Revised: Summer 2008

HANFORD SITE TOUR SCRIPT (PUBLIC)

INTRODUCTION

Welcome to the Hanford Site!

I would first like to give you a short security briefing. Each of you should display your visitor badge in plain sight above your waist. Cell phones and cameras or other forms of photographic equipment are not permitted. If there is an emergency or special situation, a cell phone will be available on board. I will not be discussing or answering questions regarding Hanford Site security. You can be assured that the Hanford Site has a well-trained and equipped security force with the ability to respond as the need requires.

VOLPENTEST HAMMER TRAINING AND EDUCATION CENTER

The Volpentest HAMMER Training and Education Center (HAMMER) – the place you boarded the bus – is an 80-acre HAMMER complex that celebrated its tenth-anniversary in 2007. It is owned by the U.S. Department of Energy (DOE).

The HAMMER name is an acronym that stands for Hazardous Materials Management and Emergency Response. However, at dedication, the acronym officially became a word when the facility was named the Volpentest HAMMER Training and Education Center, honoring local community leader Sam Volpentest, who died in 2005.

HAMMER is primarily a training complex for Hanford Site workers; but regional, national, and international emergency response and other organizations train there, as well. Through traditional classroom education sessions supported by hands-on training at life-sized props, HAMMER students learn to safely perform high-risk tasks.

The Site's safety statistics have improved dramatically since HAMMER opened its doors. HAMMER, itself, has been recognized for safe operations. In 2002, HAMMER received Star status in DOE's Voluntary Protection Program, which is based on a similar program of the federal Occupational Safety and Health Administration (OSHA).

HAMMER is one of the few training centers in the world to combine such an extensive array of training props in one large campus setting. Its location on the Hanford Site reflects DOE's commitment to protect workers, the public, and the environment, as it cleans up the Site and transports hazardous materials on the nation's roadways.

HAMMER operates as one of the most effective partnerships within the DOE complex. Partnering leverages resources, helping HAMMER reduce training costs, while improving worker and public safety, and increasing worker productivity. HAMMER's partners include other DOE contractors, other federal agencies (including the U.S. Environmental Protection Agency -- EPA, the Federal Emergency Management Agency, the U.S. Department of Transportation, the U.S. Department of Labor, OSHA, and the Department of Homeland Security), state and tribal governments, the Hanford Atomic Metal Trades Council, the Central Washington Building and Construction Trades Council, the Pacific Northwest National

Laboratory, academic institutions, industry, the Tri-City Development Council, and 12 international labor unions.

HAMMER's main campus of life-sized props and buildings cost $29.9 million to build. Its Administration Building has classrooms, distance learning and computer-based training rooms, a Learning Resource Center, and a restaurant. Its 15,000-square-foot Al Alm Training Support Building has large open bays, classrooms, and Radiological Worker practice and practical evaluation rooms. HAMMER props include the following:

- A six-story training tower with interior and exterior stairs
- A three-story burn building with propane-fueled fires
- A two-story search and rescue building with reconfigurable mazes, infrared cameras, audio capabilities, and smoke generators
- A propane-fueled flammable liquids pad
- Pond and stream props
- Confined space and trench props
- Dumpster and vehicle burn props
- A fall protection prop
- A transportation pad with a propane-fueled fuel truck fire, a rail car with a simulated vapor leak, and an overturned tanker with a simulated liquid leak
- A ten-ton gantry crane mounted on rails
- A 90-day storage pad
- A hazardous materials training pad
- An aboveground pipeline prop
- A waste tank prop
- A port-of-entry prop constructed by the U.S. Department of State for training national and international border officials.

The HAMMER Learning Resource Center, which also houses Fluor Hanford's Safety Resource Center, was developed by Xavier University of Louisiana. The center contains over 7,000 multi-media items to support safety, health, personal development and skill improvement. Computer stations are available for student and instructor use.

HAMMER's motto is "The Training at HAMMER Is as Real as it Gets!" When you see the HAMMER training courses in action, you'll know that this is very true!

PACIFIC NORTHWEST NATIONAL LABORATORY (PNNL)

At the corner where we turn north onto the main highway, we can see the campus of Pacific Northwest National Laboratory, managed by Battelle of Columbus, Ohio. PNNL started in 1965, when Battelle won the contract to manage laboratory and research operations at the Hanford Site. It was first known as Pacific Northwest Laboratory, and then it became a national lab in 1995. PNNL is one of 10 national laboratories under the auspices of the DOE's Office of Science and is a multi-program facility delivering breakthrough science and technology that solves problems in the areas of fundamental science, national security, energy and the environment.

Battelle is the largest employer in the Tri-Cities, with about 4,000 people. The PNNL budget approaches $800 million annually. A small portion of its work is associated with helping meet the environmental management and cleanup objectives for the Hanford Site, but most of its

scientific and technical research and development work supports other DOE programs, along with other federal agencies, academia, and commercial entities.

The contractual agreement between Battelle and DOE combines these privately owned facilities and equipment that you see here along the highway, with government-owned resources such as the Environmental Molecular Sciences Laboratory (EMSL – which I'll talk about in a moment) and facilities in the 300 Area.

Scientists and engineers at PNNL develop technologies that can be used by almost every segment of industry – from agriculture to health and medicine. Their fields of expertise include all the major physical sciences and engineering disciplines, and they provide expertise in nuclear nonproliferation and global arms control.

The 200,000-square foot William Wiley EMSL opened in 1997. It is a collaborative research facility – a scientific user facility that PNNL operates for the DOE. It is providing state-of-the-art resources to scientists from here and other laboratories, research universities, and industry. It has a suite of the world's most powerful nuclear magnetic resonance spectrometers, and the world's first 11.5-tesla mass spectrometer.

Today PNNL is getting ready to vacate much of its laboratory space in the 300 Area. You can see a new Physical Sciences facility that is being built just north of the main PNNL campus and just south of the 300 Area. Two other facilities – for computational and biological sciences – will be built over the next year.

300 AREA

The 300 Area is just north of Richland and PNNL. Some of the buildings in the 300 Area were constructed during World War II. The 300 Area had three main functions: fabricating metal fuel for the reactors (performed in the north end of the area); doing chemical research to improve the entire production process; and conducting life-sciences research into the effects of radioactive and hazardous materials on living organisms. Famed physicist Enrico Fermi had an office and laboratory here for a brief time.

The 300 Area produced two main types of reactor fuel, both made of uranium. About 20 million pieces of small fuel were produced. This fuel looked almost like a roll of quarters – each piece or "fuel element" was a solid cylinder 4-8 inches long, about 1 and ¼-inch in diameter, and weighed about 6 pounds. This type of fuel was used in 8 of Hanford's 9 production reactors.

Fuel for the ninth reactor – N Reactor – was much larger and heavier. It consisted of two tubes of uranium, one inside the other. When the two tubes were put together, the resulting fuel was called a "fuel assembly" because it was an assembly of two major parts. Each of the N Reactor fuel assemblies was about 26-inches long, about 2 and 1/2 inches in diameter, and weighed about 52 pounds.

We will talk more about reactor fuel when we get up near the K Reactors and K Basins.

During the Cold War, many of the 300 Area laboratories performed research to expand and improve the efficiency of weapons production, and to immobilize or dispose of radioactive waste. Today, only about a dozen facilities in the 300 Area are still used and occupied.

The 300 Area buildings that remain are used by PNNL for research. Over the years, PNNL scientists have conducted research in life sciences, analytical chemistry, bioremediation, robotics, and waste-treatment methods such as the ceramic melter. The ceramic melter technology was the world's first large-scale system for transforming high-level radioactive waste into a stable, glasslike product suitable for long-term disposal.

Ceramic melter technology first developed here in the 1960s has been used in Japan and France, and is the basis for the technology that will be used here at Hanford at the Waste Treatment Plant under construction in the 200 East Area.

Today, PNNL conducts research for many government agencies, including national security work for the Departments of Defense and Homeland Security, and energy and environmental research for the DOE and the EPA.

The building with the dark gray dome is an old research test reactor, called the Plutonium Recycle Test Reactor. Fuel containing small amounts of plutonium was tested in it during the 1960s for potential use in the commercial nuclear power industry. The reactor building will be demolished in the next few years. There were once half a dozen small, experimental reactors that operated in the 300 Area. All have long-since closed, most have been removed, and DOE is deciding whether or not to remove the reactor that sits below ground in this gray-domed building.
Washington Closure Hanford (WCH) is responsible for demolishing most of the buildings in the 300 Area and cleaning up any underlying waste sites. The company just completed demolishing the last building in the northern half of the 300 Area. All cleanup work in the River Corridor, including building demolition and waste site cleanup, is expected to be completed by 2013. After that time, only a few facilities to be used by PNNL for research will remain in the 300 Area.

300 AREA TREATED EFFLUENT DISPOSAL FACILITY (TEDF)

On the right is the 300 Area Treated Effluent Disposal Facility (TEDF). The TEDF represents a major achievement, by ending a half-century practice of discharging liquids into the ground. This facility began operating in 1994 to provide treatment and disposal of liquid wastewater from the 300 Area (from about 40 buildings). This building operates along with another like it near the center of the site that we will see later. After treatment, the clean liquid is discharged to the Columbia River. The permit that regulates the quality of the water being discharged is the strictest in Washington State.

400 AREA

On your left is the Fast Flux Test Facility, FFTF for short. Planning for this reactor began in 1965, during the heyday of nuclear power building and experimentation. Construction was completed in 1980, and full operations began in late 1982. The reactor, built to test fuel and materials for America's "breeder" reactor program, was to be a bridge to a newer, non-defense role for Hanford. A breeder reactor is one that essentially makes more fuel than it consumes. These reactors were planned to generate electric power, not weapons materials. FFTF was the world's largest test reactor of its kind.

However, the nation decided against the breeder reactor program concept and FFTF had to supplement its DOE budget by conducting paid experiments for other nuclear nations. During its 10 years of successful operation, FFTF performed a variety of research and testing programs on nuclear fuel, materials, and equipment for nuclear systems. Several of these experiments were done for Japan and Canada. FFTF also produced medical isotopes including gadolinium-153 and cobalt-60.

Finally, the finances fell short, and DOE issued a deactivation order for FFTF in 1993. The reactor was de-fueled during 1994-1995. Over the following years, DOE considered operating FFTF, to possibly produce tritium for national defense needs and medical isotopes for treating cancer and other ailments. However, in 1998, the DOE announced that FFTF would not produce material for defense. In 2000, it announced that FFTF would be closed permanently, and ordered deactivation planning to begin. Deactivation began, managed by Fluor Hanford, and an Environmental Impact Statement is underway to determine the facility's future.

In 2007, the DOE directed that any deactivation and decommissioning activities that would be irreversible be stopped. This direction was given because of FFTF's potential role in the Global Nuclear Energy Partnership, or G-NEP. GNEP is an initiative by the federal government to help revive nuclear research in the United States. The FFTF was proposed as a candidate site for some of the research and experiments to take place.

FUELS AND MATERIALS EXAMINATION FACILITY (FMEF)

Behind FFTF is a very large, gray, concrete building called the Fuels and Materials Examination Facility (FMEF). It has 250,000 square feet (23,200-square meters) of inside operating space. It is the equivalent of seven stories tall (98 feet or 30 meters high), with 35 feet extending below ground. It was completed in 1984 to serve the Breeder Reactor program and FFTF by making mixed oxide fuel and then evaluating the performance of that fuel and other materials by post-irradiation inspection.

The FMEF was built to modern U.S. DOE standards for safety, security and containment. It contains 16 hot cells, among which is the largest hot cell in the DOE complex outside of the Nevada Test Site. Hot cells are special, reinforced, shielded areas where nuclear materials can be handled without exposing workers to radiation. Workers do not enter the hot cells, but perform work using remote tools that reach into the cells through sealed ports.

However, FMEF has never operated in a nuclear mode because of the demise of the national breeder reactor program. The facility has been evaluated for many potential missions including a potential storage site for vitrified waste packages produced from tank waste, a mixed-oxide production facility in the U.S. weapons dismantlement program, a prison, a movie set, and a location for a backup bank of computers storing Internet data. However, the facility is presently empty and has no identified mission.

With the exception of FFTF and some of the larger facilities like FMEF, many of the buildings in the 400 Area are scheduled to be demolished and removed as part of the work Washington Closure Hanford will complete by 2013.

ENERGY NORTHWEST

On your right is Energy Northwest's Columbia Generating Station, the northwest's only operating commercial nuclear power plant. The tall rectangular building is the reactor building, surrounded by the turbine generator building, radioactive waste building, and six cooling towers.

Energy Northwest, formerly named the Washington Public Power Supply System, is a group of public power utilities that lease land from the federal government. Energy Northwest is not affiliated with the Department of Energy nor Hanford cleanup.

The Columbia Generating Station is a boiling water reactor, which means the water boils around the nuclear fuel to produce steam to turn turbines that turn a generator. The splitting of atoms in the nuclear fuel heats the water.

Columbia Generating Station produces more than 1,150 megawatts of electricity --enough electricity to serve the needs of a city the size of Seattle. It would take two 100-car trains of coal every day to produce the same amount of power. The federal Bonneville Power Administration sells and distributes the electricity generated here to eight northwestern states.

There are two partially completed reactors on this site. Construction for both began in the late 1970s for the former Supply System. WNP-4 was about 20-percent complete when it was terminated in 1983. Construction on WNP-1, at about 65-percent, was stopped in 1982.

LASER INTERFEROMETER GRAVITATIONAL WAVE OBSERVATORY (LIGO)

Behind the 400 Area is another interesting facility that cannot be seen from this road. It is the Laser Interferometer Gravitational Wave Observatory (LIGO). It's an advanced scientific observatory, designed to team with similar projects in Louisiana and Italy, for measuring gravity waves at extremely tiny levels. Findings may validate theories posed by Albert Einstein.

When gravitational waves travel through space and pass through Earth, they cause only minute twitches in laser beams. There is evidence the waves exist, but up to now, technology has not been powerful enough to detect them. At LIGO, two tubes, each 2-½ miles long, branch out from the central building and run along the ground. Two precisely monitored, concentrated laser beams are bounced back and forth inside the tubes. When a gravity wave is detected, the laser will go out of alignment.

This project involves California Institute of Technology, Massachusetts Institute of Technology, and the National Science Foundation. It is not a DOE project. The Hanford Site was selected because of its available space and seismic stability.

WYE BARRICADE

We are approaching our first security point. It is called the Wye Barricade after a "wye" pipe joint, which is three-pronged. The Wye Barricade is one of three main entrances to the Hanford Site – the other two are the Yakima Barricade on the west side of the site, and the Rattlesnake Barricade connecting Highway 240 with the center portion of the site and the 200 Areas.

Special security badges are required for access through the barricades. Even though Hanford no longer has a defense-production mission, there are still assets from valuable property to nuclear material that require protection.

GENERAL TRI-CITIES AND HANFORD FACTS, COMPANIES:

The Tri-Cities, as they're known, would have been quite different if it weren't for the Hanford Site. Today, Kennewick, Pasco, with a population of 60,000, is the largest of the three. Pasco is the second largest city with approximately 50,000. Richland is the third largest city with approximately 44,000. The combined population of the Tri-Cities area, including West Richland (10,000), is just under 230,000, according to the Tri-City Development Council.

The Hanford Site was established in 1943, during World War II, as part of the top secret Manhattan Project to produce plutonium for defense. Defense material production was halted in the late 1980s. The Hanford Site is now engaged in the world's largest project to clean up the legacy of radioactive and hazardous wastes that resulted from plutonium production.

The U.S. EPA and the Washington State Department of Ecology regulate Hanford's cleanup program under a long-term compliance agreement called the Hanford Federal Facility Agreement and Consent Order (better known as the Tri-Party Agreement or the TPA). This agreement sets the framework and timelines on the cleanup work to bring Hanford into compliance with environmental standards. Hanford cleanup is focused on three outcomes: restoring the Columbia River Corridor or shoreline, transitioning the Central Plateau to long term waste treatment and storage, and preparing for the future. Originally, the site covered 640 square miles and included the city of Richland. Today, the site covers 586 square miles, starting in the northern part of Richland.

The DOE owns the Hanford Site and has three managing offices:

-The Office of River Protection (ORP) manages the program to retrieve, treat, and dispose of 53 million gallons of radioactive and hazardous waste stored in 177 underground storage tanks in the central part of the Hanford Site, known as the Central Plateau.

-The Richland Operations Office (RL) oversees cleanup along the Columbia River and in Hanford's Central Plateau (not including the waste tanks), including groundwater and waste site cleanup, management of solid waste,spent nuclear fuel and sludge; facility cleanout, deactivation and demolition, environmental restoration; plutonium management; and all site services.

-The Pacific Northwest Site Office (PNSO) oversees the science and technology programs at the Pacific Northwest National Laboratory.

Activities in support of the site's missions are carried out by employees of private companies under contract to the DOE. These companies are referred to as contractors.

-Washington Closure Hanford is RL's prime contractor for environmental restoration of the River Corridor (that is, areas along the Columbia River). Its major task is to clean up waste sites, decontaminate and decommission many of the former production reactors and surplus facilities, demolish much of the 300 and 400 Area buildings, and dispose of its own cleanup waste as well as the waste of other Hanford contractors in the Environmental Restoration Disposal Facility (known as er-diff – ERDF). We will visit ERDF later today.

-Fluor Hanford, Inc. (FH) is today RL's prime contractor for managing, emptying and

demolishing the K Basins, water-filled basins in the north area of the Site that hold radioactive sludge and contaminated solid waste. Fluor Hanford also manages plutonium storage and cleanout at the Plutonium Finishing Plant, solid waste operations, soil and groundwater remediation, and site-wide services such as emergency preparedness, communications, Hanford Fire Department, Hanford Patrol, road and electrical maintenance, property management, and other site-wide support work.
However, a new contractor will be taking over much of Fluor's work starting October 1. CH2MHill Plateau Remediation Company will take over all of this work except for emergency preparedness, Hanford Fire Department, Hanford Patrol, and other site-wide support work.

-AdvanceMed Hanford (AMH) monitors the health of Hanford workers. AMH began providing the occupational and environmental health services for Hanford in 2004. Included in these services are occupational medicine, health education, behavioral health services, industrial hygiene and environmental monitoring.

-Bechtel National, Inc. (BNI) is ORP's prime contractor for designing and building the Waste Treatment and Immobilization Plant that will transform liquid radioactive tank waste into a stable glass form. The process is known as vitrification.

-CH2MHILL Hanford Group (CHG) is today ORP's prime contractor for storing, retrieving, and safely managing approximately 53 million gallons of radioactive and hazardous waste stored in 177 underground waste storage tanks. Its role also includes characterizing the waste and delivering it to Bechtel National, Inc. for vitrification when that plant goes into operation. However, a new contractor will be taking over CHG's tank farms work as of October 1. The new company is Washington River Protection Solutions LLC. It is comprised of the Washington Division of URS Corp as the primary corporation, and Energy Solutions and AREVA Federal Services as partners with smaller shares of the business.

Other key facts about Hanford:
- The site has about 11,000 employees
- Annual budget is just under $2 billion.
- Hanford is the largest employer in the Tri-Cities, making up about 31 percent of the payroll for the local community.

Managing and cleaning up Hanford nuclear wastes is being conducted in compliance with applicable laws and regulations, and in a way that will prevent harm to people and the environment.

The Site has 120 miles of roads, 250 miles of access roads, 185 miles of electrical transmission and distribution lines, and 66 miles of water piping. We are now driving on the second four-lane highway built in the state of Washington. The first such highway was constructed between Seattle and Tacoma.

A few other companies that are not prime contractors have some key roles here:
-Lockheed Martin Information Technology (LMIT) is responsible for telecommunications, computing, document control, records management and multimedia services for many Hanford companies.
-Fluor Government Group (FGG), a part of Fluor Corporation, provides engineering, procurement, construction and project management services for many Hanford cleanup projects.

HANFORD TOWNSITE

For thousands of years the Hanford area was inhabited by a nomadic Indian tribe, the Wanapums, and visited frequently by members of several other tribes, including the Yakama, Nez Perce, and Umatilla. The fish in the river were a very important food and trading resource for these people.

Settlers began moving to the White Bluffs area in the 1860s and to Hanford and Richland about 1905-1910. They called this area many things including the Great Forks, the Three Rivers, and the Priest Rapids Valley. This land is arid—it receives only about seven inches of rain a year--but with irrigation water from the Columbia the pioneers were able to make the land productive. There were field crops and orchards. The fruit was ripe here sooner than anywhere else in the Pacific Northwest.

About 1,500 people lived in this area. The towns of Hanford and Richland had about 300 people each. The town of Hanford (and later the Hanford Site) was named after Judge Cornelius Hanford of the Seattle-Tacoma area.

The effort to build an atomic bomb began shortly after the United States entered World War II in December 1941. It was called the Manhattan Project. This area was chosen to be part of the Manhattan Project because the Columbia River provided an abundant supply of cold water and hydroelectric power. It was near the major railroad center at Pasco. The weather was dry, and fairly mild. And it was away from any major population centers, which was good for security and for safety. The government looked at possible sites in Montana, Oregon and California, but none was as well-suited as the Hanford area.

The first controlled and sustained nuclear reaction was achieved at the University of Chicago in December of 1942. In January 1943, Hanford was chosen as the place where plutonium, a fissionable material used in atomic bombs, would be made. Under the War Powers Act, the federal government bought the land from the people who lived here and relocated them. The War Department took over about 640 square miles of land, or about 410,000 acres. About one-eighth of that was farmland, and the rest was open grazing land.

The U.S. Army Corps of Engineers was the supervisor of the Manhattan Project, which also included Oak Ridge, TN, and Los Alamos, NM. The DuPont Company agreed to build and operate Hanford for cost plus a fee of $1, but finished ahead of schedule so received only 67 cents. DuPont had been accused of profiteering during World War I and did not want its image tainted by war profits.

To house all the construction workers, the Army Corps of Engineers built the Hanford construction camp adjacent to the Hanford town site. At one point, there were 51,000 people at the construction camp, making it the third largest city in the state--with the largest general delivery post office in the world.

The construction camp started with tents, but eventually there were more than 800 barracks, 600 Quonset huts, and a trailer camp with 4,300 people. An auditorium that could hold 4,000 dancers was built in three weeks. There were eight mess halls where 50 tons of food was served per meal. The price for all you could eat was about 69 cents.

But even though there was plenty of food, the work at Hanford was demanding. The normal workweek was 50 hours over six days. The pay was good, but the weather was often either extremely hot or cold and always dirty and dusty because so many native plants were being ripped up in the massive construction. Dust storms were called termination winds because of the number of workers that would quit and leave Hanford after each storm.

During the war, jobs were not difficult to get, but workers were. Because of the rush to construct, people were recruited from around the nation to work here.

Today, the only evidence that the town of Hanford existed is the shell of the old Hanford High School, on your right. The school went from 9th through 12th grade; it was built in 1916 and saw its last graduating class in 1942.

The few trees you see here and there are left from the old farms and the Hanford construction camp. These trees have lived more than 60 years without irrigation. Hanford farmers planted a variety of trees for shade. The black locust and Chinese elm trees have fared the best through the years.

The strips of pavement you may see are left from the construction camp, which was closed in early 1945 and dismantled in 1946.

100 AREAS

The 100 Areas are near the north end of the site, and are the location for the nine now-closed plutonium production reactors.

Hanford's defense reactors have all been cleaned out and deactivated. A special "interim safe storage" project has been completed at five reactors – C Reactor, F, D, DR and H. The N, KE and KW Reactors will be placed into interim safe storage in the next few years.

In this project, also called reactor "cocooning," about 80 percent of the reactor building is demolished down to the four-foot-thick solid concrete walls surrounding the reactor core. All remaining openings – except for one door – are sealed with cement or steel plate, and a new long-lived roof is placed over the facility. The single remaining door is welded shut and opened once every five years and the reactor inspected. This process significantly reduces the surveillance and maintenance costs and reduces the risks to people and the environment. The reactors will remain in this cocooned state for up to 75 years, giving radiation in the reactor cores time to decay to relatively manageable levels and government regulators time to determine an ultimate disposal option. Cocooning produces a much smaller, safer facility.

At B Reactor, the world's first full-scale nuclear reactor, DOE is encouraging private-sector efforts to work toward a public museum. Recently, DOE announced that it will preserve B Reactor's historic state until a public process involving the National Park Service finishes its studies and evaluations of preserving B Reactor. If no groups or agencies convert the reactor into a museum, B Reactor will be cocooned along with Hanford's eight other defense production reactors.

Washington Closure Hanford manages the River Corridor Closure project for DOE. It includes

cleaning up 370 buildings, demolishing 486 buildings, operating the on-site disposal facility (ERDF), as well as cocooning most of Hanford's reactors.

Washington Closure is a limited liability company owned by the URS Corporation's Washington Division, Bechtel and CH2M HILL. Washington Closure began work at Hanford in 2005. The Washington Closure contract is a "pay-for-performance" arrangement – meaning the fee earned is based on fulfilling specific performance goals on schedule and within budget.

The contract also mandates Washington Closure may only perform 40 percent of the work itself and must contract out the rest, to ensure competitiveness and help small businesses. In addition, Washington Closure is required to award at least 65 percent of its subcontracts to small businesses – among the most stringent requirements of its kind in the country. By the end of 2007, Washington Closure had awarded nearly 90 percent of all subcontracts to small businesses.

DOE is now evaluating bids for a new set of contracts at the Hanford Site to replace the ones currently held by Fluor Hanford and CH2MHill Hanford Group. Cocooning of the KE and KW Reactors will be performed by a new contractor.

In general, the Hanford reactors worked very simply. Uranium fuel, fabricated in the 300 Area, was placed into horizontal tubes that run through the reactors. Control rods were withdrawn, and the fission reaction began. This reaction changed a small fraction of the uranium to plutonium, and also generated a lot of heat. Cold water from the Columbia River was pumped through the reactors, running right past the uranium fuel in the tubes, to cool them off.

During their years of operation, Hanford's reactors were modified many times. Larger and more robust pumps were installed, while thinner process tubes with larger opening were installed. These modifications allowed more cooling water to flow through the reactors, thus enabling them to operate with more uranium fuel or with uranium of higher enrichment levels. The additional uranium allowed more plutonium production, while assuring that the reactors operated within safe cooling boundaries.

F REACTOR

The reactor you see to your right is F Reactor, fully "cocooned." It was one of Hanford's original reactors. It went into production in February 1945, during World War II and was shut down in 1965 as the need for plutonium declined. At startup, F Reactor used 35,000 gallons of river water per minute. Upgrades to the pumps and other systems in the late 1950s, to produce more plutonium, brought the reactor to the level where it was using about 65,000 - 70,000 gallons per minute of river water. F Reactor was cocooned in 2003.

NORTH SLOPE

The hills ahead of us in the distance across the Columbia River are known as the Saddle Mountains, and form the northern boundary of the site. The farming at the base of the mountain range was started in the late 1950s, when the government released several thousand acres of the site. The DOE also allows cattle grazing on this land, which has become known as the North Slope. No nuclear activities took place on the North Slope. There were anti-aircraft guns and missiles there during the 1950s and until 1961. In 1971, DOE (then known as the Atomic

Energy Commission), leased its North Slope land to two other government agencies to create wildlife areas. At that time, the Saddle Mountain National Wildlife Refuge was created on 32,000 acres of land in the western portion of the North Slope, and the Wahluke State Wildlife Recreation Area was created on 58,000 acres in the eastern portion. The state portion was opened to the public for hunting in 1978, but the federal portion remained closed to protect rare plants and animals.

During the 1990s, the slope was cleaned up, and in 1999 DOE reached an agreement with the U.S. Fish and Wildlife Service to manage the entire area as wildlife habitat, while DOE retains ownership. In June 2000, President Clinton created the Hanford Reach National Monument which spans a quarter-mile corridor along most of the Columbia River shore of the Hanford Site. Today, some of the North Slope land is both Monument and Refuge, but the U.S. Fish and Wildlife manages both.

WHITE BLUFFS

We are now approaching the old White Bluffs town site. White Bluffs was founded in the 1860s and was named for the bluffs across the river. These bluffs are nearly 400 feet high, and are formed of unconsolidated ashy soils.

The old White Bluffs bank building is still standing. It was supposed to be burglar-proof, but the vault had a wooden roof and was robbed at least once. The loot from that robbery was never recovered. Legend has it that the robber buried the loot somewhere between here and Moses Lake. The town of White Bluffs also had a grocery store, a car dealership, a weekly newspaper, a primary school, a gas station, and other buildings. The train depot was just across the road among those trees on your left.

The railroad train that ran between Hanford and White Bluffs was known as Sagebrush Annie. There was also a ferryboat that crossed the Columbia out of White Bluffs. The town's main street ended at the ferry landing. The remains of a blacksmith shop stand on the north bank of the river.

During World War II, the Army and the DuPont Corporation converted some of the White Bluffs buildings, and built others, into a large machine shop complex. Known as the White Bluffs Shops, this complex functioned until the early 1970s. It has since been demolished.

H REACTOR

H Reactor is the next one on the landscape. H Reactor began operating in 1949. It was built as part of Hanford's first Cold War expansion. It is nearly identical to the World War II reactors. It was shut down in 1965 and cocooned in 2005.

HANFORD REACH

The “Hanford Reach” of the Columbia River refers to the 51-mile stretch of the river that runs from the Priest Rapids Dam just north and west of the Hanford Site boundary, to just north of Richland. The Reach is the last stretch of free-flowing water in the Columbia River in the United States. More Chinook salmon spawn in this 51-mile stretch than in any other river in the U.S. outside of Alaska. The Reach is also home to sturgeon up to 12 feet in length, steelhead,

trout (an endangered species) and many other important fish species. Many different species of wild animals and birds live along the river. It is not uncommon to see bald eagles in the trees.

In 2000, President Bill Clinton signed a bill designating the Hanford Reach as a National Monument. This designation brings federal control by the U.S. Fish and Wildlife Service, a part of the Department of the Interior. The Fish and Wildlife Service's management plan for the National Monument, known as a Comprehensive Conservation Plan, is just being finalized. It will determine which areas of the Monument can be developed with boat launches and campgrounds, where there will be historical displays and kiosks, whether or where activities such as horse-back riding and hiking can occur, and which areas will remain quiet, undeveloped, and set aside for wildlife.

D AND DR REACTORS AND MOOLI MOOLI

The D Reactor Area houses the D and DR Reactors. D Reactor was one of the three original reactors built in World War II. It is the second full-size nuclear reactor in the world. The reactor next to it is known as DR, or D Replacement. It was built during 1949-50, because Hanford scientists thought D Reactor was going to fail and they wanted to take advantage of the D Reactor pump house and other support buildings. However, they solved D Reactor's problems and the two reactors operated side-by-side until the mid-1960s. The Control Room of D Reactor is housed in the Smithsonian Museum in Washington, DC, but is not currently on display.

Both D and DR Reactors have been cocooned. Cleanup of effluent waste sites in the 100-D Area began in 1996 and has been completed there and at the other reactor areas. Cleanup of waste sites and burial grounds is underway at most of the reactor sites and is scheduled to be completed in 2013.

The government estimated there was about 10 million tons of contaminated waste in Hanford's Columbia River Corridor. To date, more than 7 million tons has been removed from near the river and transported for permanent disposal at ERDF.

The large conical mounds ahead of us were made by icebergs that melted and left deposits of sediments. These mounds have special significance to the local Native Americans who call them Mooli Mooli (Moo-LI, Moo-LI).

N REACTOR AND 100 AREAS FIRE STATION

The tan-colored N Reactor is the newest of Hanford's defense reactors, and was different from the other Hanford reactors in that it produced both plutonium for defense and steam for generating electricity. N Reactor was the only dual-purpose reactor in the United States and its original name was the "New Production Reactor." N Reactor also had a re-circulating cooling system that used much less Columbia River water than the other reactors. Its fuel was larger and different than that of the other reactors, and it had a built-in safety system that ensured a loss of water would cause the reactor's fission reaction to safely shut down automatically with no operator action required.

Construction of the reactor started in 1959. President John F. Kennedy dedicated the reactor and broke ground for the generating plant in September 1963. The generating facility began making electricity in 1966.

N Reactor operated from 1963 until January 1987 when it was shut down for maintenance, refueling and safety upgrades. In April 1986 the accident at the Chernobyl nuclear plant in the Soviet Union drew attention to N Reactor. The DOE ordered safety enhancements, and planned to restart the reactor. However, in early 1988, DOE decided to place N Reactor in standby. With the end of the Cold War, there was no longer a need for plutonium production, and N Reactor was never restarted. The N Reactor Area has been completely deactivated. This area contained slightly more than 100 buildings, all of which are being cleaned out and closed.

A major task was cleaning out N Reactor's two nuclear fuel storage basins in the reactor building. They held a total of about 1 million gallons of contaminated water. The basins are 24 feet deep and held about 350 pounds of spent nuclear fuel fragments along with other equipment. Workers removed the contaminated water and sent it to Hanford's liquid-treatment facility. The spent fuel was put into canisters, sent to the K Basins, and dried for storage. The sediment and debris went to the ERDF.

The N Reactor complex is now being demolished by Washington Closure. The reactor building and steam generator building will be cocooned by 2013.

The road into N Reactor crosses an old Columbia River channel.

The fire station we are passing on our right serves the 100 Areas.

K-EAST, K-WEST REACTORS

The K East and K West reactors began production in 1955 and were shut down in 1970 and 1971. Until 2000, their fuel storage basins contained nearly 2,300 tons of spent reactor fuel (SNF)—that was 80 percent of the SNF in the DOE's national inventory. Spent fuel is that which has been irradiated in a reactor. Part of it has turned to plutonium, and all of it is very radioactive.

Here we need to explain what normally happened to spent fuel when Hanford was producing plutonium. After being irradiated in the reactors, the fuel was transported by water-filled rail-car to the center of the Hanford Site, about 8 miles from the reactors. The water was needed in the rail cars to shield the workers from radiation, because the fuel was very radioactive. In central Hanford – known as the 200 Areas – the fuel was dumped into large dissolvers inside buildings and dissolved in acid. The fuel element or assembly was no longer a solid piece – it was then part of the liquid acid mixture. This mixture was then mixed and washed with other chemicals, in a long series of steps that gradually separated out the plutonium from the rest of the elements and chemicals in the mixture. This process that took place in the 200 Areas is called separations or "reprocessing."
However, some of the fuel irradiated at Hanford was never picked up from the reactor areas and taken to the 200 Areas and dissolved. Some of it was left behind and stored for many years – up to 30 years in some cases – in water basins inside the K East and K West reactor buildings. Storing the spent fuel underwater created one of Hanford's most important environmental threats. The fuel corroded and produced radioactive sludge. In 1994, a cleanup project was created to address this fuel. Managed by Fluor Hanford, this project successfully removed the fuel from the reactor facilities and dried it between 2000 and 2004. It also placed the fuel into dry storage on Hanford's Central Plateau.

Removing the fuel was a major turning point in the overall Hanford Site vision to consolidate, monitor and safeguard highly radioactive materials in the 200 Area Central Plateau. The spent fuel from the K Basins will remain at Hanford until a permanent, national repository is available.

Today, Fluor Hanford is continuing cleanup work in the K Basins. In 2007, it finished collecting the sludge in the K Basins in underwater containers, and transferred the K East sludge into the K West containers. The company also removed thousands of pounds of nuclear debris (or solid objects) in the water. Fluor then started deactivation and demolition of the K East Basin. Demolition of the above-ground portions of the basin structure are expected to be demolished by mid-September. In the next few years, the sludge in the K West Basin will be treated, and the K Reactors will be cocooned. Cocooning will be done by the new CH2MHill Plateau Remediation Company.

B/C REACTOR AREA:

B Reactor was the first reactor built on the Hanford Site, and was also the first full-scale reactor in the world. It has received several national awards as a nuclear and engineering landmark, and is listed on the National Register of Historic Places.

It took about one year to build B Reactor. The reactor started operating in September 1944; it was shut down from 1946-1948, and then went back into service until 1968. It is one of the most historic sites in the world.

You will learn much more about B Reactor during your visit, and you'll be able to see it as it is being explained, so I won't say much more about it now. But you have a real treat in store!

C Reactor was the first Hanford reactors to be cocooned for up to 75 years. Cocooning removed the fuel storage basin, the fuel examination facility, the surrounding support buildings and portions of the C Reactor building structure. This endeavor reduced the size of the original footprint by 81 percent. A new weatherproof roof and a remote monitoring system were then put in place.

Hanford personnel now go into the reactor only once every five years to check conditions. In the meantime, they check the building remotely. When C Reactor was checked 5 years after cocooning, it showed no leaks, no animal intrusion, no build up of gases, and no hazards to the environment. It will undergo its 10-year checkup later this year.

A major effort of the C Reactor cocooning project was to demonstrate new technologies that could be used in cocooning the other reactors. This project demonstrated 20 innovative technologies that can reduce worker exposure to contamination, lower costs and accelerate cleanup schedules. Thirteen of the technologies were actually deployed at Hanford, other DOE Complex sites, and internationally at Chernobyl.

Between the river and B Reactor, Washington Closure has finished removing contaminated soil. When the reactors operated, water pumped from the Columbia circulated around the radioactive fuel to cool it inside the reactor. This water was then sent through underground pipes to open basins to let it cool off in temperature and to let some of the short-lived radioactivity decay or "die down". The water was then discharged to the river.

The dirt under and around the open basins became contaminated, and has been excavated and taken to Hanford's waste disposal facility called ERDF. Haul trucks are filled with soil, discarded equipment and concrete debris contaminated with low-level radionuclides. The material is covered and taken to the ERDF, in order to remove contamination away from the Columbia River shoreline areas.

VISIT B REACTOR: The group tours inside the reactor, then returns to the bus.

GABLE BUTTE AND GABLE MOUNTAIN

Gable Butte is an outcropping of basalt--the same solid lava that extends thousands of feet underneath Hanford and elsewhere in Eastern Washington and Eastern Oregon. To the east about six miles is Gable Mountain. About 20 years ago, the DOE was looking for a long-term, underground storage site for the high-level nuclear waste from commercial nuclear power plants. Geologic formations throughout the United States were studied, and the top three candidates were in Texas, Nevada and Hanford.

Three tunnels were mined into Gable Mountain to test how well the basalt formation would perform as a long-term storage site. In 1987, the DOE decided to explore only the site at Yucca Mountain, Nevada, and the project ended at Hanford. The tunnels were then filled in, and the area has been returned to its original condition.

200 AREAS

We're now approaching central Hanford, also known as the 200 Areas or the Central Plateau. It is called the "plateau" because it is elevated about 200-250 feet above the water table. It contains two separate 200 areas -- 200 East and 200 West.

The 200 East Area covers approximately 3.5 square miles; the 200 West Area covers just less than 5 square miles. These areas are about eight miles from the Columbia River and 25 miles from Richland.

In the 200 Areas, as explained earlier, fuel irradiated in the production reactors was chemically processed to separate and recover plutonium for use in nuclear weapons. Several other valuable isotopes were also recovered. During World War II, the two 200 areas were constructed about 5 miles apart and in such a manner that it would be difficult for an enemy aerial attack to destroy all of the chemical separations buildings.

Today, 200 West has three processing plants, T Plant, U Plant and REDOX. 200 East has two processing plants, B Plant and PUREX.

T Plant, B Plant and U Plant were nearly identical in function at the time they were constructed in 1943-44. Duplicating facilities was done for safety as well as security. REDOX was a second-generation processing plant, which began operating in 1951. PUREX, the third-generation plant, is in 200 East Area and began operating in 1956. B Plant, U Plant and REDOX are shut down, and T Plant operates as the site's decontamination facility. It has not conducted plutonium processing since 1956. PUREX has been shut down since 1988.

RIVER PROTECTION PROJECT
(While traveling south on Rt 3 North)

To your right, you can see the 200 West Area. A major activity taking place today in the 200 Areas is the River Protection Project (RPP). This project manages and performs tank waste maintenance and cleanup. Cleaning up Hanford's tank waste is currently the largest single environmental project in the world.

The RPP is responsible for safely managing the highly radioactive waste in 177 underground storage tanks and for eventually disposing this waste. These wastes were generated as a result of chemical separations processing to recover special nuclear material from irradiated fuel from the production reactors. Today, only wastes from decontamination of shutdown facilities and from laboratories are transferred to these tanks. The RPP pumped all of the liquid wastes out of the single shell tanks, and evaporated and concentrated tank liquids so that they fit inside the site's double-shell tanks. Now, the RPP is trying to remove the salt crust and hard sludges that remained in the single-shell tanks when the liquid was pumped out.

Eventually, tank waste from the double-shell tanks will be sent to a new vitrification plant called the Waste Treatment Plant being built at Hanford, or will be solidified by an alternate technology. We'll talk more about the Waste Treatment Plant when we visit there later today.

The 200 West Area contains T Tank Farm, the first Hanford tank farm to receive chemical separations wastes in late 1944. The tanks located in this farm are single-shelled. They have just one layer of carbon steel (called a shell) inside a concrete casing.

During the 1970s, Tank T-106 in T Tank Farm experienced the largest tank leak in Hanford's history. Recently, a temporary impermeable barrier was installed over Tank T-106 to prevent rainwater and snowmelt from reaching the contaminants and moving them toward groundwater.

There are 149 single shell tanks in the 200 Areas, ranging in capacity from 50,000 to one million gallons. Because a number of the tanks were found to have leaked, the single-shell design was discontinued after 1964.

A program to pump all available liquids out of these tanks was finished in 2004. An aggressive program is now underway to remove the remaining solids and transfer them to safer double-shelled tanks. The tank solids and sludge wastes will be glassified in the future, or disposed in some other way. Dealing with the tank waste is the most complex challenge at Hanford.

200 WEST AREA:

Other important facilities in 200 West Area include:

-T PLANT: The T Plant complex was the first chemical-processing plant built at the Hanford Site, and the first of its kind in the world. Construction started in 1943 and was completed in October 1944. Because the design of the building resembles a box canyon, these separations plants were called canyon buildings.

T Plant processed the nuclear material in the world's first atomic explosion, the Trinity bomb test in July 1945, and the material in the Nagasaki weapon that helped end World War II. It's a very

historic facility.

In 1957, T Plant was converted into a decontamination and repair facility. In the 1990s, extensive upgrades were made to the facility and T Plant now functions as a decontamination facility where radioactive and hazardous solid wastes are processed and packaged to meet applicable state and federal regulations.

-PLUTONIUM FINISHING PLANT

The Plutonium Finishing Plant, known as PFP or Z Plant. It performed the final step in plutonium processing, converting plutonium solutions into metal and oxide, which was shipped offsite to be used in the nation's defense program. Also located in the PFP plant are facilities that recovered plutonium from various forms of scrap. Americium-241, a radioactive isotope used in home smoke detectors, was recovered here. The defense mission ended in 1989. Parts of the PFP complex are being demolished right now.

Fluor Hanford has cleaned out and demolished 19 of 63 buildings that existed in the PFP complex. It has also decontaminated nearly 100 gloveboxes, and shipped out hundreds of containers of other contaminated waste.

-U PLANT and REDOX

U Plant was built in World War II to process plutonium. Partial demolition of U Plant has begun in a plan called the Canyon Disposition Initiative. In this plan, the buildings surrounding U Plant will be demolished, and the waste sites in the ground surrounding the plant will be remediated. Then, U Plant will be collapsed inward onto itself, and buried in a mound of "engineered rubble" called a "cap."

The REDOX Plant at the south end of the 200 West Area is another chemical processing plant.

HANFORD WEATHER STATION
(just before leaving Rt. 3 North)

The red and white metal tower with small buildings beneath it to the LEFT marks the Hanford Meteorology Station. It has been operating since December 1944, and was built to conduct air and wind dispersion studies. It's not an official U.S. weather station. However, it tracks weather patterns and wind conditions, and relays them to various facilities and departments for onsite needs. For example, the Hanford Fire Department uses data from the meteorology station in fighting grass fires.

ENVIRONMENTAL RESTORATION DISPOSAL FACILITY (ERDF)
(Arrive at ERDF for tour. The ERDF representative will conduct this portion of the tour.)

ERDF is a large landfill that serves an extremely important role in Hanford's cleanup. It is a disposal facility for the contaminated soil and materials being dug up at Hanford. ERDF began receiving waste in 1996. Each of its cells is 500 feet wide at the bottom, 70 feet deep, and over 1000 feet wide at the surface. ERDF's liner is a system comprising multiple barriers, forming a primary and secondary protection system. Each system is designed to contain and collect moisture in order to prevent migration of contaminants to the soil and groundwater. Once ERDF

is filled with waste, an engineered barrier will be placed on top to prevent the release of waste and infiltration of rain. Currently, ERDF receives about 3,000 tons per day. Currently, ERDF holds more than 7 million tons. Its operational capacity is 10-12 million tons, which is equal to the amount of contaminated soil we expect to clean up at Hanford. The facility is designed to be expanded as needed, and is currently undergoing its third expansion.

ERDF receives only waste that is being cleaned up at older, historical facilities, waste cribs and other sites no longer being used. These facilities are called "past practices" sites.

After ERDF Tour:

WASTE SAMPLING AND CHARACTERIZATION FACILITY (WSCF)

The Waste Sampling and Characterization Facility ("Wes-Cuff" -- WSCF) complex was completed in 1993 and is operated by Fluor Hanford. WSCF is a laboratory that processes quality assurance samples and routine process control samples containing hazardous chemicals, paint, lead, asbestos, and low levels of radioactive contamination for many Site programs. Most of the samples processed in WSCF are environmental, soil or groundwater samples.

ENVIRONMENTAL MONITORING

Hanford is one of the most heavily monitored sites in the world. An extensive environmental monitoring program has existed for decades; PNNL has managed it since 1965. Each year, monitoring staff collect thousands of environmental samples both onsite and within a 50-mile radius of the Hanford Site. There are 50 air sampling stations, located onsite and as far away as Walla Walla, Yakima, Moses Lake, Mattawa, and the McNary Dam.

Samples include surface water, wildlife, soil, groundwater, foodstuffs, vegetation, and air. All samples are analyzed to detect radionuclides. Several state and federal agencies also have programs to monitor and confirm the accuracy of the information collected at Hanford.

GROUNDWATER PROJECT

Now may be a good time to discuss soil and groundwater contamination at Hanford. Contamination from the tanks, as well as from past disposal practices across the Hanford Site, pose potential risks to the Columbia River. About 80 square miles of Hanford's groundwater is contaminated at levels above the Federal Drinking Water Standard. In 1998, DOE created a special project at Hanford to integrate all of the activities that impact soil or groundwater contamination. This effort is now known as the Soil and Groundwater Remediation Project (SGRP) and is managed by Fluor Hanford.

"Pump-and-treat" systems are an important part of the SGRP at Hanford. A pump and treat system pumps groundwater to the surface, treats it remove or change contaminants, and then injects it back into the underground aquifer. The removed contaminants and filters are disposed at permitted sites, like the ERDF. The locations of the pump and treat system are selected in conjunction with Hanford's regulators and stakeholders at places where it is necessary and possible to contain chromium, strontium, carbon tetrachloride, or other contaminants in the groundwater. If these areas remained untreated, the contamination could continue moving towards the Columbia River and could pose an unacceptable level of risk.

Other treatment systems are needed for some of the contamination. Soil and groundwater remediation personnel are actively searching for, testing and deploying, new and more effective technologies to achieve cleanup.

HANFORD FIRE DEPARTMENT

The Hanford Fire Department is a highly trained, professional career industrial fire department with 138 firefighters. It provides emergency fire, medical, hazardous materials and technical rescue response on a 24-hour, 7-days per week basis.

Other services provided to the Hanford Site contractors include functional testing and preventive/corrective maintenance of automatic fire detection and suppression systems; respiratory equipment servicing, modification and repair, fire prevention, investigation and public education through the Fire Marshall's office; and incident command responsibilities in emergencies. The HFD stations are staffed with emergency medical technicians or paramedic ambulances.

The Hanford Fire Department responds to an average of 25 natural cover (grass or range) fires each year. An average of 15 of these fires occur onsite. The remainder occur offsite, and the Hanford Fire Department responds through its mutual aid agreements with surrounding fire districts, departments and agencies.

In 2000 and 2007, Hanford experienced large wildland fires. It is a tribute to the Hanford Fire Department and all the other agencies aiding it in fighting these fires that no major structures on the Hanford Site burned.

CROSS-SITE TRANSFER LINE

An underground Cross-Site Transfer Line, constructed in 1996, links the waste tanks in the 200 West and East Areas. The piping is double-contained to protect the environment from leaks, and is buried four to ten feet below the surface. This transfer line is important because it allows waste to be pumped from single-shell tanks to double-shell tanks, and to the 242-A Evaporator in the 200 East Area. Most importantly, it supports the primary mission of disposal since the vitrification plant is being built in the 200 East Area.

200 EAST AREA:

CANISTER STORAGE BUILDING: (on left)

The mint-green building on your left is one of Hanford’s newer facilities, built for the cleanup mission. It is called the Canister Storage Building because it stores large canisters holding dried, spent nuclear fuel. Most of this fuel used to be in the K Basins near the Columbia River. The canisters are stored in large steel tubes in a concrete vault below the floor of the building. The tubes are 40 feet long, and each one holds two large fuel canisters. There are only tubes below about one third of the building. The rest of the concrete vault area below grade is empty. Inside the building, a large crane can move the spent fuel canisters around if they need to be inspected or moved for any other purpose.

PATROL HEADQUARTERS: (on right)

We are now entering the 200 East Area. On the right is the headquarters of Hanford Patrol, a special guard force employed by Fluor Hanford.

SHOPS AND FABRICATION BUILDINGS

Large wooden buildings with no windows served as special fabrication shops for many years at Hanford. Some of the equipment used at Hanford couldn't be found anywhere, so it had to be custom-made. Hanford craftsmen had to understand the innermost workings of the Hanford reactors and other facilities in order to fabricate special tools to solve unique operating problems in these facilities. Hanford craft workers made complete mock-ups and layouts of the electrical and piping equipment for major production facilities before building them in actual conditions. In 2004, shop activities at Hanford were privatized, and are now performed by commercial contractors.

B PLANT AND WASTE ENCAPSULATION STORAGE FACILITY (WESF)

B Plant – not to be confused with B Reactor -- is a World War II facility that processed reactor fuel to recover plutonium from 1945-1952. The plant was modified and restarted in 1968 to separate the radioactive elements cesium and strontium from tank waste. Removing the cesium and strontium, the primary heat producers, helped cool the waste.

WESF, a shorter building on the west end of B Plant, was added in 1974 to encapsulate and store the cesium and strontium.

In 1998, B Plant completed a major deactivation project and is closed, except for periodic surveillance checks.

SOLID WASTE TRENCHES (WRAP also mentioned but not seen)

We're about the visit a Hanford Site burial ground where solid waste that was buried many years ago is being retrieved. Failed pieces of equipment, tools, laboratory waste, or dry waste contaminated with radioactivity have been packaged or boxed and buried in trenches at Hanford since World War II. Short, concrete posts mark the centerline of burial trenches that are filled and covered.

Originally at Hanford, solid waste was not segregated into types. Since 1970, Hanford has separated transuranic (or TRU) waste from other radioactive waste. Transuranic waste contains isotopes with long half-lives and eventually will go to the Waste Isolation Pilot Plant (WIPP) in New Mexico for disposal.

Two different contractors, both under DOE/RL, manage the Site's burial grounds. Active burial grounds are located in the northwest part of the 200 West Area, and are managed by Fluor Hanford. Older burial grounds in various other parts of the Site that no longer accept waste are managed by WCH.

The Waste Receiving and Packaging Facility, called WRAP, located in the 200 West Area, is Hanford's primary solid waste handling facility. It began full operations in 1998, and is

managed by Fluor Hanford. WRAP inspects, treats, and repackages waste to ensure that all packages meet the acceptance criteria of the appropriate disposal facilities. Most of the waste handling operations in the facility are done robotically to minimize worker exposure to radioactive materials.

Once the inspections are completed, the waste is repackaged if required, and readied for transport. In 2000, the WRAP facility was certified to begin TRU waste shipments to WIPP. About 400 shipments have been made thus far. Low-level and mixed wastes are disposed in lined burial grounds at Hanford. Mixed wastes (that is, wastes containing both hazardous chemicals and radioactive materials) may be treated at offsite commercial treatment facilities before burial.

VISIT Burial Ground 218-E-12B – Solid Waste representative will make presentation. Then bus departs.

PLUTONIUM-URANIUM EXTRACTION PLANT (PUREX)

The Plutonium-Uranium Extraction Plant, commonly called PUREX, was Hanford's largest chemical processing or separations facility. It's an advanced version of T, B, and U B Plants, and REDOX.

PUREX operated between 1956-72 and between 1983-88. In just those 21 years, it separated 75 percent of Hanford's plutonium and the uranium.

PUREX was shut down in 1988 and deactivated by 1997.

Quick facts about PUREX...

- As long as three-and-one-third football fields; 64 feet of height is above ground with another 40 feet below ground.
- Concrete walls up to six feet thick shielded workers from radiation.
- The PUREX Plant contains 33 miles of piping.

242-A EVAPORATOR

The 242-A Evaporator near the PUREX Plant is vital to Hanford's waste storage and disposal mission. It receives radioactive liquid wastes pumped through underground piping from double-shell waste storage tanks, and basically boils off the water. The concentrated waste goes back into the tanks, while the water that was removed is stored in nearby Liquid Effluent Retention Facility basins until it can be treated in the 200 Area Effluent Treatment Facility and disposed to the ground. The evaporation process provides more storage space in tanks and avoids the need to build additional expensive storage tanks.

In 1994, evaporator operations resumed after extensive facility upgrades. Since then, tank waste volume has been reduced by over 25 million gallons. That's a volume equivalent to more than sixteen of the large underground tanks. The evaporator has been shut down since November and is now undergoing major upgrades. It is operated by CH2MHill Hanford Group.

DOUBLE-SHELL TANK FARMS

There are 28 underground, double-shell tanks at Hanford--25 in the 200 East Area and three in the 200 West Area. They're built of concrete and steel on a concrete pad. The average capacity of each tank is just over one million gallons. The tanks are built in clusters called farms. Double-shell tanks have been used since 1971. They have two walls, like a tank within a tank. The second shell is a safety feature to prevent leaks. The space between the two walls is monitored for leaks, although no leaks have ever been detected in a double shell tank.

The temperatures and liquid levels in Hanford's underground waste tanks are closely monitored around-the-clock by a computer-automated system. Nearly 6,000 measurements are made daily; other information is routinely collected in the field.

WASTE TREATMENT AND IMMOBILIZATIONPLANT
(Note: WTP representative will board bus and conduct briefing.)

The Hanford Waste Treatment and Immobilization Facility, also known as the Vitrification Plant, is being built to vitrify Hanford's tank waste by blending it with molten glass and placing it in stainless steel containers. The wastes will remain stable and impervious to the environment. The wastes will be separated into high-level and low-activity portions and sealed in canisters. The high-level canisters will be disposed in an off-site geologic repository. The low-activity canisters will be disposed on-site.

Bechtel National, Inc. is working to design, construct, and commission the Waste Treatment Plant. The current price tag of the plant is $12.2-billion. Vitrification at Hanford is scheduled to begin in about 2019.

US ECOLOGY (point back to this after leaving WTP – bus riders cannot actually see this facility)

Licensed by the Nuclear Regulatory Commission and Washington State, US Ecology is a private commercial company that operates a low-level radioactive waste disposal site on 100 acres of the Hanford Site leased by Washington State from DOE. The disposal site is located about one mile west of us. Despite its name, US Ecology is a private company, not a government agency. Waste is received from hospitals, research facilities and industry in the Pacific Northwest. The core of the Trojan nuclear reactor, a commercial nuclear reactor in Oregon used to produce electric power, was buried at this site during 2000.

RATTLESNAKE MOUNTAIN

Rattlesnake Mountain is a true Hanford landmark, forming the western boundary of the site. It is 3,600 feet high -- just a bit higher than the summit of Snoqualmie Pass in the Washington Cascades. The highest winds recorded on Rattlesnake by Battelle meteorology equipment were about 150 mph.

There are two observatories on top of the mountain, one has ceased operating and the other houses a 31-inch optical telescope, the largest in the state. The Pacific Northwest National Laboratory established the second observatory in 1967, and most of the research programs conducted there have been funded by the DOE. However, the National Aeronautics and Space Administration also sent astronauts to the observatory to study space materials. The DOE no

longer funds research at the observatory, but its use permit with Battelle Memorial Institute has, for several years now, allowed for the operation of the observatory to be conducted by a private organization that makes it accessible to schools via the Internet.

There are a number of facilities on the summit of Rattlesnake Mountain that DOE allows for public and commercial entities' communications needs. Due in part to ecological and cultural sensitivities, the Department of Energy has approved a proposal by Energy Northwest for potential consolidation of all existing tenants into one single facility, and is expecting a more detailed plan to review prior to moving forward.

Like the North Slope, no nuclear activities were conducted on Rattlesnake Mountain. However, Army anti-aircraft defense installations, including a Nike missile emplacement, were located here in the 1950s. The missile installation was deactivated in 1961.

Rattlesnake Mountain lies within the Arid Lands Ecology (ALE) Reserve, which is part of the Hanford Reach National Monument, managed by the U.S. Fish and Wildlife Service. ALE is 120 square miles (about 75,000 acres), and contains the largest natural animal and plant community in the arid and semi-arid shrub-steppe region of North America.

This area was renamed in memory of Richard Fitzner and Lester Eberhardt, longtime Hanford scientists who died in a plane accident at the Yakima Firing Center in 1992. The FEALE (Fitzner-Eberhardt Arid Lands Ecology) Reserve is dedicated to non-destructive research and is protected from human development.

The Rattlesnake Mountain and ALE areas have an abundance of wildlife. In arid lands, water is extremely important and animals must be able to reach it easily. The Hanford Site is home to mule deer, elk, coyotes, badgers, rabbits, skunks, bald and golden eagles, herons, ducks, ground squirrels, several species of mice, lizards and three species of snakes. Wild horses also have lived here over the years, but they were removed because they were not native to the area and were competing with the wildlife.

There are many varieties of desert shrubs at Hanford; the most common is known as Big Sagebrush. Cheatgrass is the most abundant grass at Hanford, but there are up to 30 other kinds of grasses that grow here. There is even one cactus variety, the prickly pear, a low-growing cactus that is less than a foot high.

In 1994, the Nature Conservancy of Washington, a non-profit group dedicated to protecting the plants, animals and natural communities of Washington State, performed inventories of the biodiversity of the Hanford Site. It found an amazing number of species at Hanford. Some species are very rare. The 1994 study covered only 30 percent of the Hanford Site but found 56 new populations of rare plants and discovered a completely new species. The 1994 study also found 205 species of birds on the Hanford Site, including 31 species of special concern, 72 species considered rare, and 9 species never before documented at Hanford. Close to 1,000 insect species also were documented, including 19 species new to science and 200 species new to Washington State.

Thank you very much for taking the time to tour the Hanford Site. We’re glad you came and were able to see first-hand the progress being made at the Site. To learn more about Hanford, or how you can be involved in Hanford cleanup activities and decisions, please visit the website at

www.hanford.gov.