which the Comptroller General noted was attributable to Oak Ridge paying safety inspectors at a lower grade than elsewhere in the DOE complex.

## **3. HEALTH EFFECTS ARE ON THE MINDS OF MANY CURRENT AND FORMER WORKERS**

Currently, I am a retiree representative for the Worker Health Protection Program (WHPP). This program is funded by a grant authorized under Section 3162 of the FY 93 Defense Authorization Act, and administered by Queens College and the Paper, Allied-Industrial, Chemical & Energy Workers Union ("PACE"). It gives former workers a one-time complete. When I talk to former workers and retirees, I find out how little they knew about what they were exposed to. I get calls from widows whose husbands have passed away with cancers. They want to know if their spouse's exposure in the workplace caused their illness.

In 1987 NIOSH reported that Portsmouth workers had experienced excess stomach cancer and hematopoietic cancers (including leukemia). In 1992 the study was updated, in part, due to a request from Senator John Glenn. In 1996, the study summary was presented to the workforce. It indicated that there were no statistically significant elevations of any cancer deaths and the elevations of stomach and hematopoietic cancers identified in the 1987 study had diminished. These results were presented to the media in September 1999(6) . However, the NIOSH officials releasing this information apparently chose to DELETE the page defining the study's limitations(7), which includes (\*1) this was a mortality study and not a study of disease incidence; (\*2) the population is still relatively young to conduct an epidemiology study; (\*3) case control studies would be better at identifying cause and effect; (\*4) the exposure data is weak; and (\*5) workers were exposed to a mix of chemicals and radiation and the effects are difficult to disentangle. We obtained the deleted text. These limitations, if incorporated, substantially alter the light in which the findings should be considered. What motivated this apparent censorship is beyond our knowledge.

#### **4. RECOMMENDED ACTIONS FOR CONGRESS**

- Congressman Ted Strickland and 10 cosponsors introduced HR 3495 to provide workers' compensation for radiation exposed workers at DOE nuclear facilities and suppliers. It lays down important marker, because, unlike the Administration's bill (HR 3418 and S 1954), it expands coverage beyond the Paducah workforce and 55 workers in Oak Ridge to cover the entire DOE nuclear complex.
- Any successful bill must shift the burden of proof to the government in determining causation, because the failure to properly monitor for radiation and toxic hazards imposes an insurmountable burden of proof on a victim. Dose reconstruction is very costly, takes years to accomplish and the results are questionable at best since basic data was never collected in many cases. NIOSH noted in a 1993 report, that "prior to 1981, the amount of quantitative industrial hygiene data is scant to non-existent.(8)"
- A single agency, such as the Labor Department's Office of Worker Compensation Programs, should administer a federal workers comp program. We need one stop shopping for addressing occupational illnesses regardless of whether it is beryllium, radiation, toxic chemicals or heavy metals.
- The current medical screening program carried out by DOE under Section 3162 of the FY 93 Defense Authorization Act should go even further, with lifetime annual medical screening. We need fully paid medical insurance for displaced or retired workers. A Medigap supplement should be fully funded by the government for nuclear workers.

Workers at Portsmouth and Paducah face a unique problem with retiree health care benefits. Since USEC was privatized, it assumed responsibility for the Lockheed Martin retiree health care benefits program. However, these benefits could be in jeopardy if USEC, as many predict, will fall into bankruptcy or liquidate in several years. Unlike pensions, retiree health care benefits are not guaranteed under ERISA. We need legislation to guarantee that the funds which the DOE will be giving to USEC to cover the past retiree health care liability are placed in a safe harbor and these health benefits will be delivered as intended.

#### **SUMMARY**

Energy Secretary Richardson acknowledged that "After decades of denial, the government is conceding that workers who helped make nuclear weapons were exposed to radiation and chemicals that produced

cancer and early death." In the New York Times article, the Secretary said: "In the past, the role of government was to take a hike,....and I think that was wrong. " Nuclear workers have paid a price and deserve a fair remedy.

### Works Cited

- 1) The Report of the Joint Task Force on Uranium Recycle Materials Processing, of Energy, 1985, DOE/OR-859
- 2) Information on Three Ohio Defense Facilities, Fact Sheet for the Ranking Minority Members, Subcommittee on Energy, Nuclear Proliferation and Government Processes, Committee on Governmental Affairs, U.S. Senate, November 1985, GAO/RCED-86-5 11 FS.
- 3) Response to Freedom of Information Act Request by OCAW to the DOE, July 1, 1982.
- 4) A July 22, 1976 letter from Karl Hubner, Oak Ridge Associated Universities to EN. Hansen, Goodyear Atomic, states: "The dose of .8 to 1.0 rad to the thyroid gland of a fetus is considered to be insignificant, and there is no reasonable chance of damage to this organ in terms of cretinism." The letter qualified this conclusion by stating: "calculations were based on some gross assumptions that had to be made because of insufficient data."
- 5) Letter from Gene Gillespie, Site Manager, DOE to Ralph Donnelly, Plant Manager, Martin Marietta, July 20, 1990, Letter EO-221-696.
- 6) Portsmouth Gaseous Diffusion Plant: Study Summary, Rinsky, Ahrenholz, and Cardarelli, September 1999
- 7) Restated below are portions that were deleted by NIOSH before releasing the summary:

"All observational epidemiologic studies have some limitations since they take advantage of naturally occurring events rather than being conducted in an experimentally controlled environment. Here are the biggest limitations that we know about:

  - \*1) This is still a very young population and the vast majority of them are still alive. As the workforce grows older, deaths will occur at an increasing rate and of course there is no way to know what these people will eventually die from;
  - \*2) this is a study of mortality, not disease incidence. Only diseases that have high case fatality rate are measured well by mortality. Although most cancers have a high case fatality rate, there has been great progress over the past two decades in prolonging the life of persons with hematopoietic cancers. Mortality may not be a good measure of these deaths;
  - \*3) SMR analyses are not particularly good attributing the proper effects of confounding and effect modification. The case control studies that are being worked on are much better in this regard;
  - \*4) the exposure response portion of these analyses are only as good as the exposure metrics. Because of the way the plant collected exposure data our algorithms for assigning exposure, while the best that can be done, still have a degree of uncertainty To the extent that real exposures are over or under estimated, our answers will be in error; and finally,
  - \*5) these workers were simultaneously exposed to a number of chemical and physical agents and it is very difficult to disentangle the effects of the concurrent exposures.

Moreover, these workers are protected by some other factors associated with their employment at this facility, such as lower alcohol and smoking rates as a consequence of their security clearance requires. This further complicates the interpretation of any harmful effects there might have been suffered."

8) *Protocol for the Study of Mortality Patterns Among Uranium Conversion and Enrichment Workers*, NIOSH, J. Stebbins, et al, July 1 ~ 1993, pp. 15

9) *New York Times*, January 29, 2000, pp 1.