

## HISTORY OF THE FERNALD PLANT AND LITIGATION

In the early 1950's, the U. S. Department of Energy built a nuclear fuel processing plant known as the Feed Material Production Center (FMPC), located on a 1,050 acre complex near rural Fernald, Ohio, seventeen miles northwest of Cincinnati (1). The FMPC was a U.S. government facility operated by private contractors under the supervision of the U.S. Atomic Energy Commission and later the U.S. Department of Energy (DOE), and was part of the US Department of Energy (DOE) nuclear weapons production complex. National Lead of Ohio Inc. was the main contractor, and operated the plant from 1951 until December 31, 1985. The primary function of this uranium refinery was to convert uranium feed materials, in the form of uranium ore and concentrates, into uranium metal. The feed materials were chemically converted into a series of uranium salts. Uranium metal was then extracted from the salt in a process conducted at extremely high temperatures. This uranium metal was then machined into fuel cores or targets for nuclear reactors, which were shipped to other DOE sites in the nuclear weapons complex. Recycled materials from other DOE sites were received at the FMPC and used as feed materials for production or processed for recovery of uranium and waste disposal. Manufacturing at the FMPC continued until its suspension in July, 1989. In addition, the FMPC also served as a storage site for radioactive and other hazardous waste material from other DOE sites (1). In 1991, the name of the facility was changed to the "Fernald Environmental Management Project" (FEMP) in order to reflect the change in mission from production to environmental "clean up" (2), which was completed on October 29, 2006 (3).

Releases from the site resulted in exposure to ionizing radiation, especially radon, soluble and insoluble forms of uranium, and various other organic and inorganic chemicals. During the chemical separation process, intermediate and byproducts included uranium trioxide ( $UO_3$ ), uranium tetrafluoride ( $UF_4$ ), uranium hexafluoride ( $UF_6$ ) and uranyl nitrate (1,2). These compounds are more soluble than uranium ore or metal. Uranyl nitrate is the most soluble form of uranium. Releases from the plant to the community through the air pathway were primarily  $UO_3$ ,  $UF_4$ , and  $UF_6$ ; release through the water pathway also included uranyl nitrate (1,2). The health effects seen in this cohort may be attributable to the chemical forms of uranium to which they were exposed, which were more soluble than uranium ore or metal. However, many members of the cohort never received exposure beyond the background exposure received by the general population. Extensive uranium dose reconstruction using methods developed by the CDC demonstrate that over 60% of the cohort had such minimal exposure to uranium and radon that their cumulative ionizing radiation exposure was less than 3.2% over lifetime background levels.

Contamination from the Fernald uranium foundry and machining operations first made national headlines in the mid-1980's when several news organizations ran features about the impact of plant operations on workers and the community (4); emissions prior to that time (5) had not been reflected in the published record. Citizens were outraged by the extent of the off-site contamination which included releases of uranium and related products into the air and ground and surface water.

In January 1985, a class action lawsuit was filed by the citizens (plaintiffs) against National Lead of Ohio, Inc., which operated the plant at that time and its parent corporation, NL Industries, Inc., which guaranteed performance of the contract (6). The bases of the lawsuit were emotional distress and property value diminution. In 1989, after a non-binding "summary jury trial", a technique used by judges to encourage settlements in which a jury is impaneled to hear a summary of the evidence in a case without actually hearing witnesses, the parties agreed to a settlement in which \$78 million was awarded to the class (6, 7). The settlement had three components: payments to individuals for emotional distress, payments to land owners for decreases in the value of real property, and a fund to support a medical monitoring program and epidemiologic studies (6). The settlement and funds were supervised by three special masters (trustees) appointed by Hon. S. Arthur Spiegel, U.S. District Court Judge.



The Fernald Medical Monitoring Program was a result of a settlement reached in 1989, and resulted in the largest medical monitoring program created through class action litigation as a response to an environmental exposure. Settlement funds for medical monitoring were placed in the Fernald Medical Foundation, which was administered with oversight of the United States District Court (8).

The key design feature of the Program was that the examination was comprehensive – it was focused on conditions that had the most potential to improve subsequent health without regard to whether those conditions were potentially related to exposures to hazards from the Plant. The rationale for this was that the known health effects of exposures such as radiation or the metal toxicity of uranium (9) didn't have very effective treatments (e.g. – lung cancer, renal disease, interstitial pulmonary fibrosis). In contrast, regardless of what exposures may have occurred in this population, we were certain that the leading causes of death and disability in the participating population would be the same as the general population – coronary heart disease, common cancers, and stroke. The risk of death and disability from some of these common conditions is modifiable through the application of known screening practices and risk factor reduction. In short, the Program was focused on conditions with the most potential to affect future health rather than conditions potentially related to environmental exposures.

In legal terms, then, the potential remedy was indirect. Although the FMMP was not able to prevent or mitigate most health harms that might have occurred from exposures to radiation or uranium, hopefully health benefits related to health screening and promotion activities for common conditions would balance or offset those exposure-related harms that we could not mitigate.

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