

Before the
Washington State Legislature
Senate Committee on Labor & Commerce
Hearing on SB 5940
Relating to the presumption of occupational disease for certain employees
at the United States Department of Energy Hanford site

January 10, 2018

TESTIMONY OF TOM CARPENTER
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Thank you for taking my testimony today. Hanford Challenge is a non-profit organization based in Washington State whose mission is to help create a future for the Hanford nuclear site that secures human health and safety, advances accountability, and promotes a sustainable environmental and economic legacy.

Who We Are

Hanford Challenge carries out its mission by advocating for Hanford workers and whistleblowers and providing legal support when necessary; monitoring cleanup progress and advocating for safe and effective remedies and policies; pushing for accountability and transparency; watchdogging agency and contractor activities; translating complex cleanup-related issues into plain-language to empower public participation; and building and sustaining regional communities with stakeholders, tribes, agencies, regulators, contractors, academics, and interested members of the public in pursuit of a shared vision for cleanup.

Our work includes prioritizing immediate nuclear and chemical safety threats that could impact worker health and safety and communities surrounding Hanford. We also work to reduce the risk posed by the release of contaminants into the environment at Hanford, which potentially impact thousands of square miles of land that includes numerous cities and towns, productive and valuable arable land, and the Columbia River.

In 1943, the federal government brought 50,000 people to Hanford to manufacture plutonium for the world's first atomic bombs.² Forty-seven years later, in 1990, Hanford's mission shifted from nuclear materials production to environmental clean-up. Located in southeastern Washington State, the Hanford Nuclear Site is the most contaminated worksite in the western world.³ It is

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² The plutonium was used for the Trinity test at Alamogordo, New Mexico and for the bomb dropped on Nagasaki, Japan, 1945.

³ Department of Energy, *Performance Management Plan for the Accelerated Cleanup of the Hanford Site*, DOE/RL-2002-47, Rev. D, August 2002.

estimated that cleaning up Hanford will take at least another fifty years. This means that for at least another seven decades, Hanford workers will continue to be exposed to hazardous conditions.

Much of testimony I give today comes from a report I helped author in 2006, called “Systemic Injustice,”⁴ prepared when I was with the Government Accountability Project. Other parts of my testimony are based upon my work with Hanford employees over the last several decades, including up to the time of this hearing.

Background

When Hanford workers become ill or injured on the job, most of them rely on Hanford’s workers’ compensation program to get medical care. However, instead of getting the care and treatment they deserve, many workers have to battle their way through a worker’s compensation program that fails them.

The U.S. Department of Energy (DOE) has a demonstrated pattern of interference with Hanford workers’ claims. DOE’s inability to effectively oversee its own contractors and its ongoing failure to resolve concerns that workers have raised since 2000, when the compensation program became self-insured and DOE became responsible for reviewing workers’ claims, highlights the need for SB 5940.

The Hanford nuclear site produced plutonium for nuclear weapons from 1943-1989, resulting in the most contaminated site in the western hemisphere. Even though Hanford is a highly contaminated and dangerous worksite, neither the federal Occupational Safety and Health Administration, nor the Nuclear Regulatory Commission have jurisdiction to inspect worksite conditions or enforce safety regulations. Instead, DOE is allowed to regulate itself. Based on our investigations and interviews –

- **Hanford workers’ claims are denied at five times the rate of other self-insured employers (averaged over the past 5 years).**⁵ DOE has failed to ensure that workers’ claim files are complete and accurate and has used the lack of accurate worksite data as a reason to question the validity of Hanford workers’ claims.
- **Hanford workers are forced to go to Independent Medical Exams that violate state standards.** Workers have experienced Independent Medical Exams where Examiners did not have workers’ complete medical records; did not perform additional relevant testing; changed their assessment after being contacted by DOE’s lawyers; and made determinations based on incomplete medical data.
- **Hanford workers who contest the denial of their claims are met with aggressive DOE legal tactics that interfere with objective claims management and create an uneven playing field.** DOE’s program has pledged to fight claims in order to prevent

⁴ Available at <http://www.hanfordchallenge.org/chemical-vapor-exposures/>

⁵ Email communication, from T. Church, WA LNI, to S. Frame, re: Claims denial data - DOE and all self-insured claims, with Table covering 2009-2016, dated December 23, 2016.

setting negative precedents. DOE has even blocked Washington State L&I's request to re-examine a worker's claim before continuing denial proceedings at the Board of Industrial Appeals.

- **Hanford's workers' compensation program is fraught with opportunities for DOE interference.** Under the existing program, DOE is responsible for claims management. DOE and its medical contractor create and manage workers' claim files. DOE and the medical contractor require workers to be referred to Hanford's on site medical provider, they decide when to refer workers to Independent Medical Examiners, and they work together to defend DOE from workers' appeals of their compensation claims.

Along with being an employer for thousands of people, DOE's Hanford Site has also been a community. No worker imagined they would be abandoned by the system after becoming ill or injured on the job, accused of raising false safety concerns, repeatedly told that their injury was pre-existing and not work related, or forced to hire a lawyer to secure their rightful compensation claims. They deserve better.

Consider the case of one Hanford worker, Jack,⁶ who sought medical assessment and treatment for nosebleeds, headaches, nausea, and other health problems he suffered after being exposed to toxic vapors at Hanford's tank farms. When Jack went to Hanford's onsite medical provider for an evaluation, he understood that the forms he filled out there would initiate his workers compensation claim. They didn't. As a result, his claim was initially determined to be "untimely" and was denied. Jack was able to demonstrate that he had limited help and had thought he was following the correct procedures. As a result, DOE eventually agreed not to contest the timeliness of his claim. However, his troubles weren't over. Although he had noted the most recent date he was exposed to vapors, he had intended to file a claim for multiple exposures. Instead, his claim was treated as a claim for a single incident.

According to Jack and associated claims data, two doctors determined that his condition was work-related and associated with vapor exposure. However, after being contacted by DOE's lawyer and presented with monitoring data showing low ammonia readings, the doctors changed their conclusions. Instead of concluding that Jack's condition was work related, they called it *not* work related. The doctors did not receive up-to-date information about other toxic substances in the tanks, general worksite conditions, or the timing or location of the low ammonia readings.

According to Jack, he had to provide this information to the claims contractor. He later discovered that the contractor did not include it in the information they gave to Labor and Industry (L&I) when L&I was trying to decide whether or not to deny the claim. Jack could not afford an attorney and was representing himself in an effort to overturn the denial of his claim. He requested copies of the medical reports done by two Independent Medical Examiners that DOE required him to be examined by. He got the reports four months after his appointment with the Examiners and only after L&I intervened and required the contractor to send him the reports. When Jack pleaded with DOE to help correct the data in his claim file, he was told that wasn't possible because once the contractor had the claim, DOE did not get involved. As his claim was heading for denial, Washington State L&I asked DOE to agree to halt proceedings before the

⁶ Jack is a pseudonym used here in place of the worker's real name.

Board of Industrial Appeals so that L&I could have more time to review his claim and potentially reconsider their decision to deny it. DOE refused. Based on what Jack believes was incomplete and incorrect information from DOE, L&I ultimately affirmed the order to reject his claim.

Exhausted by the process, Jack dropped his appeal. As a result, he never received additional assessments or treatment from Hanford's workers' compensation program. Due to the latency period of chemical exposures, it is possible that he could experience more health problems in the future. If so, he will have to file a new claim and battle the system again.

There are many other workers like Jack who have taken risks to help clean up Hanford, gotten ill or injured on the job, and had their claims denied. Hanford Challenge first became aware of problems with the system in 2003 when we released a report documenting that Hanford workers were knowingly being exposed to vapors at the Hanford Tank Farms, suffering health impacts, and hitting roadblocks when they tried to get their compensation claims covered.⁷ The system has not improved.

In response to these and other concerns raised by Hanford workers and medical professionals, Hanford Challenge initiated a review of DOE's workers' compensation program in August 2006, *Systemic Injustice*.⁸ It examines the origins of Hanford's workers' compensation program, the adequacy of oversight, the experiences of workers who have filed claims, and defines remedies to ensure that Hanford workers have access to timely, objective, and sufficient healthcare assessment and treatment. Many of the case examples presented in this report relate to compensation claims associated with workers' exposure to vapors from the Hanford Tank Farms. Since 2006, new cases and new stories continue to pile up, with familiar storylines.

Workplace Hazards

Hanford workers are cleaning up the most contaminated nuclear site in the western hemisphere and working for a federal agency, DOE, with no independent federal safety oversight. The workforce includes electricians, laboratory technicians, maintenance staff, industrial hygienists, engineers, managers, construction workers, office professionals, safety trainers, laborers, and other specialists.

The Hanford cleanup requires people to work with⁹:

- Over 2,710 different waste disposal sites and burial grounds;
- 500 contaminated facilities that have been, or are being, demolished or remediated;
- 56 million gallons of high-level radioactive and chemical waste in underground storage tanks, some of which are leaking;

⁷ Clare Gilbert and Tom Carpenter, *Knowing Endangerment: Worker Exposure to Toxic Vapors at the Hanford Tank Farms*, Government Accountability Project, September 2003. Available at <http://www.hanfordchallenge.org/chemical-vapor-exposures/>.

⁸ Government Accountability Project, *Systemic Injustice, Hanford's Workers' Compensation Program Review of Conditions and Prescription for Remedies*, August 2006, available at <http://www.hanfordchallenge.org/chemical-vapor-exposures/>

⁹ U.S Department of Energy, Hanford Site Waste Management Units Report, DOE/RL-80-30, Rev. 12, January 2003.

- At least 2,300 tons of spent nuclear fuel;
- 25 million cubic feet of chemically and radiologically polluted solid waste; and
- 270 billion gallons of groundwater contaminated by chemicals and radioactive isotopes.¹⁰

People working at Hanford dig up, package, and transport highly radioactive debris. They demolish old buildings where they are potentially exposed to asbestos, lead, beryllium, radioactive materials, and other carcinogens. They store and monitor over 50 million gallons of high-level radioactive wastes and toxic chemical by-products. They monitor worksite conditions and try to ensure that the monitoring is adequate and is used to keep workers safe.



The cleanup projects are complicated, costly, and hazardous. For example, the River Corridor project, managed by Washington Closure, cost billions of dollars.¹¹ The River Corridor project required workers to clean up Hanford's 100 Area where nine plutonium production reactors operated; the 300 Area where uranium was fabricated and buildings are contaminated with lead, beryllium, asbestos and other hazardous substances; and the 600 Area, home to two highly radioactive burial grounds (618-10 and 618-11). This is just one of many projects that requires and will continue to require Hanford workers to face hazardous conditions.

Along with known hazards, the Hanford cleanup exposes people to unknown hazards and ongoing uncertainties. In some cases, wastes and associated hazards have not been fully characterized (e.g., the 56 million gallons in tank wastes and associated sludge residues). In other cases, wastes may be mobilized (e.g., projects that require demolishing buildings that are contaminated with lead and beryllium or projects to remove sludge from the tanks). Finally, hazards may be present but unknown because they are the result of past practices and/or accidents that were not fully documented.

These uncertainties create enormous difficulties for workers who become ill or injured on the job. Workers cannot always document the exact place and time that they became ill or injured and this can be used against them when they file workers' compensation claims. Additional difficulties are posed by various work tasks that require using new and unproven technologies and/or cleaning up areas where it is not always possible to fully characterize wastes, to plan for the hazards, or to anticipate and adapt to weather conditions that impact the effectiveness of safety plans.

¹⁰ Department of Energy, *Hanford Site Overview*, <http://www.hanford.gov>, March 31, 2006.

¹¹ Washington Closure, Hanford. Contractor description as posted at <http://www.hanford.gov/?page=170&parent=85> and viewed June 20, 2006.

Exposures to Toxins at Hanford

Occupational disease at Hanford can result from exposure to many different substances, including toxic chemicals, asbestos, beryllium, radioactive materials, and often a combination of some or all of these.

The toxins and chemicals can cause deadly harm to human health with one exposure. Further, the harm to health may not manifest for many decades. That is why this Bill's provision to protect a worker who has only worked a single shift is important. Here are some examples of the latency effect of just some of Hanford's hazards:

Latency Period for Beryllium:

From [DOE's website](https://energy.gov/ehss/about-beryllium) at <https://energy.gov/ehss/about-beryllium>

“CHRONIC BERYLLIUM DISEASE: A LONG-TERM HEALTH EFFECT

Long-term, or chronic, health effects can take years to develop after the first exposure to beryllium and can affect people who were exposed to very small amounts of beryllium. In some cases, CBD has been diagnosed in former office workers and others who had only brief, incidental exposure to beryllium.

CBD can take many years to develop.

The average time from first beryllium exposure to the development of symptoms (latency period) of CBD is 10 to 15 years. This means you can be exposed to beryllium today and not suffer any health effects for decades. Health effects have appeared in some people a few months after exposure, but not for as long as 30 years in others.”

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ASBESTOS

From the Asbestos Network at <https://www.asbestosnetwork.com/Exposure-Risks/>

"The time from first exposure to the discovery of **illness** (symptoms like shortness of breath, chest pain and chronic fatigue) is called the **latency period**. The shortest **latency period** for asbestosis is 5 to 10 years, although often it takes 40 or more years from first exposure before the **disease** is diagnosed."

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Radiation

A [2006 University of Washington Health and Safety Study¹²](#), Principles of Radiation Protection Section 2 – Biological Effects of Ionizing Radiation states:

¹² See, https://www.ehs.washington.edu/rsotrain/radprotectionprinciples/biological_effects.pdf

"1. Latent Period Following the initial radiation event, and before the first detectable effect occurs, there is a time lag referred to as the latent period. There is a vast time range possible in the latent period. The biological effects of radiation are arbitrarily divided into short-term and long-term effects on this basis. Those effects which appear within a matter of minutes, days, or weeks are called short-term effects and those which appear years, decades, and sometimes generations later are called long-term effects."

Hanford's Workers' Compensation Program was Started in Secrecy

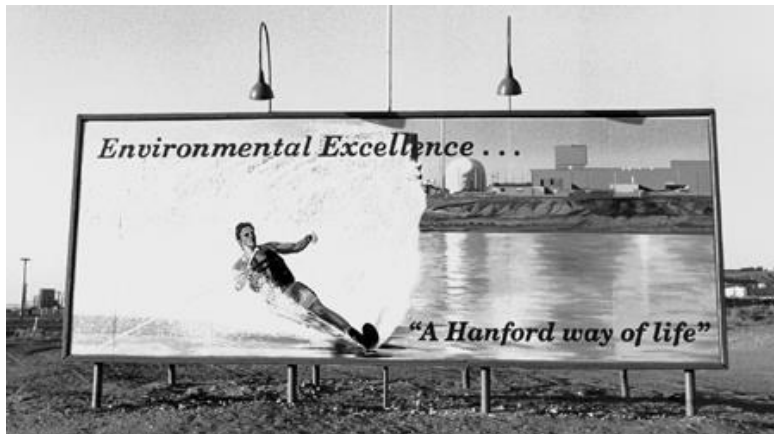


In 1943, Washington State entered into a contract with the U.S. Army Corps of Engineers and E.I. Dupont De Nemours and Company to administer a workers' compensation program at Hanford. The contract was stamped "**SECRET.**"¹³ It required the federal government to set up a fund the state could withdraw from to pay the compensation claims of Hanford workers and administrative costs.

Initial contracts between the state and federal government contained provisions to advance secrecy, reduce oversight of the federal government's actions, and allow the federal government to influence claims management.

These contractual provisions included the following:¹⁴

- Claims were filed with federal government contractors who could block the claims and ensure that they never made it to L&I for review;
- Accident reports and other data used by Hanford contractors, physicians, or hospitals to review the claims were routed through the Atomic Energy Commission before going to L&I for review;
- L&I agreed to accept descriptions from the federal government, or its contractors, even if the descriptions were incomplete;
- The contract asserted that the state employees tasked with assessing Hanford workers' claims were subject to being reviewed and approved by the federal government.



¹³ Contract W-7412-eng-25, SECRET, Copy 6 of 10 series, Modification #1 to agreement dated March 1st, 1943.

¹⁴ Contract No. AT (45-1)-562, signed by David F. Shaw, Atomic Energy Commission, Washington State Department of Labor and Industries, and the Office of the Attorney General, State of Washington, Clause 10, December 17, 1952.

The work at Hanford was classified as “top-secret” and federal and state safety inspectors were not allowed on-site to assess workplace conditions. Secrecy and the desire to maintain control over classified and related worksite information led the federal government to step in and provide industrial insurance for their workers instead of asking its contractors to do so.

Generally referred to as indemnification, this arrangement persists today. Although the mission at Hanford has shifted from producing nuclear weapons to cleaning up the wastes that were left behind, contractors whose employees are covered under DOE’s workers’ compensation program do not incur the financial burdens associated with workers’ compensation claims-the public does. This arrangement has been preserved regardless of recommendations from engineering, safety, and union professionals to “stop providing disincentives to safe engineering by absorbing workers’ compensation and associated medical costs due to unsafe technology.”¹⁵

The initial proclamations authorizing the special workers’ compensation agreements stipulated that the agreements between DOE and L&I could remain in place:

- During the continued emergency declared by the President in May 1941;¹⁶
- During the continued existence of the emergency declared by the President in 1950;¹⁷ or
- As long as certain provisions of the War Powers Act of 1941 remained in effect.¹⁸

Special agreements in the name of national security were not unique to Hanford. They existed at most DOE sites involved in the production of nuclear weapons. However, they were not always legal. For example, in 1984 the U.S. Court of Appeals ruled that the special agreement between DOE and the State of Nevada was illegal because it failed to meet the requirements of Nevada’s Industrial Insurance Act and the Nevada Occupational Disease Act and deprived the worker of his right to due process.¹⁹

After the Cold War ended, Washington State was also on shaky ground with its agreements with DOE because the justification for the agreements no longer existed. There was no longer a state of continued emergency and key provisions of the War Powers Act of 1941 were no longer in effect.

Instead of eliminating the allowance for special agreements, Washington State and DOE modified and sanctioned them. In 1997, the state passed legislation to allow L&I and DOE to

¹⁵ International Union of Operating Engineers, *Assessing the Full Costs of New Remediation Technologies: Guidelines for Identifying Occupational Safety and Health Costs for Environmental Remediation Technologies*, April 30, 2001. Research supported by the U.S. Department of Energy’s National Energy Technology Laboratory under cooperative agreement DE-FC21-95MC32260. The recommendations were developed by health and safety professionals, scientists, economists, managers, and engineering representatives from unions, academia, federal agencies, and the private sector.

¹⁶ Proclamation 2487, May 27, 1941.

¹⁷ Proclamation 2914, December 16, 1950.

¹⁸ Washington State Legislature, *War Projects on Defense Projects Insurance Rating Plans*, Session Laws 1951, Chapter 144, March 15, 1951.

¹⁹ Keith L. Prescott v. United States of America. United States Court of Appeals, Ninth Circuit. 731 F.2d 1388. In 1979 Keith Prescott, a former engineer at the Nevada Test Site, got bone marrow cancer. When he filed a workers’ compensation claim with DOE his claim was denied. Prescott filed a tort claim. The contractor (Reynolds Electrical and Engineering Company) and DOE tried to dismiss it and failed. When the employee prevailed in the District Court.

negotiate special agreements for Hanford's workers' compensation program.²⁰ The legislation authorized special workers' compensation agreements between L&I and DOE, and as under prior law provided that, "*these agreements need not conform with the requirements of the state's industrial insurance law of this state if the department finds that the application of the plan will effectively aid the national interest...*"²¹

Which national interests are to be aided by the workers' compensation program? All subsequent agreements and contracts are mute on this question.

Hanford's Program was Self-Insured with Limited Review

From 1943 until January 2000, workers' compensation claims from Hanford workers were reviewed and processed by L&I under a special insuring agreement between DOE and L&I. Under the agreement, L&I administered and adjudicated Hanford workers' claims. DOE reimbursed L&I for benefit payments made to Hanford workers covered by the program and paid L&I for the costs of reviewing and adjudicating the claims.

In January 2000,²² DOE was certified to be a self-insured program and manage its own claims with oversight from L&I. Unlike other entities that apply to become self-insured:²³

- DOE never filled out an application for self-insurance; and
- DOE never had a review of its safety program at Hanford.

DOE's escape from the State of Washington's standard procedures for reviewing and regulating a self-insured program was sanctioned by RCW 51.04.130. This arrangement was formalized in a Memorandum of Understanding (MOU) between DOE and L&I which states "*L& I and DOE agree that DOE shall not be required to file an application for self-insurance inasmuch as this MOU shall serve as certification for the purpose of self-insurance.*"²⁴ When asked about the types of reviews that did take place, one Washington State employee told an investigator that there really was not any review and staff were told to '*butt out and just accept the program.*'²⁵

Once accepted as a self-insured program, claims from DOE's program were no longer reviewed and processed by the state. Instead, DOE performed this function. L&I claims administrators only review a Hanford claim if DOE denies it or if there is a special request from an employee or the employer to assist with claims review.

²⁰ HB 2020, C 109 L 97. Incorporated into statute as RCW 51.04.130.

²¹ RCW 51.04.130. See Appendix D of this report.

²² Joyce Walker, Program Manager, Self-insurance, *Subject: Self-insurance Certification*, Letter to U.S. Department of Energy, January 25, 2000.

²³ RCW 51.14.030.

²⁴ Amendment 1 of the Memorandum of Understanding between the U.S. Department of Energy, Richland Operations Office and the State of Washington Department of Labor and Industries, Article V, p. 2, December, 2002. "L& I and DOE agree that DOE shall not be required to file an application for self-insurance inasmuch as this MOU shall sever as certification for the purpose of self-insurance."

²⁵ Personnel communication to Lea Mitchell, Government Accountability Project. July, 2005, as quoted in *Systemic Injustice*.

DOE's acceptance into the state's self-insured program coupled with the lack of federal or state safety oversight at Hanford creates conditions that diminish transparency, reduce oversight, and harm workers' access to objective medical evaluation and treatment.

Exposures to Chemicals at Hanford

Occupational disease at Hanford can result from exposure to many different substances, including toxic chemicals, asbestos, beryllium, radioactive materials, and often a combination of some or all of these. One area of ongoing contention concerns diseases resulting from exposure to toxic chemical vapors emanating from Hanford's 177 underground nuclear waste tanks.

Since at least 1987, the toxic vapor issue has plagued Hanford—and increasingly so to date. In 1992, DOE issued a report²⁶ that led to all tank farm workers being required to only work in the Hanford tank farms using supplied air respiratory equipment for several years. With little justification, the supplied air requirement was removed, right before a series of tank-disturbing activities were undertaken as part of the saltwell pumping campaigns. This led to more exposures. In 2003, the Government Accountability Project issued a report, *Knowing Endangerment*, which I co-authored, documenting the underreported diseases resulting from exposure to toxic vapors, and Hanford's failure to protect workers from inhaling them. In 2004, DOE Office of Independent Audits and Assessments, the National Institute of Occupational Safety and Health, and the State of Washington²⁷ all issued reports based upon, and validating, the allegations in the *Knowing Endangerment* report.

In 2014, vapor exposures were on the increase due to resumption of tank remediation work, and approximately 70 workers reported for medical evaluation due to vapor exposures. The resulting outcry led to the commissioning of an independent report²⁸ by DOE, and led by DOE contractor Savannah River National Laboratories. Its report, released on October 30, 2014, was entitled the Tank Vapor Assessment Team (TVAT). This report contained numerous critical findings and 47 separate recommendations, most of which Hanford is still scrambling to implement. Among the findings –

“The ongoing emission of tank vapors, which contain a mixture of toxic chemicals, is inconsistent with the provision of a safe and healthful workplace free from recognized hazards. Mitigating the emission of and worker exposure to tank vapors represents an extraordinary challenge that cannot easily be addressed through traditional approaches. Full commitment of the Hanford site and DOE leadership will be needed to address the vapor exposure issues. The formation of the TVAT is a sign of site management's degree of commitment.” - p. 15

“...The exposures are to acute, intense concentrations. In four of the six exposures where personnel experienced upper respiratory issues, field measurements at the source found irritants at concentrations far exceeding the OEL.” - p. 43.

²⁶ Available at <http://www.hanfordchallenge.org/chemical-vapor-exposures>.

²⁷ All available at <http://www.hanfordchallenge.org/chemical-vapor-exposures>.

²⁸ *Hanford Tank Vapor Assessment Report*, October 30, 2014, SRNL-RP-2014-00791, Revision 0, available at http://www.srnl.doe.gov/documents/Hanford_TVAT_Report_2014-10-30-FINAL.pdf

“Management must acknowledge the health risk associated with episodic releases of tank vapors. While the ability to measure and document exposures may currently be inadequate, workers are nonetheless being affected by vapors on the tank farms. Acceptance of this observation should be communicated to all internal and external stakeholders.” - p. 15-16.

“Of the issues facing the current IH program, the one causing the vast majority of reported worker exposures requiring medical treatment comprise short-term and acute (bolus) exposures, which cause immediate symptoms in the workers and may or may not develop into medical signs of chemical exposure. The current program is not designed to detect and is incapable of detecting and quantifying this type of transient exposure event.” - p. 17

“A presumption of work-relatedness is consistent with Occupational Safety and Health Administration (OSHA) guidance. Previous medical determinations should be re-visited based on a more thorough understanding of the uses and limitations of the monitoring data.” - p. 18

“The TVAT believes that in its current state, the IH (professional and technician level) resources available are not sufficient to properly characterize and assess worker vapor exposure in the tank farms. The lack of IH participation, as compared to radiation control, in critical work activities, and the extreme delay in reporting formal monitoring results (backlogs have increased to 40 days) lead to the belief that management is not committed to understanding and controlling chemical hazards and that the recognition, evaluation, and control of chemical hazards are less important than for radiological hazards.” - p. 19

“ The observations about this technical issue are straightforward:

1. Worker vapor exposures are continuing.
2. There is no immediate local alarm that can be sounded when an incident occurs.
3. Without continuous chemical monitoring in the stack, there is no record of source strength.
4. Workers do not carry escape respirators.
5. Work teams have not carried grab samplers to activate during a vapor exposure incident.
6. Some change houses have been located on a hillside at the same altitude as the elevated stacks.” - p. 32

In September 2015, Washington State Attorney General Bob Ferguson, United Association Local 598, and Hanford Challenge brought federal court actions²⁹ against DOE and its contractor

²⁹ The separate actions were ultimately joined into one complaint, captioned Hanford Challenge, United Association of Plumbers and Steamfitters, Local Union 598 and State of Washington v. Ernest Moniz, Department of Energy, and Washington River Protection Solutions, LLC., NO. 4:15-cv-05086-TOR (*consolidated with* NO. 4:15-cv-05087-TOR), U.S. District Court, ED WA.

Washington River Protection Solutions (WRPS). The relief sought in these lawsuits is the protection of Hanford workers from inhaling toxic vapors that can lead to and have led to serious occupational diseases.

That lawsuit is still pending in the Eastern District court in Spokane. In support of those actions, the plaintiffs filed expert testimonies of several distinguished toxicologists, doctors, certified industrial hygienists, and engineers describing the conditions at Hanford, particularly in and around the high-level nuclear waste tanks, and arriving at conclusions that harm can and has occurred resulting from toxic vapor exposures.

State of Washington toxicologist expert Joyce Tsuji,³⁰ declared in her statement:

“Summary of Opinions

a. Hanford tanks contain complex mixed radioactive and chemical wastes involving thousands of organic and inorganic chemicals; these chemicals are present in both the waste itself and in tank headspace vapors.

- 1) Mixing of waste among tanks has resulted in somewhat similar chemical composition overall among tanks and over time; however, despite the number of samples analyzed, characterization of the chemical content and concentrations of tanks is limited by the large number of tanks, mixing of wastes, and dynamic nature within tanks involving chemical and radiolytic reactions and internal and external conditions (e.g., pressure and temperature). Reported ranges in concentrations therefore do not completely characterize tank headspace composition and concentrations, meaning that chemicals may be present at concentrations that are higher than reported.

b. Workers in and around the tank farms have been, and continue to be, exposed to elevated levels of chemicals from the tanks.

- 1) Acute high-dose bolus exposures to largely undiluted tank chemicals from venting of vapors, tank leakage, or releases during waste disturbance have resulted in worker exposure events for decades; recent reports of exposure events demonstrate that these exposures continue to occur.
- 2) Longer-term exposure incidents over several hours have also led to workers seeking medical attention.
- 3) Higher exposure concentrations are not well quantified and the evidence indicates that vapor concentrations can be even higher than measured.

c. Hanford tank farm headspace vapors contain some of the most toxic chemicals known, as well as other toxicants that have been reported to cause serious health impairment and even fatalities

³⁰ Declaration of Joyce Tsuji in Support of Plaintiff State of Washington’s Motion for Preliminary Injunction, available at <http://www.hanfordchallenge.org/chemical-vapor-exposures/>, also available on PACER, the federal court document system (paysite).

with acute high-dose exposures. These chemicals, individually and collectively, can be extremely harmful to human health.

- 1) Numerous site reports and the scientific literature have acknowledged the toxicity and risk of serious health effects posed by these chemicals. Workers have been, and continue to be, exposed to chemical vapors at levels that require medical attention and have led to adverse health impacts. While it is possible to recover from some of these health impacts with proper treatment, a subset of these health effects are not immediately reversible, and some workers have experienced permanent damage to their health.
- 2) Many of the chemicals contribute to upper and lower respiratory tract irritation and tissue injury, in addition to possible neurological effects from acute exposures.
- 3) Numerous chemicals present in the tanks are also carcinogenic or are of higher toxicity.

d. Tank exposures cause health effects and pose risks of serious, irreversible impairment.

- 1) Workers have been, and continue to be, exposed to chemical vapors at levels that require medical attention and have led to adverse health impacts.
- 2) While it is possible to recover from some of these health impacts with proper treatment, a subset of these health effects are not immediately reversible, and some workers have experienced permanent damage to their health.
- 3) Reported chemical concentrations in tank vapors for certain chemicals individually are sufficiently high to cause or contribute to serious health effects. The potential for higher chemical concentrations, frequent worker exposures resulting in medical attention, and the combined effect of multiple chemicals further increase the risk of serious health effects.
- 4) Without better characterization of bolus (i.e., short duration, high concentration) exposures and the toxicity of tank vapor mixtures, DOE and WRPS cannot effectively ensure that workers are protected from serious health effects.”

Dr. Tim Takaro, M.D., with a specialty in occupational medicine and a long history with working with Hanford nuclear site workers, also filed a Declaration.³¹ He wrote:

“Causal link between tank vapor exposures and respiratory and neurologic symptoms.

WRPS currently lists 59 chemicals of potential concern in the tanks. Tsuji Dec. ¶18 referencing Ex. 4. This is consistent with the Savannah River National Laboratory (SRNL) Hanford Tank Vapor Assessment Report in 2014 which concluded that, “under certain weather conditions concentrations approaching 80% of the head space concentration could exist 10 feet downwind from the release point and potentially in workers’ breathing zones.”

³¹ Declaration of Dr. Tim Takaro, M.D., in Support of Plaintiff State of Washington’s Motion for Preliminary Injunction, available at <http://www.hanfordchallenge.org/chemical-vapor-exposures/>, also available on PACER, the federal court document system (paysite).

Using this information coupled with ambient air and personal monitoring evidence the SRNL panel was convinced of significant exposure potential to workers. The panel used the biological effects of these exposures along with their spatial and temporal dimensions to establish the link between these exposures and adverse health effects reported by workers. They then applied well-established epidemiologic criteria (Bradford Hill Criteria for Causation) which “strongly suggests a causal link between chemical vapor releases and subsequent health effects, particularly upper respiratory irritation, experienced by tank farm workers”. In my review of individual medical records for a small subset of workers I show specific examples of this relationship for respiratory and neurologic complaints for four tank farm workers.

Extent and consistency of exposures and health impacts.

Hundreds of USDOE and contract workers work in and around these emission sources with varying degrees of exposure assessment and detection. Tank Farm operations require approximately 700 workers per shift (Cary A. 2016). The nature of the tank head space emissions means that episodically and with recently increasing frequency, workers experience exposures. Chain link barriers and distance do not always protect from these exposures. Not surprisingly, many of these exposures are outside the fence where workers spend more time in work trailers adjacent to the fenced, restricted zones without respiratory protection (*e.g.*, AP, SY and AZ tank farms).

Workers differ in their susceptibility to exposures and worker exposure limits are therefore stated to protect most workers, but not all (ACGIH 2016). Therefore, even exposure below permissible levels may be hazardous for workers with either previously injured respiratory tract membranes or age related, genetic, or other susceptibility to the chemicals in the complex mix that characterizes tank vapors. Together these factors lead to the ongoing health risk to tank farm workers.

Finally, the extent and consistency of the exposure events and health response and conclusions on causality are supported by temporal consistency. Table 2. Shows a comparison between recent reports from workers in April and May of 2016 compared with an 18-month period Oct. 2008-Mar 2010 showing a dramatic increase in frequency and highly consistent pattern of symptoms.”

- Takaro Declaration, pp. 11-14 (map omitted).

Summary

SB 5940 provides a path for Hanford workers to obtain medical care and compensation for occupational diseases resulting from exposure to hazardous substances at the most contaminated and dangerous workplace in the nation. It is ironic and unfortunate that the average Washington State worker is *five times more likely* to receive medical care and compensation under the worker compensation law than a Hanford worker.

This Bill affords Hanford workers the same presumption of occupational disease that this body created for firefighters in 1987. And like those firefighters, Hanford workers are exposed to unknown and unknowable concentrations of toxic chemicals, most of which (1350 out of 1800 in the tank vapors alone) do not even have set Occupational Exposure Limits. Even less is known about the additive or synergistic effects of exposure to multiple chemicals.

Thank you for the opportunity to submit this testimony.