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**The Oak Ridge National Security Complex:  
Human Health and the Environment  
as Casualties of Hot and Cold Wars**

A Global Green USA Legacy Program Report

By Dr. Jasmine Aimaq

**Executive Summary**

When governments, the media, and the public talk about nuclear weapons, it is often to invoke images of terrorists and rogue states detonating weapons of mass destruction in our streets. There is another side to the existence of nuclear weapons, however, another danger that receives far less attention, but is perhaps the more immediate threat. The Cold War may be over, but the environmental legacy of the arms race is not. Past and present activities at the Nuclear Weapons Complex (NWC) continue to put the environment and human health at risk in many communities in the United States.

This report reviews lingering and emerging dangers at the largest NWC site, the Oak Ridge National Security Complex in Tennessee. The Oak Ridge site is both a high-value target for terrorist attack, a source of environmental contamination, and a potential public health threat. This report examines the nexus between environment, health and security at Oak Ridge, and discusses known and potential dangers in each of these areas. Problems include:

- the health and environmental dangers posed by Highly Enriched Uranium (HEU) and plutonium, exacerbated by inadequate storage at the site;
- unsatisfactory security around dangerous fissile materials;
- the serious effects of beryllium and mercury on human health;
- decaying buildings and storage tanks from which hazardous materials have leaked;
- contamination of White Oak Creek, which carries toxic waste from the site to a popular swimming, boating and fishing spot;

- shortcomings in the government's Energy Employees Occupational Illness Compensation Program;
- developmental problems among children that may be linked to toxic waste from the Oak Ridge site; and
- allegations of "environmental racism" in the adjacent town of Scarboro.

Specific policy suggestions are made at the end of the report. Global Green USA believes that any solution requires the participation of the affected communities as well as the local and federal government. We encourage key stakeholders to engage in a dialogue about how best to mitigate the many dangers associated with Oak Ridge. Community involvement must be accompanied by government commitment and specific, measurable actions.

This report is the second in a Global Green USA series on the NWC and the dangers posed by nuclear weapons assembly, maintenance and disassembly. Our first report, "The Death of a Nuclear Warhead," focused on the disassembly of nuclear weapons at the Pantex Plant in Texas, and can be downloaded at [www.globalgreen.org](http://www.globalgreen.org).

## **Introduction**

To the casual passer-by, Oak Ridge, Tennessee, might look like an ordinary American town, but it is far from ordinary. Oak Ridge, Tennessee is home to the Department of Energy's Oak Ridge National Security Complex,<sup>1</sup> the largest of eight active Nuclear Weapons Complex (NWC) sites in the United States. Today, some 13,000 men and women work at the 33,750-acre square mile complex, and 750,000 people live within 50 miles. As home to the largest NWC inventory of fissile materials, Oak Ridge is at once a high-value target for terrorist attack, a potential public health threat, and a potential source of environmental contamination. Indeed, numerous reports by the government, private organizations and the news media have presented scientific and anecdotal evidence of a troubling legacy of security, public health and environmental woes.

This report provides a succinct, comprehensive review of the Oak Ridge facility, detailing security, safety, health and environmental problems linked with the specific tasks carried out at the site. With this report, Global Green USA hopes to raise public awareness concerning the potential impacts of weapons dismantlement, to encourage efforts to mitigate and prevent security, health, and environmental damage around Nuclear Weapons Complex sites, and to point the way to a safer Nuclear Weapons Complex with a series of policy recommendations aimed at the administration and lawmakers. This report is the second in a series of Global Green reports on nuclear weapons dismantlement and stockpile stewardship. The first, “Death of a Nuclear Warhead,” was published in 2004.<sup>2</sup>

### *Why Oak Ridge?*

The Oak Ridge Complex stands out from other U.S. Nuclear Weapons Complex sites for several reasons.

**Security** – Oak Ridge is home to the largest Nuclear Weapons Complex inventory of fissile materials, including highly-enriched uranium and plutonium, which are the ingredients of a nuclear device or radioactive bomb. As such, the facility is under threat of theft and/or smuggling of these materials from the complex. Another concern is infiltration of the Oak Ridge Complex by a terrorist intent on assembling and detonating a crude nuclear device within the compound. Security tests conducted in the aftermath of September 11, 2001 revealed flaws in security and suggested public health and environmental problems.

**Stockpiles of Dangerous HEU** – Oak Ridge is tasked with stockpiling all of the Highly Enriched Uranium (HEU) removed from dismantled nuclear weapons. The Moscow

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<sup>1</sup> Until 2000, the plant was known as the Oak Ridge Nuclear Reservation; the plant was renamed by the National Nuclear Security Administration in November 2000.

<sup>2</sup> Jasmine Aimaq, *The Death of a Nuclear Warhead: The Environmental and Health Impacts of Nuclear Weapons Complex Activities* (Global Green USA, 2004), [www.globalgreen.org](http://www.globalgreen.org).

Treaty (officially, the Strategic Offensive Reductions Treaty, or SORT), signed by the United States and Russia in 2002, stipulates the withdrawal of thousands of operationally deployed strategic nuclear warheads. Because all HEU is sent to Oak Ridge after the nuclear weapons are taken out of service, the dismantlement workload at the complex is likely to increase significantly over the next few years.<sup>3</sup> This growing HEU stockpile could be accompanied by an increase in related threats, including the threat of a terrorist-related theft of HEU, which can be used to make a simple nuclear bomb.

**Public welfare and the environment** – The scope and extent of worker health problems at the Oak Ridge Reservation are striking. A series of articles in *The Tennessean* in the late 1990s reported anecdotal evidence of patterns of illnesses around Oak Ridge and other nuclear weapons sites, and asked whether adequate precautions were taken to protect worker health and safety.<sup>4</sup> Subsequent studies by the Tennessee Department of Health<sup>5</sup> and congressional hearings on illnesses related to Department of Energy<sup>6</sup> nuclear weapons sites raised further questions about worker health and safety and environmental impacts at Oak Ridge. In addition, the Oak Ridge facility is located near areas populated by underprivileged groups, most notably lower class African-American communities, raising questions about the impact of federal activities on racial equity and justice.

In sum, urgent issues surround the U.S. Nuclear Weapons Complex in general and Oak Ridge in particular – issues that have too long been ignored.

### *Policy Environment*

The Bush administration has launched a series of policy initiatives that Global Green USA believes increases, rather than decreases, many of the security, environmental and

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<sup>3</sup> Bill Brumley, Oak Ridge chief of the National Nuclear Security Administration (NNSA), August 13, 2004.

<sup>4</sup> *The Tennessean's* "Special Report: An Investigation into Illnesses Around the Nation's Nuclear Weapons Sites" is available at <http://www.tennessean.com/sii/longterm/oakridge/storyindex.shtml>.

<sup>5</sup> Tennessee Department of Health, Report on Oak Ridge Health Studies released in 2000; available at <http://www2.state.tn.us/health/ceds/OakRidge/ORidge.html>.

health dangers associated with nuclear weapons maintenance and storage. The Stockpile Life Extension Program (LEP), for example, being implemented by the Department of Energy's National Nuclear Security Administration, aims to preserve the operational life of each nuclear weapons system for at least 30 years.<sup>7</sup> Similarly, the Stockpile Stewardship Program aims to lengthen the life expectancy of various nuclear weapons components by decades, and in some cases, by over a century. In fact, over the next decade, the U.S. government plans to invest \$45 billion in the Stockpile Stewardship Program.<sup>8</sup> This will put added operational strain on DOE sites, which are already plagued by safety and security problems.<sup>9</sup>

The National Nuclear Security Administration has recently embarked on an eight-year project to expand the capacity and capability of the Y-12 plant at Oak Ridge to meet the planned workload for replacing uranium components in nuclear weapons.<sup>10</sup> Essentially, the Bush administration intends to continue and expand the nuclear weapons program, rather than take a step towards safely and permanently disassembling these arms. As noted above, it also means an added workload for plants already exhibiting alarming signs of decay and responsible for significant damage to the environment and human health.

Meanwhile, the Moscow Treaty, signed by the United States and Russia in 2002, stipulates the withdrawal of thousands of operationally deployed strategic nuclear warheads. Because all HEU is sent to Oak Ridge after the nuclear weapons are taken out of service, this has the potential to significantly increase the dismantlement workload at Oak Ridge.<sup>11</sup>

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<sup>6</sup> Senate Hearing on DOE Illnesses, March 18, 2000.

<sup>7</sup> See the National Nuclear Security Administration at <http://www.nnsa.doe.gov/>.

<sup>8</sup> DOE employee who declined to be identified.

<sup>9</sup> DOE official who declined to be identified.

<sup>10</sup> The Y-12 National Security Complex has a number of missions, including surveillance of weapons through disassembly, inspection, and documentation of findings; production of hardware to support laboratory tests required for stockpile certification; dismantlement of retired weapons; management and storage of nuclear weapons; among others. See <http://www.y12.doe.gov/bwxt/> for more information.

<sup>11</sup> Bill Brumley, Oak Ridge chief of the National Nuclear Security Administration (NNSA), August 13, 2004.

In light of such developments, we must ask whether the dangers associated with NWC site activities are being properly managed, and whether known environmental and health risks are being effectively addressed by the federal government. It is essential that programs such as the Stockpile Life Extension Program be made contingent on full protection of the environment, the public, and workers at NWC sites from the known effects of nuclear weapons maintenance activities.<sup>12</sup>

### **In this Report**

This report addresses the following questions:

- What specific activities are conducted at the Oak Ridge Complex, and what identifiable risks are associated with these activities?
- What health and environmental problems have occurred in and around the Oak Ridge community?
- What steps are being taken at the Oak Ridge plant to safeguard the health of its workers and the surrounding environment and community?
- Have grievances by the adjacent communities been submitted? If so, what has the government done to address these grievances?
- What policy changes could be implemented to ensure that public health and the environment around Oak Ridge are safeguarded?
- How can Oak Ridge serve as a case study for better management at Nuclear Weapons Complex sites and activities around the country?

### **Oak Ridge: History, Mission and Activities**

Since the end of the Cold War some fifteen years ago, the Nuclear Weapons Complex (NWC), once a nationwide network of 27 sites, has been reduced to eight active sites, each with unique tasks pertaining to the assembly of nuclear bombs, the disassembly of retired nuclear weapons, and the storage and management of nuclear weapons

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<sup>12</sup> For an early post-Cold War study, see Office of Technology Assessment, U.S. Congress, *Dismantling the Bomb and Managing the Nuclear Materials*, OTA-O-572 (Washington DC: US Government Printing

components. The current mission of the Y-12 plant is listed in Table 1. (Missions for the other NWC sites are listed in Table 2.) While the storage of HEU is today one of the main missions of Oak Ridge, the site for years had other responsibilities that have left a long and troubling legacy.

The Y-12 site was built rather hurriedly in 1942 for the main purpose of enriching uranium via electromagnetic separation.<sup>13</sup> After World War II, Y-12 assumed responsibility for manufacturing the HEU portions of US nuclear weapons as well as the secondaries (see *Inside the Bomb* diagram) for thermonuclear weapons. Later, as the United States began retiring warheads as part of its international arms control commitments and nuclear arsenal modernization plans, Oak Ridge became – and remains – home to large stockpiles of HEU returned from dismantled bombs.

Table 1 – Y-12 Plant Quick Facts

<b>Date established</b>	1942
<b>Current Tasks</b>	Maintain capability to produce secondaries and cases. Conduct surveillance on and dismantle secondaries. Store and process uranium and lithium materials and parts. Process beryllium. Provide production support to weapons laboratories.
<b>Size</b>	811 acres
<b>Employees</b>	3500
<b>Annual budget</b>	\$800 M for FY 2004
<b>Residents in Oak Ridge</b>	55,000
<b>Residents within 50 miles</b>	750,000

Table 2: The Nuclear Weapons Complex Today

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Office, 1993).

<sup>13</sup> DOE official who declined to be identified. See <http://www.ornl.gov/history> for a history of the Oak Ridge complex.



Site	Mission
Kansas City Plant	Produce, procure non-nuclear components Conduct surveillance testing on and repair non-nuclear components
Pantex Plant	Assemble, maintain and conduct surveillance on warheads Disassemble nuclear warheads being retired Store plutonium components from dismantled warheads
Oak Ridge Y-12 Plant	Maintain capability to produce secondaries and cases Conduct surveillance on and dismantle secondaries Store and process uranium and lithium materials and parts Provide production support to weapons laboratories
Savannah River	Recycle tritium from dismantled warheads Conduct surveillance on and reclaim returned tritium reservoirs Support tritium source projects
Sandia National Labs	Conduct research and engineering activities Conduct experiments on nuclear weapons effects Design non-nuclear components Provide safety and reliability assessments of the stockpile
Lawrence Livermore National Labs	Conduct R&D in basic sciences, mathematics and computing Conduct experiments on physics of nuclear weapons Maintain capability to design nuclear explosive packages Design and test advanced technology concepts Provide safety and reliability assessments of the stockpile
Los Alamos National Labs	Conduct R&D in basic sciences, mathematics and computing Conduct experiments on physics of nuclear weapons Maintain capability to design nuclear explosive packages Design and test advanced technology concepts Provide safety and reliability assessments of the stockpile Manufacture and conduct surveillance on selected non-nuclear components Conduct pit surveillance and modification for reuse; fabricate pits
Nevada Test Site	Maintain capability to conduct underground nuclear tests, and evaluate effects Conduct experiments on physics of nuclear weapons Support emergency response and radiation-sensing activities

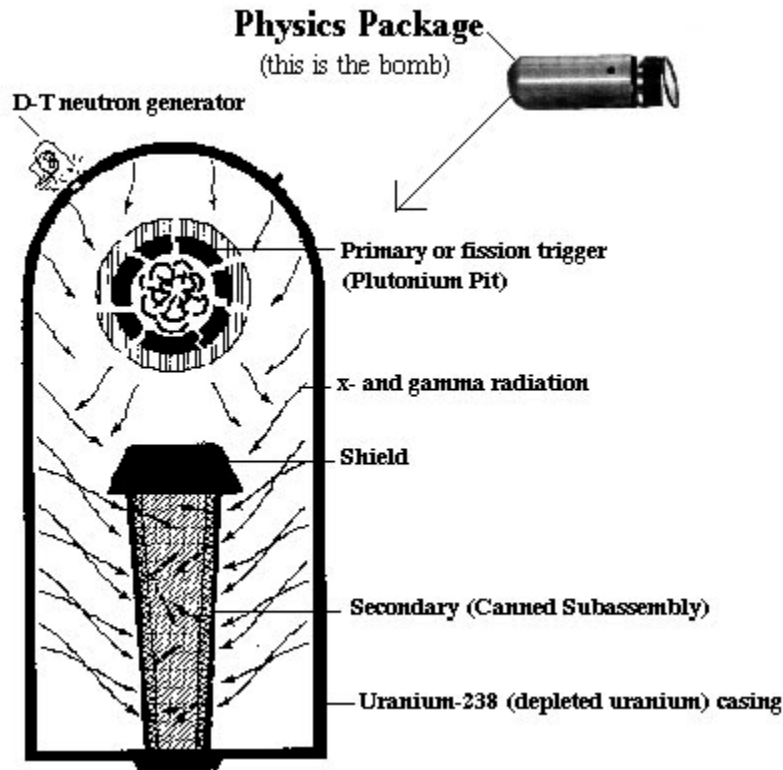
*Inside the Bomb*

Within the broad category “nuclear bombs,” there are two principal types of weapons: atomic (fission) bombs, and thermonuclear (fusion) bombs.<sup>14</sup> The bombs dropped on Hiroshima and Nagasaki were both atomic bombs, with a far smaller destructive capacity

<sup>14</sup> Thermonuclear bombs are also known as hydrogen bombs, popularly referred to as H-bombs.

than the next generation of nuclear weapons – thermonuclear bombs, which dominate today’s US and Russian arsenals. To illustrate the vast difference between the weapons of 1945 and those of today, the current “MX Peacekeeper” intercontinental ballistic missile (ICBM) contains 10 individual thermonuclear bombs equaling 100,000 times the power of the bomb dropped on Hiroshima.<sup>15</sup>

There are three stages to the detonation of a thermonuclear bomb. The primary, or trigger stage, consists of fission, or the splitting of the atom – the scientific breakthrough that signaled the dawn of the nuclear age. The second consists of fusion (secondary), and the third entails yet another stage of fission. These events occur one after the other, but in such close succession that they appear as a single event. Visually, the physics of the bomb itself are as follows.<sup>16</sup>



<sup>15</sup> See The Committee for the Compilation of Materials on Damage caused by the Atomic Bombs in Hiroshima and Nagasaki, *Hiroshima and Nagasaki: The Physical, Medical, and Social Effects of the Atomic Bombings* (New York: Basic Books, 1981).

<sup>16</sup> Diagram reprinted from Oak Ridge Environmental Peace Alliance primer, “Understanding the Bomb,” available at [stopthebombs.org](http://stopthebombs.org). No publication date.

As is seen in the above sketch, the secondary, which is also known as a canned subassembly, is physically separate from the primary. Activities at Oak Ridge have centered mainly on processes linked with the thermonuclear secondary, i.e. with uranium, rather than plutonium.

The physics package is the primary part of the weapon. The cylinder-shaped secondary consists of several layers, with the outside layer composed of natural uranium and enclosing a layer of lithium deuteride, the fuel that helps trigger the secondary explosion. The lithium in turn houses an innermost layer of Highly Enriched Uranium (HEU). Most of the explosive power of the bomb comes from the secondary, which thus accounts for the tremendous yield of modern weapons.

The secondary is an amalgam of materials potentially dangerous to health and the environment, and the removal of the secondary from the weapon poses particular risks. Like the rest of the weapon, secondaries were built to stay whole; nuclear bombs were not built to be easily taken apart. As the delicate disassembly task progresses, workers are exposed to a variety of dangerous substances, the most obvious being the HEU itself, and the task can inadvertently release into the air and soil significant amounts of both HEU and other toxins. Before weapons began to be dismantled, however, workers at Oak Ridge spent decades processing HEU. The legacy of damage to worker well-being dates back to these earlier days, and is exacerbated by current shortcomings in safely storing HEU from disassembled weapons.

Besides the HEU from secondaries, toxic materials – most notably beryllium and mercury – were processed at the Oak Ridge Complex. In nuclear weapons, beryllium, a strong but lightweight metal, was used to create shields around the core to reflect and amplify neutrons back into the critical mass. Mercury was used extensively in the process of lithium enrichment, a necessary step in creating the secondaries.

*The Dangers of HEU*

The greatest health risk from large intakes of HEU is damage to the kidneys, because, in addition to being weakly radioactive, uranium is a toxic metal. The Environmental Protection Agency (EPA) has conceded that uranium exposure increases the risk of cancer due to its radioactivity. Since uranium tends to concentrate in specific locations in the body, the risks of cancer of the bone, liver cancer, and blood are increased. Inhaled uranium also increases the risk of lung cancer.<sup>17</sup> According to some experts, lung cancer, due to inhaling uranium decay products, is in fact the most serious health hazard associated with this material.<sup>18</sup>

The refurbishment and long-term storage and maintenance of secondaries also raises serious questions. In addition to HEU, the secondary casing has been exposed to plutonium through proximity to the primary. Plutonium is a highly hazardous, carcinogenic material. In fact, it is one of the most dangerous materials known, and is especially insidious because it is quite difficult to detect once it is outside secure containment or has been incorporated (breathed or ingested) into the human body. It is not difficult for plutonium to enter the body, since it can easily be inhaled or be ingested accidentally through contaminated food and water. It is also possible to be contaminated through accidental ingestion of plutonium-containing soil. Once absorbed into the body, plutonium typically deposits itself on soft tissue, most notably the liver and on bone surfaces, particularly in bone marrow.<sup>19</sup>

As part of the Stockpile Stewardship Program, one of the major missions of the Oak Ridge plant is to rework the secondaries to extend the life of every thermonuclear weapon by another 120 years. Currently, there may be as many as 5,000 secondaries stored at Oak Ridge. Because each contains or has been in proximity to HEU, beryllium, mercury and other hazardous materials, the possible health threat to employees and the surrounding community is evident.

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<sup>17</sup> Environmental Protection Agency, "Radiation Information: Uranium." Available at <http://www.epa.gov/radiation/radionuclides/uranium.htm>, updated November 30, 2004.

<sup>18</sup> Arjun Makhijani, Institute for Energy and Environmental Research, interview with the author, January 7, 2003.

<sup>19</sup> See Jasmine Aimaq, *The Death of a Nuclear Warhead: The Environmental and Health Impacts of Nuclear Weapons Complex Activities* (Global Green USA: 2004), esp. pp. 3-5, "The Health and Environmental Effects of Nuclear Weapons Materials."

*The Dangers of Beryllium*

The toxicity of beryllium has become clear since the early days of the Manhattan Project. Today, the Department of Labor's Occupational Safety and Health Administration (OSHA) warns that inhaling beryllium dust or fumes could cause a fatal, chronic lung disease commonly identified as Chronic Beryllium Disease (CBD). CBD can occur among people who are exposed to the dust or fumes from beryllium metal, metal oxides, alloys, ceramics, or salts. The onset is slow, and even very small amounts of exposure to beryllium have been shown to cause the disease. In some cases, CBD develops while workers are still on the job, but in others it may not develop until many years after a person has stopped working in the beryllium industry, or has been transferred to a job that does not involve beryllium exposure. Chronic Beryllium Disease normally develops in workers who have become sensitized to beryllium, i.e. have developed an allergic reaction to beryllium. A worker may become sensitized at any point during job exposure, or in some cases may not become sensitized until after leaving a job where there has been beryllium exposure.<sup>20</sup>

Besides CBD, an ailment known as Acute Beryllium Disease has also been identified. As opposed to CBD, this disease usually has a quick onset. Symptoms resemble those of pneumonia or bronchitis. The acute form of the disease is believed to occur as a result of exposures well above the current permitted levels, and is far less common than CBD.

Studies of workers exposed to beryllium have also revealed significantly elevated risks of lung cancer. The International Agency for Research on Cancer (IARC), the expert cancer agency of the World Health Organization, has concluded that exposure to beryllium can cause lung cancer in humans.<sup>21</sup> Finally, a skin disease characterized by poor wound healing and a rash or wart-like bumps can occur as a result of skin exposure to beryllium dust.

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<sup>20</sup> For more information on beryllium, see <http://www.osha.gov/SLTC/beryllium/recognition.html>.

*The Dangers of Mercury*

Initial exposure to high concentrations of mercury vapor produces symptoms similar to “metal fume fever” including fatigue, fever, and chills. Respiratory system effects include cough, shortness of breath, tightness and burning pains in the chest and inflammation of the lungs. In some cases, a potentially life-threatening accumulation of fluid in the lungs (pulmonary edema) has occurred. Exposure to high, but unspecified, concentrations of mercury vapor has caused death due to respiratory failure. All of the reported deaths resulted from inhaling mercury vapors formed upon heating mercury.

Several case reports have described harmful nervous system effects following inhalation of high concentrations of mercury vapor. The most prominent symptoms include tremors (initially affecting the hands and sometimes spreading to other parts of the body), emotional instability (including irritability, excessive shyness, a loss of confidence and nervousness), sleeplessness, memory loss, muscle weakness, headaches, slow reflexes and a loss of feeling or numbness.

A classic sign of exposure to high concentrations of mercury is inflammation of the inside of the mouth (stomatitis), sometimes with a metallic taste, excessive salivation and difficulty swallowing. Other digestive system effects include abdominal pains, nausea, vomiting and diarrhea. Kidney injury is common following exposure to high concentrations of mercury. Reported effects range from increased protein in the urine to kidney failure. Exposure to high concentrations of mercury has also caused elevated blood pressure and heart rate.<sup>22</sup>

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<sup>21</sup> Canadian Centre for Occupational Health and Safety, “OSH Answers: Diseases, Disorders and Injuries: Beryllium Disease,” available at <http://www.ccohs.ca/oshanswers/diseases/beryllium.html>, March 2002.

<sup>22</sup> Canadian Centre for Occupational Health and Safety, “OSH Answers: Chemicals and Materials, Chemical Profiles: Mercury,” available at [http://www.ccohs.ca/oshanswers/chemicals/chem\\_profiles/mercury/health\\_mercury.html](http://www.ccohs.ca/oshanswers/chemicals/chem_profiles/mercury/health_mercury.html), December 1998.

Given the dangers of HEU, beryllium, and mercury, it is unsurprising that health and environmental dangers have surfaced at alarming rates at the Oak Ridge Complex and beyond. Evidence of problems, and exacerbating factors, are discussed below.

## **Troubles at Oak Ridge**

### *Revealing Studies and Exacerbating Problems*

In December 2003, the Department of Energy conducted a special review of the protective security forces throughout the Nuclear Weapons Complex. As part of the review, the effectiveness of the guard force at Oak Ridge was tested. According to government sources, the security forces could not protect the vast stockpiles of HEU at the site from a terrorist attack.<sup>23</sup> The test suggests that there may be a broader safety problem that puts into serious question the integrity of environmental and health protection at the site.

A first major problem, the review revealed, was that the Oak Ridge facility has inadequate storage facilities for HEU. There are six Material Access Areas (MAAs) that store significant quantities of HEU; nearly all the MAAs are 50 years old or older and have been retrofitted repeatedly. None was designed to house the amount of HEU currently within their perimeters. The HEU is not only vulnerable to attack, it is also packed so densely that the risk of accident – such as spillage and leaks – is far higher than acceptable.<sup>24</sup> An equally worrisome fact is that many of these buildings are made of wood. Not only are such buildings less secure and easier to penetrate, but given the highly pyrophoric nature of HEU, the presence of enormous amounts of this material in wooden buildings is potentially catastrophic. Any spark may catalyze a conflagration.<sup>25</sup>

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<sup>23</sup> Project on Government Oversight (POGO) Alert, “Oak Ridge Y-12 Facility Fails to Protect Nuclear Materials During Mock Test,” January 15, 2004.

<sup>24</sup> On May 7, 2004, DOE Secretary Spencer Abraham outlined major changes to the Department of Energy’s security policies in a speech to the 32<sup>nd</sup> Annual Security Police Officer Training Competition at the Savannah River Site in South Carolina. Abraham announced the construction of a Highly Enriched Uranium Materials Facility to consolidate and provide enhanced protection for HEU stored at Y-12.

<sup>25</sup> Former DOE official Bob Alvarez, in conversation with the author, May 2004.

A third problem is that some level of radiation or toxic substances currently contaminate 247 buildings and leak from many of the 56 burial pits.<sup>26</sup>

While such problems have gained greater media attention since the September 11, 2001 tragedies, the government has long been aware of shortcomings at Oak Ridge, and indeed throughout the NWC, for much longer. In summer 2001, for instance, John S. Foster, Jr., a former director of Lawrence Livermore National Laboratory and then chairman of the Panel to Assess the Reliability, Safety, and Security of the United States Nuclear Stockpile<sup>27</sup> told a special panel of the House Armed Services Committee that some NWC specialized production capabilities had fallen into disrepair, and a more streamlined management approach should be instituted at the NNSA. Foster's statement also highlighted prominent problems in the areas of environment, health, safety and security.<sup>28</sup>

Management and oversight shortcomings have been a constant source of problems, and exacerbate existing dangers. In 2000, the Defense Nuclear Facilities Safety Board (DNFSB) identified a potential safety issue regarding canned subassemblies in a "thermal environment," i.e. secondaries exposed to high temperatures, and the risk of fire. The Board concluded that Weapons Safety Specifications had not been updated to reflect recent Board recommendations on secondaries, and warned that it was "imperative" for safety specifications to contain the most current information available.<sup>29</sup>

By the late 1990s, after five decades of secretive and semi-secretive operations, Oak Ridge scientists and South Carolina state officials were discovering that toxic contamination at the 55 square mile Oak Ridge site – of which Y-12 is only one part –

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<sup>26</sup> Susan Thomas, Laura Frank and Anne Paine, "Oak Ridge contamination even worse than feared," *The Tennessean*, August 17, 1997.

<sup>27</sup> The Panel to Assess the Reliability, Safety, and Security of the United States Nuclear Stockpile was established by Congress in 1999.

<sup>28</sup> Statement prepared by John S. Foster, Chairman of the Panel to Assess the Reliability, Safety, and Security of the United States Nuclear Stockpile, for a hearing on management of the National Nuclear Security Administration before a House Armed Services Committee Special Oversight Panel on Department of Energy Organization, June 26, 2001.

<sup>29</sup> Discussed in letter from John T. Conway, Chairman of the DNFSB, to General John A. Gordon, Administrator of the NNSA, September 25, 2001.



was worse than previously imagined.<sup>30</sup> According to an August 1997 article in *The Tennessean*, a local newspaper, the contaminated sites covered 5,000 acres, with 1,400 acres so contaminated with radiation and posing such a threat to human life that the Department of Energy will never be able to leave them unguarded. The article reported examples of specific contamination:

- A number of underground storage tanks contain highly dangerous radioactive sludge.
- White Oak Creek, which flows along the southern boundary of the Complex, carries radioactive strontium and tritium into the Clinch River. The Clinch River in turn flows into Watts Bar Lake – a popular boating, fishing, and swimming spot and also a source of drinking water for several communities.
- Eighteen buildings are deemed at risk of spontaneous nuclear reaction.

In addition, an immense building that was home to lithium-enriching activities – a process specific to the construction of fusion bomb secondaries – is also located on the Y-12 site. Vast amounts of mercury were used in the lithium-enriching process, so much so that the building has been shut down due to environmental and health concerns. Today, “the building literally has mercury draining out of the walls in the basement and so contaminates the Y-12 area that just digging in the dirt exposes liquid mercury.”<sup>31</sup>

### *The Spread of Sickness*

Evidence of environmental and health damage at Oak Ridge began to appear a number of years ago. In 1997, scientists discovered that toxic contamination at the Complex was worse than previously imagined. At the time, scientists did not know the extent of the damage. Today, seven years later, no one knows the full extent of the contamination. What is known is that the damage is real, severe, widespread, and more extensive than imagined during the many decades since Oak Ridge began operations.

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<sup>30</sup> Susan Thomas, Laura Frank and Anne Paine, “Oak Ridge Contamination Even Worse Than Feared,” *The Tennessean*, August 17, 1997.

For more than 50 years, radioactive, hazardous and mixed wastes have been buried, poured into ponds and streams, burned, and discharged into the air. The resulting contamination has traveled through sewers, air, groundwater and surface streams. The malignant elements and materials spread in unpredicted ways. Showers, laundry and hand wash stations are located throughout the site, for example, and through the years have contributed significantly to the migration of fissile material into sewers. Prevailing winds blow from the site toward the residential communities around the site, and residents talk of “childhoods spent wading in a creek that flows from” the plant.<sup>32</sup> The most threatening link between the people and the poisons, however, is water. In Oak Ridge, water flows along a labyrinth of underground cracks and fissures in rock formations, making it impossible to predict where all the water will go.

Although it now seems ironic, water was one of the main reasons why Oak Ridge was chosen as a secret bomb-development site back in 1943. The Clinch River and the many streams and creeks around the Complex were thought to provide an ideal topography for nuclear activities. Time proved otherwise, however; over the years, the waterways carried toxic metals and chemicals into the Clinch River, and ultimately, into the lives of nearby residents.

Rain poses a problem as well. Rainfall has leaked into buildings contaminated with, for example, lead and mercury. The run-off then flows into creeks, which in turn flow into the Clinch River, the Watts Bar Lake, and the Tennessee River. Some of the rain will seep into the ground instead, but even this spells danger; underground water rises in nuclear waste burial pits, sweeping contaminants toward creeks when it falls. In addition, poisons that are heavier than water can spread contamination to the moving, underground water. Scientists have yet to devise ways to effectively contain these poisons, as any efforts to do so might drive the poisons deeper into the ground.

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<sup>31</sup> DOE official who declined to be identified.

Contaminated air emissions from the Complex still occur, although they have decreased significantly since the Complex ceased its nuclear enrichment activities in 1985. The air in the region is typically calm, which means that any emissions are slow to disperse and likely to remain concentrated in the area. Authorities closely watch the hazardous waste incinerator at the site's K-25 section, for instance, which burns radioactive waste from around the country. The level of danger posed by these emissions to human health and the environment remains undetermined.

What is evident, however, are patterns of unexplained illnesses in and around Oak Ridge.<sup>33</sup>

### Oak Ridge Workers: Still In The Dark

In response to growing agitation about health problems at Oak Ridge, the DOE began funding a number of health studies, including a Tennessee Department of Health-directed study on local health problems and their connection to activities at the plant.<sup>34</sup> The study, a \$14 million, nine-year initiative, provided independent assessments of contaminant releases. Specifically, the study focused on four areas:

- Releases of radioactive iodine-131 from Oak Ridge National Laboratory between 1944 and 1956 (then known as X-10);
- Releases of mercury from the Y-12 Plant, particularly in the 1950s;
- Releases of PCBs from facilities throughout the Oak Ridge Reservation;
- Releases of radioactive substances from waste disposal areas at Oak Ridge National Laboratory (X-10) via White Oak Creek to the Clinch River.

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<sup>32</sup> Anne Paine, "Special Report – An Investigation into Illnesses around the Nation's Nuclear Weapons Sites: Health Studies Fail to Reveal Answers," *The Tennessean*, February 9, 1997.

<sup>33</sup> Frank Sutherland, "Special Report – An Investigation into Illnesses around the Nation's Nuclear Weapons Sites: Editor's Letter Introducing Part 3 of *The Tennessean's* Investigation," September 29, 1998. See <http://www.tennessean.com/special/oakridge/part3/frame.shtml>. See also information provided by World Information Service on Energy (WISE), an NGO based in Amsterdam, available at <http://www.antenna.nl/wise/index.html>.

<sup>34</sup> Tennessee Department of Health, Report on Oak Ridge Health Studies released in 2000; available at <http://www2.state.tn.us/health/ceds/OakRidge/ORidge.html>.

The purpose of the study was to determine which and what level of contaminants people had been exposed to, and to identify which workers were most likely to have been affected. In several cases, scientists concluded that releases at Oak Ridge were substantially higher than had been previously acknowledged by the federal government, leading to higher incidences of disease. Specific health issues noted by the studies include:

- Increased risk of bladder cancer among workers who were on the job into the mid-1980s;
- Multiple myeloma, a cancer of bone marrow, among Oak Ridge Y-25 workers;
- Higher incidences of lung and other cancers among Y-12 workers compared to the general U.S. population;
- Elevated levels of mercury.

Studies have also noted that mortality rates among white male workers at the site are similar to those for national death rates among the general population. While this seems at first glance to imply that there are no particular health problems at Oak Ridge, a closer analysis suggests otherwise. Death rates for white males in specific occupational groups are normally substantially lower, because national rates include people who are ill, who cannot work because of health problems, and who are elderly. The mortality rates at Oak Ridge must therefore be considered high.

### Behind the statistics

There are faces and lives behind the studies and statistics, faces and lives that long to be seen and heard, to awaken the public and the government to the trials and tribulations of those of Oak Ridge. The following cases help policymakers and the public move beyond statistics.

Glenn Bell was a machinist at Oak Ridge, hired in 1968. Today, Bell suffers from beryllium disease. In 2000, he began meeting with reporters and providing interviews to help draw attention to the health plight of workers at the site.<sup>35</sup> Signs of trouble for Bell emerged first in 1980 when a sudden onset of major breathing problems, a primary symptom of beryllium disease, was misdiagnosed as asthma. Only in 1993, when beryllium testing became more common at DOE sites, was he diagnosed. About 600 workers at the Oak Ridge site are estimated to have dealt directly with beryllium. By 2003, the DOE recognized the danger, and noted that the health dangers posed by beryllium had to be addressed. The recognition was too little, too late, however. To date, the DOE has failed to settle on a final plan for how to better safeguard workers from beryllium, in large part due to the high costs of all proposed initiatives.<sup>36</sup>

Asked whether workers were adequately warned of and protected from risks at the site, Bell replied, “In hindsight, no... There was a common expression, ‘you could eat the stuff and it wouldn’t hurt you.’... I think the biggest thing was the push for production was put ahead of worker health.” While Bell feels he was treated appropriately once diagnosed, and was immediately moved to another part of the plant, he notes: “There are some people still working at the plant in beryllium areas who have been diagnosed as beryllium sensitive, which has a strong probability of turning into beryllium disease.”

Bell acknowledges that the government has taken some steps to remedy the situation. The upshot of this, however, is that “there are people within the government, both in the Department of Energy and Congress, that are trying to change things for the better, but so far, it’s been pretty piecemeal. They haven’t done enough and they haven’t done it soon enough... Some of the people are sick enough that they need immediate help, their issues need to be addressed now. Some are broke, they have lost almost everything.”<sup>37</sup>

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<sup>35</sup> “Radioactive America,” June 18, 2000, an episode of the weekly television series, *America’s Defense Monitor*, produced by the Center for Defense Information. See <http://www.cdi.org/adm/1341/Bell.html>.

<sup>36</sup> DOE worker who declined to be identified.

<sup>37</sup> All statements by Glenn Bell are from “Radioactive America,” June 18, 2000, an episode of the weekly television series, *America’s Defense Monitor*, produced by the Center for Defense Information. See <http://www.cdi.org/adm/1341/Bell.html>.

When the question of NWC-related diseases came to the attention of Congress, the testimonies of Rose Marshall and Cheryl A. Dyer were included in Senate hearings on emerging illnesses at the DOE. Rose Marshall, too ill to attend the hearing, asked that her letter be brought before the Senate. Marshall testified that she suffers from a host of serious ailments including chronic obstructive lung disease; chronic asthmatic bronchitis; fibromyalgia; chronic inflammatory arthritis; dementia and depression; and hypertension. She had no symptoms or illnesses prior to her employment at the site.<sup>38</sup> Some sixteen years at Oak Ridge led to similar problems for Cheryl Dyer. One day, Dyer found that she had become oddly disoriented. “I did not know where I was or what I was doing. I got lost going from one building to another. I got lost at home going from one room to another. I would sit at work for hours without knowing where I was,” Dyer reported. She was diagnosed with cyanide poisoning. She was remanded from work. Within one week, the cyanide levels in her blood were dramatically lower. Dyer’s ordeal never stopped, however. She has lost the ability to speak fluidly and suffers from chronic pains and dramatic losses of energy. Speaking of all those who have been similarly affected by their work at Oak Ridge, Dyer has concluded that “This is not a life that we are living. It is merely existing.”<sup>39</sup>

The government has not completely ignored cases such as these. The Department of Labor, for example, established an “Energy Employees Occupational Illness Compensation Program” in response to the mounting evidence of ailments and illnesses engendered by work at Nuclear Weapons Complex sites.<sup>40</sup> This program is intended to assist employees who have been diagnosed with illnesses incurred specifically as a result of exposure to radiation, beryllium, or silica. It is striking, however, that exposure to the many chemicals and toxic metals, including mercury, is not included.

Perhaps because of limits to insurance coverage and the difficulty in definitively proving a causal connection between an ailment and a specific Nuclear Weapons Complex source

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<sup>38</sup> Testimony of Rose Marshall, Senate Hearing on DOE Illnesses, March 18, 2000.

<sup>39</sup> Testimony of Cheryl A. Dyer, Senate Hearing on DOE Illnesses, March 18, 2000.

<sup>40</sup> The program was established through the Energy Employees Occupational Illness Compensation Act of 2000. The Act can be viewed at <http://www.cdc.gov/niosh/ocas/pdfs/theact/title36.pdf>.

or circumstance, the Department of Labor has rejected many worker claims for compensation. A review of specific claims reveals unacceptable causes for rejection. The Department rejected the claim of one employee who spent ten consecutive years at Oak Ridge, for instance, because conditions such as brain damage from industrial exposure to mercury, anxiety and nausea, were not covered by the compensation program.<sup>41</sup> Meanwhile, anecdotal evidence among Oak Ridge employees of memory loss, trembling, anxiety disorders and macular and other degeneration abounds. “My life is over—I’m dying,” says Stella Lee, an Oak Ridge worker for 17 years whose body is wracked by tremors, memory loss and degenerating bones. Lee was one of more than 200 Complex workers and nearby residents interviewed by *The Tennessean* who believe they have been harmed by activities at the site. “They could have warned us,” she says. “They could have said, ‘If you work here or live around here be careful – there’s lots of poisons that could hurt you.’” But they didn’t do that. We had no way to know any better.”<sup>42</sup>

Despite the DOE’s insistence that the site was safe, and that workers were not exposed to significant risks, scientists probing the problem in the late 1990s revealed the following.<sup>43</sup>

- More than five times the amount of uranium than previously estimated leaked from vents and windows at the Y-12 Complex, where radioactive fuel was machined into warhead components. Nearly 80,000 pounds escaped since 1944, an amount scientists say creates a higher-than-normal cancer risk for nearby residents;
- At the K-25 uranium enrichment facility, uranium release estimates have doubled;

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<sup>41</sup> US Department of Labor, Office of Workers Compensation Programs, Division of Energy Employees Occupational Illness Compensation, Docket number 9351-2002, *Notice of Final Decision*, August 17, 2002.

<sup>42</sup> Stella Lee, 57, interviewed by Susan Thomas, Laura Frank and Anne Paine, “Oak Ridge Contamination Even Worse Than Feared,” *The Tennessean*, August 17, 1997.

<sup>43</sup> Studies cited in Susan Thomas, Laura Frank and Anne Paine, “Special Report: An Investigation into Illnesses at the Nation’s Nuclear Weapons Sites: Oak Ridge Contamination Even Worse Than Feared,” *The Tennessean*, August 17, 1997.

- Although large-scale mercury releases from Y-12 during the 1950s and 1960s were thought to be well understood, scientists now believe 50% more was released to the environment than originally calculated.

For years, workers have been digging up mercury that was carried by East Fork Poplar Creek into the city of Oak Ridge, and that settled on the banks “in dark, layered bands so thick they are visible to the naked eye.” Government officials fear that toxic substances may have been dumped elsewhere without being recorded – incidents that Dennis G. Cope, deputy director of the cleanup for Lockheed Martin, refers to as “some midnight dumping.” Searches have turned up a number of sites where poisons were covertly dumped, and scientists have expressed surprise at the levels of radioactive particles flowing into the Clinch River.<sup>44</sup>

#### Oak Ridge Neighbors: Ordinary People in an Extraordinary Place

Workers at the site are not alone in their suffering. Suspicious rates of disease and various ailments have been discovered also in surrounding communities. Most alarmingly, it appears that the underprivileged in our society have suffered the most – both from the damages wrought by Nuclear Weapons Complex activities and by the government’s lukewarm efforts to address the problem.

#### Children: The Weakest Victims

According to Tennessee state records, mental, physical and learning disabilities among children are far higher than normal in Roane County, a small community downstream from the Oak Ridge site. The following statistics are especially alarming.<sup>45</sup>

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<sup>44</sup> Dennis G. Cope interviewed by Susan Thomas, Laura Frank and Anne Paine, “Special Report: An Investigation into Illnesses at the Nation’s Nuclear Weapons Sites: Oak Ridge Contamination Even Worse Than Feared,” *The Tennessean*, August 17, 1997.

<sup>45</sup> Statistics reported by the Tennessee Department of Education, August 1997.



- The number of children with learning disabilities more than doubled from the 1990 to the 1996 school years. This jump was more than five times the average increase of school systems statewide;
- The number of children with health-related disabilities soared from eight to 123 over the same period. These disabilities range from leukemia to attention deficit disorder;
- The number of children with mental retardation rose at a rate four times that of the state;
- Total enrollment of children with learning problems also doubled, at a rate five times the state average.

Although the government claims there is no direct link between these disturbing statistics and contaminants released from the Oak Ridge site, the public has made the connection. While the DOE says the Oak Ridge incinerator is safe – that its emissions, and poisons leaking from the Complex, are in amounts too small to hurt people – many parents wonder why so many children suffer from such unusual syndromes.

Scientific evidence suggests that environmental poisons can have a severe impact on mental function. Studies financed or conducted by the National Institute of Environmental Health Sciences, for example, demonstrate a connection between even low levels of lead in children's bodies to lower IQs.<sup>46</sup>

While direct links are elusive, the experience of downwind communities such as Roane County are clearly a sign that much further study of environmental impacts at all NWC facilities is needed, and that all safeguards should be taken at the site until definitive conclusions have been reached.

*The People of Scarboro: A Case of Environmental Racism?*

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<sup>46</sup> National Institute for Environmental Health Sciences study. Press release can be viewed at <http://www.niehs.nih.gov/oc/news/leadiq.html>.

The Scarboro neighborhood of Oak Ridge is largely African-American. It is also the closest residential neighborhood to any Department of Energy plant anywhere in the nation. When Oak Ridge was founded in 1943, a “Negro village” existed where Scarboro is now. The population, originally expected to peak at 25,000, grew to 75,000 residents by the spring of 1945. The Manhattan Project and the Oak Ridge site were a large part of the reason.

Recruiters brought black workers from Mississippi and Alabama to work as janitors, maids, and manual laborers at Oak Ridge. Often illiterate and impoverished, these men and women were promised wages that seemed strangely high at the time. They were transported to Oak Ridge and settled in “hutments” – 16x16-foot rooms equipped with little more than a few beds and a stove. Children were not permitted, the women were separated from the men, and the men were not allowed on streets at nighttime. These conditions bred frustration, resentment, and anger that manifested themselves in violence and theft.<sup>47</sup> As one observer notes, “It was very degrading even for that time in the South.”<sup>48</sup>

And a long legacy of mistrust between Scarboro and the DOE was born. Today, half a century later, it appears the mistrust of Scarboro residents may have been justified.

Scarboro appears to have suffered more than any other DOE-adjacent community – both in terms of risks and health damages, and in terms of perception that their claims and grievances have been neglected by the government. One reporter uncovered a disturbing pattern in Scarboro, leading to renewed media, public, and government attention to the area. He visited every single family living on the street closest to the Y-12 facility. On this single block, he found that every single child suffered from a serious breathing disorder.<sup>49</sup> The articles caused first a statewide, then a national stir, and Centers for

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<sup>47</sup> Recollections of LaVada Chisholm, Jackie Holloway and Alfred Stephens, reported by Caryl Kaplan, “‘Black Experience in OR’ is Sunday topic,” *The Oak Ridger*, April 27, 2001.

<sup>48</sup> Jacqueline Kitrell, interviewed for the American Environmental Health Studies Project by Change-Links.org. Available at <http://change-links.org/envirracism.html>.

<sup>49</sup> Reported in the American Environmental Health Studies Project, Change-Links.org. Available at <http://change-links.org/envirracism.html>.

Disease Control and Prevention (CDC) was summoned to conduct a thorough analysis of the situation.

The vicinity to Oak Ridge was an obvious potential factor. But the CDC did not focus its investigation on external environmental factors. Instead, it initiated a study on indoor air quality. One physician reported that doctors participating in the study were specifically instructed not to investigate the activities at Y-12 as a potential causal factor.<sup>50</sup>

Fannie Ball, a longtime resident of Scarboro, a 16-year employee of Oak Ridge, suffering from thyroid cancer and elevated levels of mercury in her blood, sums up residents' fears. "First, what they've found scares me to death. Secondly, it makes me very angry that DOE has never tried to help us before. It makes me think they've known about the poisons for a long time but didn't do anything."<sup>51</sup>

Traces of poisonous contamination at higher levels than expected were also found in a DOE-run environmental survey of Scarboro. The elevated toxic agents included banned pesticides, heavy metals (mercury, lead and selenium), and radioactive substances (strontium-90 and uranium) including traces of fuel-grade enriched uranium. Scarboro residents are especially concerned that the levels were in some cases higher than those found on the nuclear Complex itself.

In late 2003, the Agency for Toxic Substances and Disease Registry (ATSDR) prepared to release a definitive version of its public health assessment on uranium releases from the Oak Ridge plant, with a heavy focus on the Scarboro neighborhood. Its conclusion: that the uranium poses "no apparent health hazard."<sup>52</sup> While the EPA as a whole offered no criticism of the ATSDR study, two EPA offices – the EPA Region 4 (which serves Tennessee and seven other states in the southeast) and its Office of Radiation and Indoor

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<sup>50</sup> Reported in the American Environmental Health Studies Project, Change-Links.org. Available at <http://change-links.org/envirracism.html>.

<sup>51</sup> Fannie Ball interviewed by Susan Thomas and Laura Frank in "Special Report—An Investigation into Illnesses at the Nation's Nuclear Weapons Sites: Oak Ridge Test Finds High Level of Contaminants," *The Tennessean*, September 23, 1998.

<sup>52</sup> Cited by Paul Parson, "EPA to Address Concerns," *The Oak Ridger*, April 7, 2004.

Air began to take issue with aspects of the study. The EPA Region 4 office noted that the dose or risk criteria used by ATSDR was questionable. And the Radiation office voiced concerns over the health evaluation criteria used by ATSDR and suggested that the health assessment underestimated certain radiation doses, among other things.<sup>53</sup> The Oak Ridge Reservation Health Effects Subcommittee, a board of some 20 community members in Oak Ridge, convened to discuss the contradictory statements. Illustrating the extent of the controversy, Jon Richards, the EPA liaison to the Subcommittee, told the group that it was highly unusual for the EPA not to issue a single, unified set of comments.<sup>54</sup>

### **Concluding Remarks**

In light of the many problems plaguing Oak Ridge, it is no surprise that activist groups in the area have protested the government's Stockpile Stewardship Program. The Oak Ridge Environmental Peace Alliance, the most prominent of the groups, continues to vehemently protest both the program and the continued use of the Oak Ridge plant as a "bomb factory" in their neighborhood. Frustrated with the DOE, citizens have taken steps of their own. The people of Scarboro have formed an international group along with members of the Russian grassroots organization, "Step Towards," to share information and together confront the toxic legacy which both peoples share. The group designed a soil, sediment and water sampling initiative in 2003, and began implementing the program this year. The objective is to analyze samples for beryllium, mercury, lead, as well as several other elements, in an effort to better document and understand the environmental and health impacts locally of nuclear weapons and radioactive materials handling.

While citizen activism is a hallmark of a healthy democracy, so is a responsible government focused on the well-being of its people. Amid fears of terrorism and the spread of weapons of mass destruction, our government should be concerned that mass

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<sup>53</sup> EPA Region 4 and EPA Office of Radiation and Indoor Air, Reports on *Release of Radiation at the Oak Ridge Security Complex*, November 2003.

<sup>54</sup> Jon Richards interviewed by Paul Parson, "Y-12 Uranium Document Gets Support, EPA Concerns Still Loom Over Documents," *The Oak Ridger*, December 12, 2003.

destruction is already underway – an insidious, long-term destruction of human health by toxic materials mismanaged by the Nuclear Weapons Complex. Decades of production and maintenance of nuclear weapons and components, coupled with the consequences of dismantlement, and the effects of the current expansion of stockpile life extension programs, sound a loud warning bell about their potential environmental and health damages. Should US policymakers be willing to incur these dangers in the name of national security and a weapons development agenda?

National security has no meaning in the absence of a healthy populace and protected environment safeguarded by an honest and forward-looking government. Costs cannot be evaluated without measuring the potential loss of life and the corruption of the water, soil, and air that sustain life. And trust must not become a casualty of the current war on terror. Fears of foreign groups and external dangers must not lead the government to put new operational strains on the Nuclear Weapons Complex before adequately dealing with the magnitude of existing concerns, and eroding the people's trust in their leaders' commitment to their well-being. The many health and environmental problems around Oak Ridge serve as an illustration of an issue that has yet to be properly addressed. The government must demonstrate an honest, focused and committed effort to rectify the damage done, respect and compensate those who have suffered, and prevent future suffering.

### **Specific Recommendations**

- **Independent Public Health Analysis:** An independent, scientifically valid, up-to-date analysis should be conducted to determine conclusively if the rate of illnesses in Oak Ridge is higher than normal. Such a study should be conducted by a neutral and reputable body, such as the National Academy of Sciences. Congress should request that funds be appropriated for such a study as soon as possible.
- **Independent Environmental Assessment:** An independent, scientifically valid, up-to-date environmental assessment should be conducted on air, water and soil quality. Again, this could be achieved through a congressional appropriation of funds for a National Academy of Sciences survey.
- **National Stakeholder Dialogue:** The Administration should ensure that evaluation and cleanup of Oak Ridge and every other NWC site are made major priorities before

further, and perhaps irreversible, damage occurs. As part of this, a National Dialogue of stakeholders should be created to identify and coordinate goals, priorities and programs. The model employed for problems relating to the Rocky Flats, Colorado site, or for non-incineration technologies for chemical weapons destruction – the Assembled Chemical Weapons Assessment (ACWA) Program – could serve as successful examples.

- **Local Stakeholder Involvement:** Public input from affected communities must be included in the process to devise solutions and build consensus for cleanup and improved safety around the plant. The challenges of balancing economics and jobs concerns with long-term potential impacts of Nuclear Weapons Complex activities such as those at Oak Ridge is a formidable one that currently seems tilted in favor of short-term economic concerns. A shift in policy is needed to balance this and economic calculations must begin to take into account the long-term costs of damaging human health and the environment.
- **Worker Safety and Health:** The DOE must protect its occupational health program from budget cuts. The DOE should analyze and report to Congress data it already collects about worker injuries and illnesses on a regular basis, through a formalized process.
- **Workers' Health Insurance and Compensation:** The DOE should consider simplifying health insurance and workers' compensation procedures and significantly expanding the scope and number of conditions covered by the compensation programs. Any ailment that can beyond reasonable doubt be linked to NWC activities, such as diseases caused by exposure to mercury, should be covered.
- **Environmental Justice:** The question of Scarboro, Tennessee, and concerns about environmental racism must be addressed by the government. Scarboro should be used as an example of positive steps the government can take to responsibly manage the legacy of the Cold War arms buildup, and to demonstrate its commitment to underprivileged demographic groups. A first step would be to examine Scarboro relative to other NWC sites, to establish whether a pattern of discrimination against and neglect of underprivileged populations exists. The Los Alamos and Sandia laboratories, for example, are near large Hispanic and Native American communities, and could serve as bases for comparison.
- **Environmental Security:** The Administration and Congress should define the cleanup of the sites, and environmental and health safety in general, as inherent components of national security and, more specifically, of Nuclear Stockpile Stewardship. This statement could be included in the annual National Security Strategy Document, or the annual Nuclear Posture Review.
- **Public Disclosure and Transparency:** Important issues such as risks associated with contamination from the Complex require more thorough public discussion and input in order to increase awareness and ensure a fair public process for policy

change. One key step is for the DOE to better explain to the public the risks associated with contamination from the Complex through a program of full disclosure, transparency, and community-wide outreach.

## **Final Note**

This concise study and report has been undertaken to raise awareness and shed new light on important public health and environmental impacts of ongoing nuclear weapons activities, including the Stockpile Stewardship Program, of the U.S. Department of Energy. It is by no means intended to be a final, comprehensive analysis of these problems, but will hopefully encourage more scientific study, public discussion, and political decision-making in this area, important to national and homeland security, public health, and environmental protection.

We encourage the reader to pursue additional sources of information from government, scientific, and non-governmental organizations and agencies, many of which will be found in the footnotes to this study. While this report focused on the Oak Ridge National Laboratory in Tennessee, such issues also exist at the other Nuclear Weapons Complex sites mentioned. A prior Global Green USA report, *The Death of a Nuclear Warhead: The Environmental and Health Impacts of Nuclear Weapons Complex Activities*, focused on the Pantex Plant in Amarillo, Texas.<sup>55</sup>

The legacies of a half century of Cold War – especially radioactive and chemical contamination – will take time to identify, study, and remediate. There will be no quick, silver-bullet solutions to these serious, vexing problems. However, the long-term nature of these public health, environmental, and safety issues in no way condone the continuation of dangerous practices nor the oversight of critical remediation needs. As noted earlier, national security is as much about supporting healthy communities as about providing strong military defense. We are only as strong and secure globally as we are healthy back home.

## **About the Author**

Dr. Aimaq's work at Global Green USA focuses on the connections between environmental issues and international affairs. She has spent the past several months conducting preliminary research on the environmental impact of demilitarization/disassembly. Dr. Aimaq also teaches International Relations at the University of Southern California, including a course on international politics and the global environment. Previously, she served as a senior associate at the Pacific Council on

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<sup>55</sup> See Jasmine Aimaq, *The Death of a Nuclear Warhead: The Environmental and Health Impacts of Nuclear Weapons Complex Activities* (Santa Monica, CA and Washington, DC: Global Green USA, 2004), available at [www.globalgreen.org](http://www.globalgreen.org).

International Policy, the western partner of the Council of Foreign Relations, where she worked on policy questions affecting the Pacific Rim and also served as a project manager and coordinator. She has also taught Global Peace and Conflict Studies at the University of California at Irvine and at Lund University, Sweden. Dr. Aimaq holds a Ph.D. in International Affairs from Lund University, Sweden and a BA from UCLA, and is the author of a book on French-American relations during the Cold War. She has spent extensive time abroad and is fluent in several languages.

### **About Global Green USA**

Global Green USA is the U.S. affiliate of Green Cross International, the international environmental movement founded by President Mikhail Gorbachev more than a decade ago. Global Green USA's mission is to foster a global value shift toward a safer, more sustainable world by addressing the three greatest challenges facing humanity: stemming global climate change, eliminating weapons of mass destruction, and providing access to fresh water for the 1.5 billion people who go without it.