

# Hanford Update

U.S. Department of Energy - Washington State Department of Ecology - U.S. Environmental Protection Agency

Fall 2006

***U.S. Army Corps of Engineers delivers cost and schedule validation for the Hanford Waste Treatment and Immobilization Plant***



*Exterior siding being placed at the Low-Activity Waste facility*

On September 7, 2006, the U.S. Department of Energy (USDOE) released the U.S. Army Corps of Engineers (USACE) report detailing its extensive review and validation of Bechtel National Inc.'s (BNI) Estimate at Completion, detailing the cost and schedule for Hanford's Waste Treatment and Immobilization Plant (WTP). To reduce uncertainty in the planning of this first-of-its kind project, Secretary Samuel W. Bodman last year requested this independent review and validation by the USACE to produce a credible and defensible cost and schedule.

The USACE recommends a \$650 million addition to the cost which includes \$320 million in base costs to cover potential fluctuations in labor rates and \$330 million in

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additional contingency, bringing the total estimated cost for completing and testing the WTP to \$12.2 billion. The USACE also recommends the addition of 3 months to the overall project schedule, putting completion of the facility in November 2019. The validated cost and schedule estimate assumes consistent Congressional appropriations of \$690 million from Fiscal Year (FY) 2007 through construction and commissioning completion.

“To effectively manage a project of this size and complexity, the USDOE must have a credible cost and schedule from which we can effectively plan. With the USACE validation of BNI’s estimate, we can now begin to put together a reliable baseline that will lead us to the safe and successful construction of the WTP,” Assistant Secretary for Environmental Management Jim Rispoli said.

The \$12.2 billion validated cost estimate includes \$9.1 billion in base cost and approximately \$3.1 billion in contingency. Of the \$9.1 billion base cost, \$2.7 billion has been expended through FY 2005, leaving approximately \$6.4 billion total remaining as “to go” costs for the project. With the approximate \$3.1 billion of contingency, the remaining estimate to complete the plant is \$9.5 billion.

In addition to the validated cost and schedule, the USACE report recognized organizational and staffing changes that have been initiated by USDOE and BNI that are improving project management processes. The report also includes findings and associated recommendations and observations regarding cost, schedule, risk, and management processes. Those findings and associated recommendations include:

- Addition of base cost for labor rate estimates, specifically in electrical, piping, and instrumentation.
- Establishment of an electronic interface to integrate data systems.
- Addition of base cost for labor rates related to startup and testing of the WTP.
- Negotiation and revision of the BNI contract to clarify roles, authority, and enforcement provisions between BNI and DOE.
- Establishment of a technical scope, cost, and schedule baseline for the project.
- Improvement of the change control process.
- Implementation of an Earned Value Management System.
- Establishment of USDOE ownership of all project contingency.

Each of the findings and associated recommendations in the USACE report will be evaluated by USDOE. Several are already being addressed, including implementation of an Earned Value Management System, baseline establishment, and planned negotiation and revision of the BNI contract.

The USACE report can be found on the internet at [www.hanford.gov](http://www.hanford.gov) under Whats New/ORP Public Documents and Presentations.



*Workers finish the first half of the mudmat for the glass former facility.*



*Once constructed, WTP will be an industrial complex of facilities for separating and vitrifying (immobilizing in glass) millions of gallons of radioactive and chemical wastes stored at the Hanford Site. The five major components of the WTP will be the Pretreatment Facility for separating the waste into high-level and low-activity waste fractions, the High-Level Waste and Low-Activity Waste facilities where the wastes will be immobilized in glass, the Analytical Laboratory for testing quality of the glass and other monitoring activities, and the Balance of Facilities which will comprise over 20 various support facilities. Once complete, the WTP will be the largest and most capable facility of its kind.*

### ***Key Hanford Cleanup Contracts Extended by USDOE***

The U.S. Department of Energy (USDOE) has extended two of its major prime contracts at the Hanford Site. The extensions are for up to two years and are valued at approximately \$1.3 billion for Fluor Hanford and \$500 million for CH2M HILL Hanford Group.

The extensions will ensure uninterrupted site activities while competitive procurements are being completed. The extensions are part of the USDOE's Hanford Central Plateau acquisition strategy, and will result in three new cleanup contracts in 2008.

The Fluor contract is managed by USDOE's Richland Operations Office. During the extension period, the company's cleanup work will include:

- Completing demolition of the radioactive liquid waste treatment facilities and cleaning out glove boxes at the Plutonium Finishing Plant.
- Finishing containerization and transfer of radioactive sludge from the K East reactor basin to the K West reactor basin and design of the sludge treatment system.

- Reaching 60 percent of all suspect transuranic waste retrieved for disposal.
- Installing and/or operating systems to address groundwater contamination, including a new pump-and-treat operation at 100 K, a new technology at 100 D, a 300-foot barrier at 100 N, and at least 30 new monitoring wells.
- Demolishing 10 high-risk industrial facilities.
- Removing about 700 gallons of sodium from the Fast Flux Test Facility.

The CH2M HILL contract is managed by USDOE's Office of River Protection. Work during the extension period will include:

- Maintaining and operating the tank farms, the 242-A Evaporator, and the 222-S building.
- Continuing the retrieval of radioactive and chemical waste from single-shell tanks.
- Advancing the Demonstration Bulk Vitrification System Project.
- Reducing base tank farms operations costs through efficiencies and continuing the upgrade of tank farm systems and equipment.

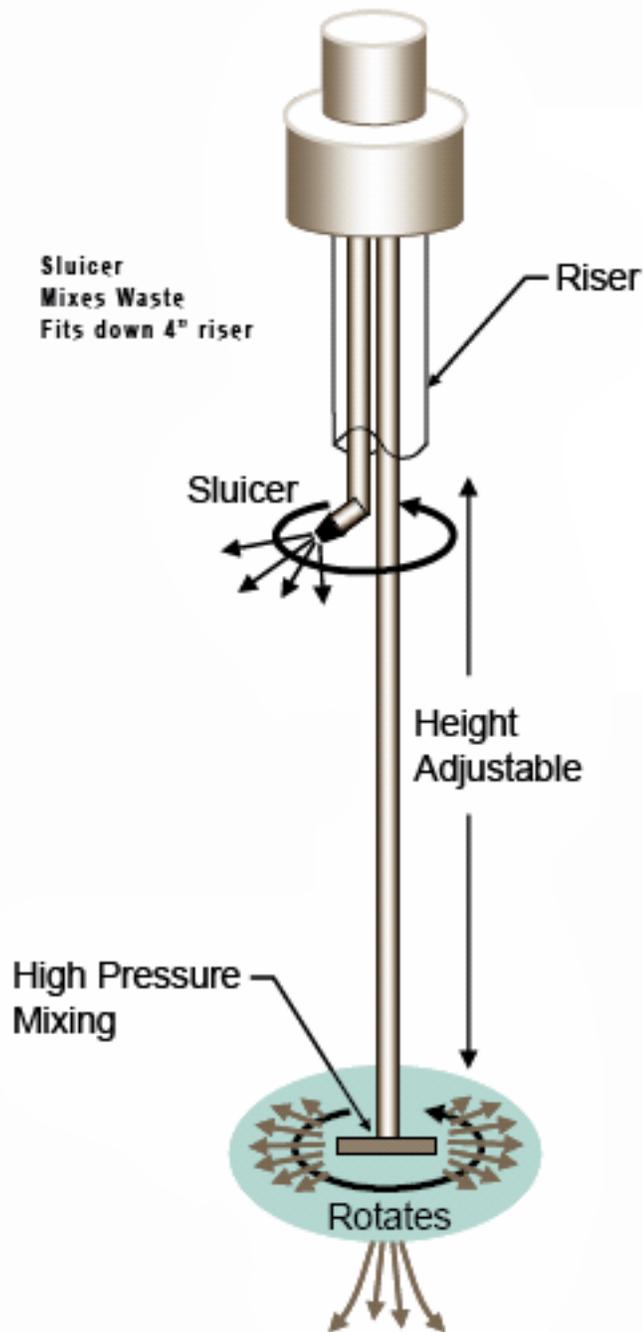
***New state-of-the-art technologies being used at Hanford***

The U.S. Department of Energy Office of River Protection, along with its Tank Farm Contractor CH2M HILL Hanford Group, Inc., has been testing three new state-of-the-art, innovative technologies to determine if they can enhance removal of chemical and radioactive waste from underground single-shell tanks (SST). They are the Sand Mantis, the Aardvark, and the Rotary Viper.

Technologies now used in tank waste retrieval include Acid Dissolution, Modified Sluicing, Vacuum Retrieval, Saltcake Dissolution, and Remote Water Lance or Salt Mantis. To date four SSTs have been emptied. Four more SSTs are in various stages of retrieval and two additional tanks are being outfitted for retrieval startup in 2007.

One of the challenges in retrieving waste from SSTs is to introduce water in the right locations to break up and mobilize hardened waste material so it can reach the pump and be retrieved from the tank. One of the most widely-used waste retrieval technologies at Hanford has been modified sluicing, which uses nozzles to spray water at 100 pounds per square inch at a flow rate of about 100 gallons per minute to dissolve waste and wash it to the pump in the center of the tank. This technology is effective, but like all retrieval technologies, it has its limits and uses large quantities of water, which increases the volume of waste that has to be stored.

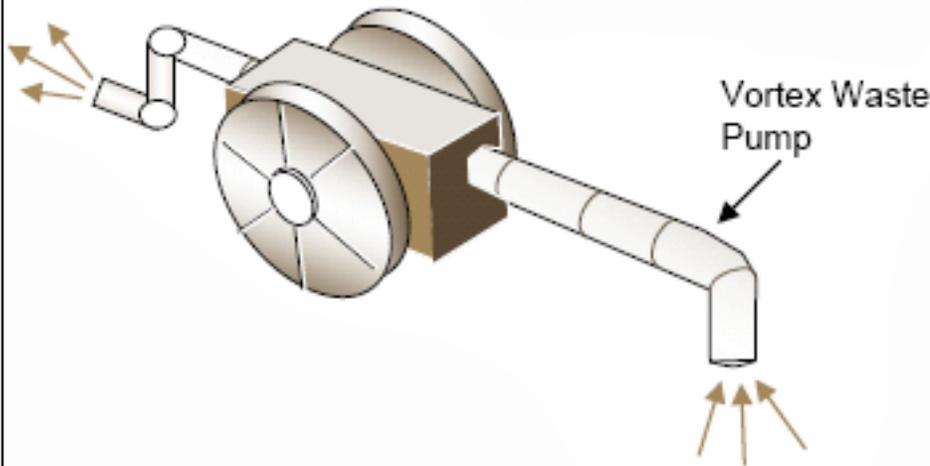
**Rotary Viper: Waste Mixing Tool**



*A new high-pressure mixer tool, called the Rotary Viper, is on a variable height shaft that allows operators to direct the mixing energy to the right location and control the direction of the spray so it will retrieve the largest amount of waste. If the testing proves successful the Rotary Viper could be deployed early next year.*

## Aardvark: Waste Breakup and Transfer Tool

Developed for mining industry  
Pumps material with Vortex Pump  
Does not fit in 12" riser



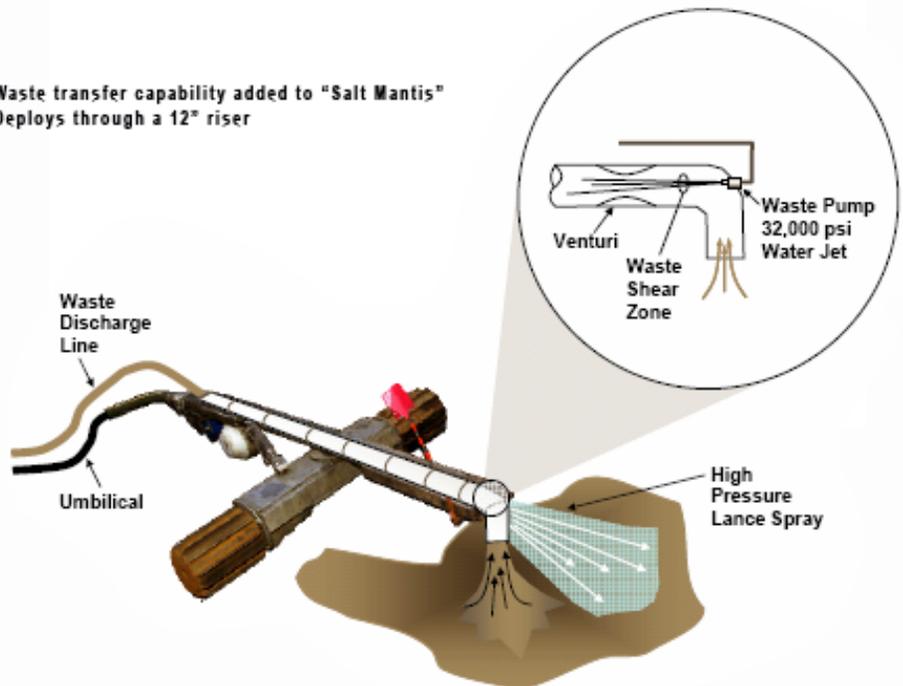
*The Aardvark is another type of mobile retrieval tool that is similar in design to the Sand Mantis, only smaller. Like its big brother it uses a high-pressure water system to create a vacuum to remove waste from the bottom of a tank, but it lacks the ability to use water to mobilize the waste, relying instead on the power of its vacuum system. It has the same ability as several other in-tank devices to move around by remote control and reach the waste that is otherwise inaccessible.*

One of the technologies under study is a mobile retrieval tool referred to as the Sand Mantis which combines high-pressure water with a waste transfer pump. It can move around inside a tank to reach waste that would otherwise be inaccessible. Not only does the Sand Mantis break up and mobilize hardened waste material using a stream of high-pressure water, it can also vacuum it out of the tank. An added feature is that the transfer pump has no moving parts.

The Sand Mantis is similar in appearance and design to the Salt Mantis, a one-of-a-kind device inserted into one of Hanford's tanks last year on a demonstration basis. It successfully used high-pressure water to break hardened waste material at the bottom of the tank. The Salt Mantis exceeded even the most optimistic expectations for performance and lessons learned. Those lessons along with a vacuum system have been incorporated into the Sand Mantis technology and are now being tested.

## Sand Mantis: Waste Breakup, Mixing, and Transfer Tool

Waste transfer capability added to "Salt Mantis"  
Deploys through a 12" riser



### *Ethanol fuel available to Hanford Site employees*

A new ethanol-85 fuel pump has been opened at a filling station in the center of the Hanford Site. Ethanol-85 (E85) is a blend of 85 percent ethanol and 15 percent unleaded gasoline and produces fewer greenhouse gases when used as fuel.

The U.S. Department of Energy has directed its field offices and contractors across the country to reduce consumption of petroleum-based fuels as alternative fuels become available. Two hundred sixty-eight of the current fleet of 1,300 government vehicles used by a number of Hanford Site contractors can run on E85. Contractor Fluor Hanford officials said that each time a vehicle has been ordered, a model capable of using E85 fuel was purchased if available and appropriate for the job.



*Researchers are looking for ways to use agricultural residues such as corn husks and stalks to make ethanol fuel.*



*A researcher gathers wood chips to use in making ethanol fuel.*

Hanford officials have begun notifying site employees who drive “flexible fuel” government vehicles—vehicles that can use the ethanol-85 fuel—that the new pump is open. The station, located in the 200 East Area, is operated by Conoco and is also open to site employees who want to gas up their personal vehicles. The station is within the restricted area of Hanford and is not accessible to the general public.

Hanford officials also are reminding employees with flexible fuel vehicles that an ethanol-85 fuel pump has been open since May at the Pacific Pride station in nearby Richland, reportedly the first filling station in the state with an ethanol-85 pump.

“We have been ordering vehicles that can use the alternative fuel for the past few years in anticipation of ethanol-85 becoming available in our area,” said Randy Peterson, Fluor Hanford’s manager of Fleet Services. “If each of the vehicles uses the ethanol-85 fuel exclusively and fills up at this pump, we could be using as much as 50,000 gallons per year and significantly reducing emissions of carbon dioxide by those vehicles.”

***Hanford Advisory Board update***

Contributed by Todd Martin, Chair

The Hanford Advisory Board (Board) got a jump on its top priority for 2007 in September by calling for a credible, comprehensive plan for retrieving and vitrifying Hanford's high level radioactive tank waste.

Isn't there already a plan for vitrifying (melting into glass) this waste, you might ask? Like most things at Hanford, the answer is mixed—a little 'yes' and a little 'no'.

Let's start by looking at a general, simplified overview of the current plan:

- Waste is being (and will continue to be) retrieved from older, less reliable single shell tanks (SSTs) and transferred to newer, more reliable double shell tanks (DSTs).
- From the DSTs, much of the waste will be transferred to the Waste Treatment Plant (WTP), large processing facilities and often considered the cornerstone of Hanford cleanup.
- In the WTP, waste will be separated into low activity (LAW) and high level waste (HLW).
- Both the LAW and HLW will be vitrified in the WTP.
- The LAW will be buried at Hanford.
- The HLW will be stored at Hanford until a national repository for disposal becomes available.
- The WTP is not sized to vitrify all of Hanford's tank waste on a reasonable schedule. Because of this, USDOE is pursuing a technology called bulk vitrification to provide a 'good as glass' waste form to speed the completion of Hanford's tank waste program.

So, that's the 'yes' part of the answer. Following is the 'no' part:

- The WTP is nearly a decade behind schedule and the cost has more than doubled.
- The bulk vitrification effort is also experiencing cost growth, schedule delays and technical challenges.
- Retrieval of waste from SSTs is costing more and taking longer than estimated. Current projected funding levels will not result in emptied SSTs by 2018, as is required by Hanford cleanup agreement.
- The DST system is nearly full, threatening continued SST retrieval efforts.

Given the above difficulties, and the interrelated nature of each component of the tank program, the entire program is in jeopardy. The Board has concluded the current plan is neither credible nor comprehensive.



*53 million gallons of highly radioactive, highly hazardous wastes is stored in aging underground storage tanks.*

As Hanford cleanup's most expensive, technically challenging and critical activity, the Board advised USDOE and Ecology to develop a comprehensive, credible solution to Hanford's tank challenges.

The significant progress to date—construction of the WTP and retrieval of several SSTs—was a direct result of a regional consensus behind the plan for Hanford's tanks. The current difficulties have broken this important regional consensus.

The Board sees rebuilding regional support as a critical element to restoring credibility and confidence in Hanford's tank program. Such rebuilding emphasizes the need for cooperation and collaboration between the Board, USDOE, Ecology, EPA, and the public.

In September the Board issued advice and principles to USDOE and Ecology to begin a dialogue with the hopes it will lead to restoration of a credible plan. The Board's principles include a request that USDOE and Ecology work together on an assessment that:

- Provides realistic schedule estimates for each critical task and impacts across the program when critical tasks are delayed.
- Includes an enforceable schedule for obtaining additional treatment capacity (e.g. bulk vitrification or a second LAW facility).
- Considers all reasonable alternatives to mitigate the impacts of WTP delays (e.g. construction of additional tanks, early start-up of LAW facility, other commercially available technologies, and simpler vitrification processes).
- Solicits input in a timely manner from the Board, other stakeholders and the public.

Through the results of this assessment, the Board hopes the Hanford community can find its way to a successful resolution to the important challenges posed by Hanford's tanks.

### *Hanford Sitewide Permit – 9th Revision*

Washington State's Department of Ecology is preparing to reissue Hanford's sitewide permit. It will be ready for review sometime between mid-January and the beginning of March, 2007. The comment period will be 60 days to allow public review of the extensive changes to this very substantial permit.

#### *What's the sitewide permit?*

Ecology handles the entire Hanford Facility as one treatment, storage, and/or disposal facility. Hanford operates under a single permit number. Ecology issued the original permit in 1994. State regulations require permits to be reissued every ten years to comply with the Resource Conservation and Recovery Act.

Hanford's sitewide permit is huge. It consists of the main body and the completed unit-specific portions. The sitewide permit has grown as more unit-specific pieces are added to it. When units are closed, they retire from the permit. Eventually, it will grow into an all-encompassing permit for the entire Hanford Site.

The new revision is important because it contains all changes in the past ten years. It also brings all regulation requirements up to date. When Ecology issues a permit, it's based on the regulations in force at that time. When the regulations change, the permits already in place do not reflect the new requirements. This revision will correct that.

All the new units going into this permit revision already have had public comment. In the past ten years, Ecology has modified some of these units. This revision shows which units are now in the permit and which units have been closed, and shows changes in the past ten years. Ecology has added a table that shows all units expected to go into the Permit.

#### *What's the public comment process?*

Ecology will accept written (mail, email, fax) comments for 60 days. Ecology will issue a comment response summary and permit decision after that. (The goal is to finish this in 60 days, but for a permit this large, it may take longer.) Revision 8 of the permit remains in effect until the permit is reissued.

## *Public Comment Periods*

**October 9 through November 27, 2006**

2+2 Melter Configuration Permit Modification  
Waste Treatment & Immobilization Plant

The Washington State Department of Ecology invites you to comment on a permit modification for Hanford's Waste Treatment and Immobilization Plant (WTP). The plant will immobilize millions of gallons of highly radioactive waste in glass. The permit modification would change Attachment 51 of the Dangerous Waste portion of the Hanford Facility Resource Conservation and Recovery Act (RCRA) Permit as follows:

- The melter configuration would change from one high-level waste (HLW) melter and three low-activity waste (LAW) melters to two HLW and two LAW melters.
- The permit would include detailed designs for the HLW melters.
- The permit would include secondary containment calculations for the pretreatment facility.

### ***What does this permit modification change?***

U.S. Department of Energy (USDOE) first applied for this permit modification in 2004 and held a public comment period from March 31 to June 1. As a result of those public comments, Ecology determined the change was significant enough to reclassify the modification to a "Class 3." In a Class 3 modification, Ecology issues a draft permit for public review and comment. The changes in Ecology's draft permit are below:

**Melter configuration** - The current permit authorizes construction of three LAW melters and one HLW melter. The draft permit changes the melter configuration to two LAW melters and two HLW melters, and is referred to as the 2+2 permit modification. The LAW building originally was to have three melters. Each melter was expected to make 10 metric tons of glass per day for a total of 30 metric tons. Recent pilot testing for the LAW melters proved that two melters will be able to make at least 30 metric tons of glass per day. At the same time USDOE wants to increase the output of the HLW building and is adding a second HLW melter.

**Melter design** - The current permit has a general description of the HLW melter design. The draft permit adds detailed design drawings and engineering specifications for the HLW melters.

**Pretreatment Facility secondary containment** - The draft permit adds details for secondary containment for the radioactive liquid waste system in the Pretreatment Facility. The details are for flooding volume scenarios and calculations, sump data, and to address findings from the Independent, Qualified, Registered Professional Engineer review.

### ***Attend the public hearing***

Ecology will hold a public hearing Thursday, November 9, 2006, at the Nuclear Waste Program office, 3100 Port of Benton Blvd, Richland, WA 99354.

At 7:00 p.m, Ecology will give a presentation and be available to answer questions. The formal public hearing will follow. During the hearing you can submit official spoken or written comments. Please contact Madeleine Brown at 509-372-7936 for more information.

Send written comments to:  
Brenda Becker-Khaleel  
Washington State Department of Ecology  
3100 Port of Benton Blvd.  
Richland, WA 99354  
509-372-7971 fax  
bbec461@ecy.wa.gov

### ***RCRA Permit Modifications***

The Department of Energy transmitted Class 1 modifications to the Hanford Facility Resource Conservation and Recovery Act (RCRA) Permit for the period through September 30, 2006, to State of Washington, Department of Ecology (Ecology). Pursuant to WAC 173-303-830(4)(a)(i)(B), the Permittees of the Hanford Facility RCRA Permit are providing notice. Hanford Facility RCRA Permit Condition I.C.3, allows for quarterly notification of Class 1 modifications to be made to Ecology. Contact Greta Davis, Ecology on 509-372-7894 for further information about the Class 1 modifications.

# Hanford Update

The Hanford Update newsletter provides general information about Tri-Party Agreement cleanup and compliance activities. The newsletter also contains information on public meetings, workshops, and other opportunities to participate in Hanford Site decisions. The newsletter is available on the Internet at [www.hanford.gov/tpa/updates.html](http://www.hanford.gov/tpa/updates.html).

## Hanford Happenings

### Public Hearing

**Thursday, November 9, 2006**

2+2 Melter Configuration Permit Modification: Waste Treatment Plant  
7 p.m. Ecology presentations and question/answer, public hearing will follow.  
Contact Madeleine Brown 509-372-7936.

### Spokane State of the Site meeting

**Tuesday, November 14, 2006**

Red Lion Hotel at the Park, 303 W. North River Dr., Spokane, WA  
6 p.m. Booths, displays, information, 7 - 9 p.m. Town Hall discussion.  
Contact Sharon Braswell 509-376-8503.



**Hanford Cleanup Line: 800-321-2008**

**Fall 2006**



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