Heart of America Northwest
The Public's Voice for Hanford Cleanup
1314 NE 56th St Suite 100 - Seattle, Wa 98105
Voice: (206)382-1014 - Fax: (206)382-1148 - http://www.hoanw.org

January, 2006

Hanford's High-Level Waste Vitrification Plant Risks and Costs are Unacceptable

USDOE Has Failed All Management Reforms Needed, Including Repeated Warnings to Stop Use of Design – Build Contracting
(Where the plant is under construction before being adequately designed and permitted)**.**

Funding For Construction Should Be Discontinued Until: New Management; Independent Safety Regulation; A Proof of Concept Pilot Plant; Design is Validated; Lower Risk and Higher Throughput Vitrification Technologies Are Incorporated.

At least 67 of Hanford's older High-Level Nuclear Waste Single Shell Tanks have leaked over a million gallons of deadly waste which is spreading towards the Columbia River. The newer Double Shell Tanks have begun corroding as well.[i] USDOE and the Bush Administration continue to consider abandoning 10% of the 53 million gallons of Hanford's High-Level Nuclear Wastes in the bottom of the tanks and USDOE has NO plan to cleanup the leaked wastes. USDOE continues to try to overturn in court the provisions of the state's Cleanup Priority Act (passed as Initiative 297 with the highest vote total in state history) which require tanks to be emptied and leaks cleaned up to the extent practicable.[ii]

Hanford's High-Level Nuclear Wastes must be retrieved from tanks and turned into a stable glass (vitrified) – this fundamental concept has widespread support. Vitrification of 53 million gallons of High-level Nuclear Wastes and properly closing the tanks is an unprecedented technological effort with costs which are expected to exceed $50 billion and take another three decades[iii]. There is tremendous political pressure to throw money into the effort under a contract that calls for $690 million a year to Bechtel National Inc. for design and construction, and a couple of billion dollars more for "supplemental" treatment. The contract for that first vitrification plant complex was supposed to cost $4.3 Billion with full scale operations treating real wastes in 2011.

The cost has skyrocketed – again – and, is likely to reach $9 Billion, with hot operations for 2/3rds of the plant delayed four to seven years. A time-out to

consider better options to vitrify waste faster, at lower risk and lower cost; and, to have validated designs before resuming construction – would be wise.

However, there is little uniform agreement about anything regarding the waste retrieval, tank closure and vitrification – despite political and economically motivated claims to keep funds flowing. For instance, in pursuit of its efforts to reduce the amount of waste requiring vitrification or treatment, USDOE continues to consider leaving up to 10% of wastes in tanks as residues, which would include up to 50 million Curies (25%) of the radioactivity in the tanks.[iv] USDOE has pursued efforts to rename (reclassify) such High-Level Nuclear Waste residue in tanks to be called "incidental" waste allowing it to be abandoned in place – without attempting to meet legal requirements to retrieve 99% or the limit of technology for retrieval.

The cost of the Vitrification Plant went from $4.3 Billion in December, 2000 to $5.78 Billion in 2004, and is now acknowledged to be likely to increase from $5.78 Billion[v] to between $8.34 and $9.6 Billion, and startup of key portions delayed four to seven years. The Army Corps of Engineers recently reviewed Bechtel National Inc's (the contractor building the Hanford Waste Vitrification Plant, or HWVP) formal estimated cost and schedule for completion and found them to be without any reliability, and found mismanagement problems. This echoes other findings of mismanagement and ignoring technical problems issued by GAO, the National Research Council (NAS) and others, discussed below.

Safety studies, discussed in this memo, show there is a ***1 in 2 chance*** of a major nuclear / chemical accident with release if the plant is allowed to be constructed and operated as planned. Many of these safety problems were known in 1999/2000 and were ignored until costs and safety disclosures forced a halt to construction in the face of budget cuts.

This report summarizes key studies on USDOE's failure to implement contract and management reforms issued by the GAO, National Research Council, Hanford Advisory Board, Heart of America Northwest, and others which have led to the predicted massive cost overruns, lack of a plan to efficiently utilize technology to treat wastes, and the potential for catastrophic safety problems. We briefly describe the risks which were known, but ignored by USDOE management and Bechtel until after well over a billion dollars was spent on construction. The report discusses the lack of independent safety regulation which – coupled with a lack of management control – threatens to create not only a plant which might not work, but one with unacceptable safety risks. We then present our recommendations which start with a dose of medicine of suspending funding for construction until a cure is in place.

The long overdue Tank Closure Environmental Impact Statement and a Tri-Party Agreement milestone calling for a report in June, 2006 on the options for completing vitrification of the lower activity (ILAW) High-Level Wastes offer the opportunities to consider the alternatives presented in this report as well as curing the safety problems and cost overruns. Construction must stop until the alternatives that may allow more waste to be treated with greater reliability, safety and lower cost are considered, and validated designs with independent safety oversight and cost controls are in place. Pouring $690 million a year into construction of a plant that has no design, no validated costs and no external safety regulation is enabling an addict to continue on a self destructive course. USDOE's current proposed scope and alternatives for the environmental impact statement fail to consider meaningful (and legally compliant) alternatives and the safety risks from USDOE's plans.The National Environmental Policy Act (NEPA) requires that these be considered, and we expect the public will join us in rejecting any EIS that fails to consider these issues as inadequate.

What is the Vitrification Plant?

There are four fundamental components of the Hanford Waste Vitrification Plant (HWVP) under construction – driven largely by USDOE decisions to reduce the amount of vitrified glass that would be sent to Yucca Mt, Nevada[vi]:

1. **Pretreatment Plant** to ***separate*** out very **High Activity Waste (HAW, or High-Level Waste; HLW**) from the greater volume of soluble wastes. This plant is affected by the seismic, nuclear and chemical safety concerns that were ignored by USDOE and Bechtel.
2. **High Activity Waste Vitrification Plant** to vitrify the 20% of volume, which will have 90% of radioactivity, into glass logs that would be slated to go to a deep underground geologic repository – presumably, in USDOE's plans, Yucca Mt. This plant is now affected by the seismic, nuclear and chemical safety concerns that were ignored by USDOE and Bechtel.
3. **Low Activity Waste (LAW) Vitrification Plant** which will take 40-60% of the volume and turn it into glass blocks that would be disposed forever in Hanford's soil in a new landfill. This plant was not sized big enough to do all 80% of LAW waste by 2028, which is the TPA deadline. Thus, USDOE embarked on an effort to displace the need for a second LAW vitrification plant, which it refers to as "supplemental technology". The LAW Plant is not affected by the seismic and chemical safety issues that have halted construction at the Pretreatment and High-Activity Waste plants.
4. **"Supplemental Technology"** – USDOE's name to find an alternative to building a second LAW vitrification plant. This is now focused on a technique called **"bulk vitrification"** under a contract with a company named AMEC. USDOE has failed to disclose to Congress the massive cost overruns on this project.

July 2005 Photo of Hanford High-Level Waste Vitrification Plant facilities (USDOE)

Example - Mismanagement and cost overruns for the bulk vitrification project:

Bulk Vitrification was promised to be a two year research project demonstrating the capability of a mobile system not requiring any containment buildings for vitrifying massive amounts of tank waste in a shipping container sized metal box. The initial presentation was that this would cost only $30 million for two years to produce 50 boxes of waste from Tank S-109 – with goals to show the technique could work and test to see if the glass would immobilize the waste as well as the glass from HWVP. This grew to $40 million, and then to an RFP at $60 million. This spring we forced USDOE to disclose that the total project cost had grown to $102 million (exclusive of decommissioning). This was of great concern last spring, since this growing cost was disclosed at the same time that USDOE proposed massive cuts in funding for other cleanup work. Our concern was necessary and higher priority work would be deferred or dropped - or, that far greater waste treatment benefit with greater certainty could be achieved by putting that $102 million to work as a third melter for LAW – which would enable LAW to meet or come close to meeting the 2028 TPA deadline.

The new cost estimate has now grown to a total project cost of $154 million, $97 million for construction alone. [vii] This is just for the demonstration pilot plant. A full scale production facility(ies) for bulk vitrification for 40-60% of tank waste volume will clearly cost as much as a second LAW facility, having drained the funds which could have paid to install a third melter in the current LAW facility.

USDOE has never disclosed the five fold cost increase to Congress, despite our having urged this repeatedly and warning that failure to do so violated Appropriations Committee rules and applicable laws.[viii] Nor has the long-term total project cost been disclosed if bulk vitrification is used to displace LAW vitrification.

USDOE has represented that Bulk Vitrification is "Needed to Meet Mission Requirements" to provide treatment for 40-60% of the High-Level Waste LAW volume.[ix] This is not accurate. As this report shows, if a third melter was installed now in the LAW Vitrification Plant, an additional 20% of the waste would be treated by 2028 – without the expenditure and risk of bulk vitrification. That would still leave 20-40% of the waste requiring "supplemental" treatment – either via bulk vitrification or in a second LAW treatment plant. USDOE has led many to believe that some tanks could be completely emptied using bulk vitrification, creating a potential to have the environmental benefit of emptying tanks sooner than waiting for LAW vitrification – this is not accurate. Supernatant and sludge from tanks must still be retrieved and treated via vitrification in HWVP. Thus, there is no saving from using multiple Bulk Vitrification facilities (which have not

containment) to avoid the retrieval and piping of waste from the tanks to the HWVP.

Bulk Vitrification will not be available to start up for the first tank (S-109) research and demonstration project until late 2007. Initially, the retrieval and demonstration for waste from this tank was to be underway already in 2005. Thus, bulk vitrification will not offer a means to speed removal of waste from multiple Single Shell Tanks faster than it will be possible to have LAW vitrification operating – if LAW vitrification (unaffected by the seismic and hydrogen gas safety issues, according to USDOE) proceeds on schedule. The biggest threat to LAW vitrification may be the diversion of funds to bulk vitrification – which has a high likelihood of being a "dry hole" incapable of safely producing glass with as high quality for long-term leachability and without producing secondary wastes requiring burial that result in groundwater contamination.

USDOE's Mismanagement of the High-Level Waste Retrieval and Vitrification Program is Legendary.

The initial commitment made in the Hanford Clean-Up Agreement was to have a vitrification plant operating in 1998. USDOE unilaterally dropped that and embarked on a disastrous "privatization" experiment at the urging of Senator Slade Gorton and Congressman Doc Hastings. Under privatization, USDOE contracted with British Nuclear Fuels (BNFL) to design and build the vitrification plants. Privatization was abandoned in 1999, and BNFL's contract terminated when BNFL reported its total cost (including massive financing costs and profits) would be $15 Billion. This even exceeded the warnings by GAO and Heart of America Northwest in invited testimony opposing the privatization scheme to the U.S. House Commerce Committee Subcommittee on Investigations and Oversight – which predicted that BNFL's privatization contract costs would be more than double a government fair cost estimate. USDOE turned over BNFL's design to the new contract winner, Bechtel under a "fast track", "design-build" contract in December, 2000.

USDOE claimed to Congress and the public that its new approach to vitrification and Hanford's High-Level Nuclear Wastes, part of a national plan for "accelerated cleanup" would save $20 Billion.

> In January, 2004, we wrote:
>
> USDOE continues to claim that the Hanford Performance Management Plan will result in "$20 billion in savings" by abandoning vitrification for a new baseline that renames waste or employs other technologies to avoid vitrification for 60% of the Low Activity Waste ("LAW") in the High-Level Nuclear Waste tanks. The basis of the claimed $20 billion in savings, however, is from comparing speculative and unvalidated cost estimates for new alternative treatment technologies with a discredited and never seriously entertained 1995 USDOE plan to abandon the entire first phase vitrification plants after only a few years of use, and build whole new High-Activity, Low Activity and Pretreatment vitrification plants from scratch.

The GAO has written Congress summarizing USDOE's mismanagement of the cleanup program as follows:

> ***"since 1990, we have designated DOE's contract management—broadly defined to include contract administration and project management—as a high-risk area for fraud, waste, abuse, and mismanagement because of the department's history of inadequate management and oversight and failure to hold its contractors accountable."***[x]

USDOE has repeatedly ignored the recommendations in GAO reports to correct massive mismanagement. GAO repeatedly urged USDOE to stop using design-build contracts for highly technical projects involving high risk. These are contracts where construction is allowed to proceed while design is underway – even before permitting has can occur. Typically, design of a major project must be 80% complete to enter the environmental permitting process, and in order to have a cost estimate with a reasonable level of certainty (90%). GAO (and HoA and the Hanford Advisory Board) have repeatedly criticized USDOE for continuing to use design build contracts on projects with high technical uncertainty regarding technology performance and first of a kind projects. Yet, USDOE went and followed the same highly criticized path in 2004 for the bulk vitrification plant project despite the criticism from GAO on the main Hanford Vitrification Plant.

In June, 2004, the US Government Accountability Office (GAO) summarized the mismanagement and failure to heed prior advice in a major report to Congress on the Vitrification Plant and USDOE's planning for Hanford's High-Level Nuclear Wastes. GAO was especially critical of USDOE's use of "fast-track" "design-build" for the untested technological challenges of the most complex nuclear technology construction project in American history:

> In the short term, however, several factors, including the accelerated approach and contractor performance problems, have lengthened construction time and raised contract costs by $1.4 billion to $5.7 billion. Because of long-standing problems that preceded Hanford's contract, DOE has instituted reforms in both contract and project management. DOE's 2000 Hanford contract implemented the contract performance reforms, including linking contractor fees to cost and schedule performance. The contract did not, however, implement project management reforms, such as an overall plan to accomplish waste treatment by the regulatory deadline. Not implementing project management reforms at the outset has added to the risks in cleaning up Hanford's tank waste. First, to start quickly, DOE committed to a "fast-track" process in which design, technology development, and construction are performed concurrently on different aspects of the project. For projects of Hanford's complexity, this approach is not compatible with controlling costs and schedules. Second, DOE has delayed completing analyses needed to determine the most cost-effective approach to waste separation and may have missed savings opportunities of at least $50 million a year. Third, DOE has not adequately defined or communicated the potential effects of a legal challenge to its overall plan for minimizing how much high-level waste is disposed of in an underground repository.[xi]

GAO found that fast-track meant, for example, that wall construction outpaced design. This has now led to suspension of construction on the High Activity and Pretreatment Plants to resolve the seismic design and hydrogen gas safety upgrades which were known to be necessary over five years ago. But, of equally high significance, this approach has led to a failure to:

a) have a validated design that can accomplish the mission with costs that can be independently validated; and;
b) incorporate available technologies and design that can accomplish the mission with lower cost, greater reliability and solving many of the safety problems.

GAO explained:

> *Using a fast-track management approach*. DOE has committed to a "fast-track" process in which many design, technology development, and construction activities are performed simultaneously, thereby significantly increasing the risk of cost increases and schedule delays as
>
> the construction project progresses. .... In addition, efforts to resolve key technical challenges, including incorporating alternative treatment technologies, continue to fall behind and threaten to affect the overall project's baseline.[xii]

Lower Cost, Safer and More Reliable Alternatives Have Been Ignored –
A "Time-Out" is Needed to Consider Them in the Tank Closure Environmental Impact Statement and Get off the Design-Build Train Wreck:

Two failures stand out to consider and utilize alternative treatment paths which could increase reliability, and result in a treatment system which would be more likely to meet the goal of treating all 53 million gallons of waste by 2028.

First, USDOE refused to heed repeated advice that it upgrade the design of thoughput for pretreatment to allow for a third melter in the LAW Vitrification Plant. In response to repeated urgings that this be considered, USDOE cited the cost – then that the construction was too far along to incorporate and fully utilize a third LAW melter. Thus, design-build fast track was cited as the reason for not being able to create a more reliable system with greater treatment capcity. The cost was pegged to the Hanford Advisory Board and Heart of America Northwest in repeated communications as $75 million if installed at the outset, and then $125 million if installed later. ***Remember, the LAW vitrification plant, with two melters, is now designed to only handle 40—60% of the LAW portion of the waste by 2035.***

Even if not fully utilized, the third melter would dramatically increase the *capacity*, *reliability*, and *capacity factor* – the percent of time and capacity at which the plant is operated. This would reduce the size and cost for "supplemental" treatment or a second LAW vitrification plant – and enable the completion of treatment of all tank wastes by 2032, and likely by the TPA deadline of 2028 (the High-Activity Waste being the portion that prevents completion by 2028 if there is a LAW Plant with three melters operating starting in 2011).

Simply put, USDOE refuses to take a systems approach to the mission of treating all tank wastes by 2028. Indeed, not one alternative that USDOE is considering in its long-delayed EIS is compliant with the TPA deadline of 2028.

In June, 2005, the Hanford Advisory Board criticized USDOE for failing to consider even one alternative in the upcoming "Tank Closure Environmental Impact Statement" (EIS) which would be compliant with the TPA: retrieve at least 99% of all tank wastes and vitrify the wastes by 2028. In none of the alternatives does USDOE attempt to cleanup all the contamination and leaks before calling the tanks "closed" (USDOE proposes to act as if the area of the tanks and leaks are "landfills").[xiii]

> The Board wishes to register its strong concern that no alternative in the scope of the EIS is compliant with the Tri-Party Agreement (TPA). DOE-ORP's proposed suite of alternatives includes only one alternative that meets the TPA treatment standard of vitrifying all the wastes (after retrieval of 99% or better). All other alternatives in the EIS use additional treatment technologies and/or are not based on retrieving and treating all wastes by 2028. The Board advises DOE-ORP that the EIS should analyze at least one alternative that complies with the TPA requirements for treatment and removal of tank wastes by 2028.[xiv]

USDOE proposes to study adopting an alternative plan that completes treatment in 2034 only if leaks are not cleaned up, and much of the High-Level Wastes are not treated and glassified, but are, instead, renamed Transuranic waste to be disposed in New Mexico. New Mexico has made clear that it will not revise its laws and permits to allow this. Hence, some of the GAO's criticism for USDOE continuing to make plans assuming that laws

and standards will change and that lawsuits will not be filed to block actions that violate those permits.

USDOE's says it has one alternative to meet the TPA deadline of 2028. This alternative, however, is for vitrification with "supplemental treatment" (bulk vitrification) for only 90% of the tank wastes. USDOE's "compliant" alternative is based on leaving 10% of the waste untreated and no cleanup of leaks.[xv] Of course, that is not "completing the mission" or compliant.

USDOE forecast that an alternative with the current Vitrification Complex under construction plus one additional Low Activity Vitrification (LAW) plant with 3 melters would complete treatment in 2038 – ten years late. USDOE refuses to consider any alternative which adds the third melter to the plant currently under construction. However, if it were added, it would dramatically increase capacity and reliability (even though the capacity of the pretreatment plant is limited due to construction while design was not completed). With a second LAW vitrification plant then of two or three melters, the entire mission could be completed in 2028 – if the High Activity Vitrification Plant were capable of being started without four to seven years of delay. Under our proposal, LAW no longer is the "long pole in the tent".

USDOE did not disclose to the State and Hanford Advisory Board that, in April and May, 2005, it directed that all of its analyses stop assuming that any portion of the Vitrification Plant can operate sooner than 2013: "a slip of 4 years as directed by ORP." Documents leaked to us include an April 21 directive and revision log for alternatives to be presented in the EIS. A plan to delay hot start would directly violate the Hanford Clean-Up Agreement (TPA). Instead of admitting this directive, USDOE has continued to present that it is planning for hot start of LAW vitrification in 2011, and did not acknowledge the delay for HLW and pretreatment until the Army Corps' report began to be leaked out. A four year delay in start up, under USDOE's plans, results in at least four year delays for completion of treatment.

The significance of USDOE's plans to delay hot start includes not only the USDOE's expected delay in completing the work, but the fact that use of design time to consider and plan for a higher throughput system with greater vitrification capacity, greater reliability and independent safety oversight is possible. And, if a time out in construction were wisely used to have such a system with greater capacity and reliability, ALL the tank wastes could actually be vitrified faster than under USDOE's proposed alternatives!!!

Secondly, USDOE refuses to consider the use of Iron Phosphate glass (FePh) melters instead of its preferred Borosilicate glass. There is little dispute that Iron Phosphate reduces the chemical complexities and separations necessary – greatly reducing system costs, increasing reliability and safety. The biggest

advantage of this alternative, however, is that it allows for much greater throughput and capacity – the limiting factors for throughput are dramatically different. Again, the DOE insistence on limiting the total amount of HAW glass requiring disposal in Yucca Mt or another repository is one explanation for this rejection. Yet, it is increasingly unlikely that Yucca will ever open for any of Hanford's glass – and, even if it does, a major portion of the HAW glass will have to be stored for decades or hundreds of years at Hanford because it will not fit into Yucca under the current license limits.

Installation of a third melter with Iron Phosphate glass formulation would combine to increase reliability and throughput dramatically:

> "(u)se of FeP glass in a three-melter system in the existing LAW facility may cost approximately 10 billion dollars less than building the second LAW vitrification facility that would be required for additional vitrification capacity."[xvi]

Smith and Boldt (2005) found that installing a third LAW melter and use of Iron-Phosphate glass would save several billions of dollars over the life cycle and enable the mission to be completed within the TPA deadline.[xvii]

> New analyses to predict achievable throughput rates for the LAW facility, operating within the heat removal capacity limitations of the current LAW facility design, have shown that using FeP glass in place of BSi glass could increase the facility glass production rate by nearly 15% because of the shorter cooling times for the poured canisters that result from the lower glass operating temperature with FeP glass. [xviii]

Despite the reasonableness of this alternative and the legal requirement to consider reasonable alternatives, USDOE has refused to include this in the scope of the delayed environmental impact statement.

If USDOE continues to construct without waiting for design, results of pilot plant studies, and consideration of alternative configurations with alternative technologies in the never issued Tank Closure Environmental Impact Statement, the opportunity to install a third melter will be entirely missed.

A window is open for consideration: there is a TPA milestone calling for a report by June 30, 2006 on alternative configurations for treatment of tank wastes. USDOE has delayed the Tank Closure EIS and consideration of these alternatives MUST be included to meet the legal requirement of NEPA that all reasonable alternatives be reviewed. Finally, the massive cost overrun coupled with safety delays suspending construction open up a window to stop construction until there has been proper consideration of a safer, more reliable and lower cost system which can treat all the tank wastes. This

time-out, as Boldt and Smith's analyses show – may actually be what is needed to complete the mission of retrieving and treating tank wastes by 2028 --- while rushing ahead and continuing to construct on a design-build basis will lock in a set of USDOE plans that take far longer at much greater cost!

USDOE's Cost Claims Have No Validity:

In 2004 and 2005, the US Government Accountability Office (GAO) issued formal reports finding that USDOE had no basis for cost savings claims made to Congress and the public that DOE's "accelerated cleanup program", which had a goal of reducing the amount of waste to be vitrified:

> USDOE's plans, said the GAO, are "predicated on a key legal assumption (being able to rename High-Level Nuclear Waste) that has been successfully challenged in court." Nuclear Waste: Absence of Key Management Reforms on Hanford's Cleanup Project Adds to Challenges of Achieving Cost and Schedule Goals.GAO-04-611, June 9, 2004.

"Nearly All of the Cost Reductions Were to Occur at Three Sites Where DOE Is Having Significant Technical, Regulatory, or Management Challenges"...
NUCLEAR WASTE: Better Performance Reporting Needed to Assess DOE's Ability to Achieve the Goals of the Accelerated Cleanup Program; GAO-05-764, July, 2005.[xix]

> "The activities and projects for which DOE was falling behind the accelerated schedule involve technically complex and costly cleanup activities, and usually require specialized treatment technologies.
>
> "Radioactive tank waste, for example, involves treating highly radioactive waste generated from the reprocessing of reactor fuel that contains a mix of hazardous and radioactive constituents, and requires relatively complex treatment technologies such as waste separation and vitrification.
>
> "Cleaning up radioactive tank waste accounts for about 30 percent—or almost $40 billion—of DOE's estimated total cleanup costs. To date, key facilities DOE needs to use to treat and dispose of this waste are still being designed and built, and waste treatment technologies continue to be developed and tested." Id at 18.

> "For example, the Hanford Site must construct key facilities and test complex technologies before it can treat 55 million gallons of radioactive tank waste. Recently, work on this project has been delayed due to engineering and contractor performance problems, leading DOE to reevaluate its ability to complete the project under current cost and schedule constraints. DOE expects to revise project cost and schedule goals in fiscal year 2006." Id at 19.

Cost and Schedule for the Vitrification Plant Continue to Spiral Out of Control:

The Government's Fair Cost Estimate for design, construction and hot start of the HWVP complex was $4.1 Billion in September, 2000. Bechtel's Offer, as the contract was awarded in December, 2000, was $4.3 billion (including fee and contingency).

In March 2003, with Bechtel saying that 40% of design was complete, Bechtel updated the cost to complete to be $5.4 Billion.

In March, 2004, USDOE revised its baseline and cost to complete, and informed Congress, that the cost had risen to $5.8 billion – after increasing contingency above that identified by Bechtel. This figure was greeted with more than a bit of sticker shock in the press and in Congress. 55% of design and 22% of construction were claimed to have been completed.[xx] Yet, it was criticized immediately as not representing an accurate, reliable cost due to failure to incorporate known design changes and resolution of safety issues.

USDOE required Bechtel to provide a revised, validated Estimate at Completion (EAC) cost estimate. This was due in March, 2005 and provided in April. Such a validated cost should be available for a project with 30% of its construction said to be completed with a confidence level exceeding 85%.

Bechtel was told by USDOE to produce two cost and schedule estimates[xxi]:

> Scenario A) "unconstrained funding" – no limit to Congresssional Appropriation for any year and six months of schedule contingency until hot operations start (with real radioactive waste). Total Cost: $8.065 Billion;
>
> Scenario B) funding limited to the contractual amount of $690 million per year – with Bechtel continuing to be able to use holdover funds from prior years until they are exhausted. Again, the scenario was to be presented with only a six month contingency. Total Cost: $8.348 Billion.

Thus, Bechtel now forecasts costs DOUBLING from the Government Fair Cost Estimate of $4.1 Billion, and nearly doubling from its own contract offer of $4.3 Billion. Under the two scenarios, hot operations are delayed between four and seven years --- the cost of this delay to the entire system for treating wastes is not considered. Nor is there any consideration of increased risks

When GAO issued its July, 2005 report critical of the management and cautioning that additional cost increases might be expected, USDOE was refusing to make available the Army Corps of Engineers' review of the cost

and schedule "Estimate at Completion" of the Hanford Waste Vitrification Plant design and construction contractor, Bechtel National Inc. (BNI). GAO and the public were also not given access to the Bechtel cost and schedule estimate in July, 2005. The Army Corps report released to the public in December, 2005 is heavily redacted, but many key conclusions are disclosed.

We now know that the BNI cost and schedule estimates have NO reliability. That is to say that no percentage for reliability can be placed on either the cost or schedule. It is more likely that one will be right guessing about the cost by flipping a coin than relying on BNI's cost estimate.

The Army Corps review of the Bechtel National cost estimates ($8 to $8.3 Billion) found:

> ***"There is a concern, however, that the 2005 EAC has not fully estimated potential cost growth."***[xxii]

The Army Corps' review of Bechtel's EAC found that 3.5 million *more* engineering hours were estimated to be required than in the contractor's prior estimate – an astounding figure for a project that was supposed to be significantly designed and for which USDOE claimed that 55% of design and 35% of construction and concrete were complete.[xxiii]

Key findings regarding contract oversight by USDOE and Bechtel management were blacked out in the version of the Army Corps report provided to us as members of the Hanford Advisory Board (however, these were obtained by media).

While blacking out the criticism of Bechtel's management, the Army Corps Report clearly shows that USDOE and Bechtel have an expectation to renegotiate the contract with a minimum of approximately a quarter billion dollars of profit (fee) payments to be available to Bechtel, and up to $425 million – under the scenarios where hot operations are delayed until 2015 or 2018.[xxiv] Thus, again the GAO Recommendations that contracts hold the contractor accountable for schedule and cost commitments in the contract would be thrown out and Bechtel rewarded with a whole new set of massive profit payments.[xxv]

The Army Corps found:

> ***"the current contract does not include sufficient incentive for BNI to control cost and schedule"***[xxvi]

The cure is not to renegotiate to provide more fee, but to have a contract, per the GAO advice, that has strong incentives and penalties for both cost

and schedule performance – which can not be based on an approach of ignoring the failures under the first five years of this contract.

In its March, 2005 Report on USDOE's failure to follow its own contract reforms and recommendations from prior GAO reports, the GAO found: *"DOE has relied on unvalidated contractor data to monitor contractors' progress."* [xxvii]This is due to USDOE not having adequate trained contract oversight personnel and abandoning requirements for independent validations of cost and schedule by outside expert organizations for each major project.

Safety: Ignored and Lacking the External Regulation Needed for Credibility

Seismic (earthquake) safety design standards, hydrogen gas explosion and chemical safety analyses for the Vitrification Plant were understood to have been inadequate in the late 1990's. Concerns were officially raised to USDOE within the first year of BNI's contract in 2001 – as Bechtel continued to proceed based on the criticized BNFL designs. The risks remain – subject only to USDOE self-regulation - without any independent regulation, and without disclosure and discussion of what standards should apply.

Study finds inconsistencies in vit plant safety procedure

Published Friday, December 16th, 2005 Tri-City Herald

By Annette Cary, Herald staff writer

Quality problems in the construction of Hanford's vitrification plant can be traced to weaknesses in the nuclear safety culture on the project, according to a Department of Energy analysis.

Contractor Bechtel National has not had a consistent "culture that placed equal value on reliable production and operational safety," the new report said.

Bechtel loses $500,000 for quality issues

Published Friday, December 23rd, 2005 Tri-City Herald

By Annette Cary, Herald staff writer

The Department of Energy will withhold $500,000 from Bechtel National's incentive fee for quality problems in the construction of Hanford's vitrification plant.

Roy Schepens, manager of Hanford's DOE Office of River Protection, notified Bechtel on Thursday of his decision, following last week's completion of an analysis of quality problems. The analysis traced problems to weaknesses in the nuclear safety culture on the construction project.

"The seriousness of this system failure mandates that it must be addressed and corrected immediately," Schepens wrote in a letter to Bechtel National.

Withholding $500,000 out of $225 million in fees that Bechtel and the Army Corps still estimate available to Bechtel – not a fine – is the smallest step in the face of massive criticism over the lack of independent safety regulation and the lack of a safety first culture in the fast-track, design-build contract. In fact, withholding fee is somewhat of a joke since it may be restored for other purposes... and, it ignores the fact that the contract is so far behind that the entire fee structure will have to be renegotiated (SEE Army Corps Report).

USDOE-Office of River Protection promised the public it would fully enable an independent Safety Office to regulate safety at the vitrification plant for design, construction and operation. The Office filed quarterly reports offering public transparency into its concerns about design and safety. Then, USDOE-ORP quietly shelved the Office. The Nuclear Regulatory Commission (NRC) was publicly touted by DOE to have a role overseeing safety, which ended after it issued its critical report (discussed below). The Defense Nuclear Facilities Safety Board (DNFSB) has issued numerous recommendations for safety – which went unresolved and ignored for several years after it began to have a role in 2001. Finally, a confrontational and funding crisis in 2005 forced USDOE to stop ignoring the seismic and hydrogen gas that were warned about since 1998. USDOE suspended construction, except to higher design standards, until seismic design and testing caught up. The DNFSB however, is not the same as an independent regulator. USDOE can refuse to follow recommendations. It offers no protection for whistleblowers, and no resident safety inspectors and no ability to fine contractors for cutting corners.

In October, 2005, the DNFSB wrote USDOE that USDOE had not responded in a timely manner to the numerous safety issues that DNFSB had raised, and made clear that there remained a difference in approach[xxviii]: DNFSB is seeking to have a design that would allow operations of the $5.8 billion (now maybe $9 billion) plant to resume after a serious earthquake or accident; whereas, USDOE and Bechtel are designing a plant merely to have risks controlled to be what BNI and USDOE decide is acceptable and not have a plant that could be cleaned and restarted:

> "the Board believes that a conservatively designed Waste Treatment Plant (WTP) that will remain operable following any natural phenomenon hazard is essential to the treatment and disposal of this waste."

USDOE and Bechtel assume that consequences of major accidents are mitigated by following plans (e.g., evacuation and "interdiction" of crops) that do not exist or are unlikely to protect workers and the public from an accident.

"The accident consequences at Hanford's Waste Treatment Plant are comparable to those accidents at a large nuclear reactor," stated Bob Alvarez, former Senior Environmental Policy Advisory to Energy Secretary Richardson in summarizing the Nuclear Regulatory Commission's review of the safety at the Vitrification Plant and lack of independent regulation.[xxix]

> After three and a half years of involvement at Hanford, NRC found in 2001 that DOE contractors consistently downplayed the severity of potential accidents.
> NRC estimated that the overall unmitigated risk of major radiological

> and chemical accidents at Hanford's high-level waste operations was 2.4E-2/yr,
> translating into a 50-50 chance over an estimated 28 years of operation of the
> facility. According to NRC more than two-dozen significant safety issues and 50 specific topics remained unresolved.
>
> Existing engineering controls and administrative methods can reduce accident
> risks at the Hanford Waste Treatment Plant to acceptable levels, with
> the possible exception of glass melters, designed to mix radioactive wastes with
> molten glass. They will be the largest in the world and pose potentially the most
> severe accident consequences. NRC found that further analysis was required to determine if melter risks could be reduced to levels acceptable for reactor accidents. But, NRC warned that "few tests appear to be planned to verify safety
> parameters prior to construction."[xxx]

These risks were well known four years before USDOE finally ordered a halt to construction for engineering to address the chemical and seismic safety issues. Indeed, Alvarez warned Washington State officials of these risks to no avail for several years – with Ecology typically responding that it had no nuclear safety oversight role and was unwilling to consider chemical and hazardous waste safety issues from processing in its hazardous waste permitting role. NRC involvement in safety oversight ended in 2001 – while Bechtel continued to be able to select which safety requirements should be applicable without any independent regulation.[xxxi]

The requirement to upgrade design to withstand a greater seismic risk or to ascertain if the degree of earth movement would be higher than the current design basis has drawn the most attention following DNFSB concerns that led to the suspension of some construction in 2005.

The DNFSB reports that the seismic basis for the plant – based on California ground motion studies and not considering the potential ground movement in Hanford's loose glacial soil layers - was no longer considered reliable in the late 1990's. By 2001, shortly after the DNFSB began to have a safety role for the HWVP, DNFSB was concerned that this was being ignored and the design and construction were being allowed to proceed on what was understood to be an inadequate technical basis.[xxxii] USDOE did not act until 2005.

In regard to chemical / hazardous waste safety issues, the DNFSB also found that USDOE had not responded to known risks in a timely manner – this is an area where Washington Ecology has failed to act despite full authority

under federal and state hazardous waste laws and Ecology's permit authority over the plant as a hazardous waste treatment facility:

> **Chemical Process Safety.** Three issues related to chemical process safety need to be addressed: hydrogen generation rate estimates, hydrogen in pipes and ancillary vessels, and pulse jet mixing of non-Newtonian fluids.
>
> Hydrogen Generation Rate-In its letter of November 4**,** 2002, the Board informed DOE of its concerns regarding the hydrogen generation rate estimates being used to design WTP hydrogen mitigation systems. These concerns were based on BNI's use of the generation rate for the Hanford Tank Farms as the WTP design basis.[xxxiii]

The jury is still out on other major hydrogen gas explosion related risks, while USDOE and BNI continue to move ahead with design and construction – and without any public or regulatory debate about what USDOE may view as "acceptable risks" (USDOE's views greatly exceed the standards for cancer risk and hazardous materials exposure under state and federal laws[xxxiv]):

> "The Board's preliminary review indicates that BNI has developed some engineering solutions that will successfully prevent hydrogen-related accident scenarios. The exception appears to be BNI's desire to accept the risk associated with hydrogen deflagrations and detonations when a component failure would not adversely impact the public, collocated and facility workers, or other safety-class and safety-significant systems. If this is BNI's strategy, the Board expects that DOE will demonstrate that the likelihood of these accidents is extremely remote and that the public and collocated and facility workers will be protected. Additionally, the design needs to meet all applicable codes and standards and minimize the potential impact on WTP safety related systems and site risk reduction objectives (e.g., timely treatment of tank waste).
>
> "The Board recognizes that DOE has just begun its review of BNI's strategy for dealing with these hydrogen-related issues and has not approved the final hydrogen mitigation design criteria or the final design. The Board believes DOE must not rush its evaluations of BNI's proposals and must demand a full understanding of the potential impacts of this design approach....
> "DOE also needs to consider the entire spectrum of risk associated with these types of accidents (e.g., safety and mission risk) before approving a design with any inherent weaknesses. The Board believes this will be a difficult undertaking."[xxxv]

The DNFSB's call to take the time to consider these risks fits well with our recommendations that these risks and designs be subject to true independent external safety regulation – subject to meeting risk standards from other applicable laws, not USDOE's idea of "acceptable risk". These risks and the standards should be fully disclosed and discussed with the public in the Tank Closure EIS – along with a comparison of the lower risks from alternative processes, such as Iron Phosphate melters and less reliance

on high risk technical chemical separations. This is not something for USDOE to decide behind closed doors.

The NRC review of safety issues found that the likelihood of a serious nuclear processing accident is 50-50 over 28 years of operation – which has only drawn attention in the media following release of Alvarez's report with the Government Accountability Project in late 2005. It has drawn no apparent response from Washington Ecology.

NRC has well established rules and procedures for regulating nuclear construction and approval of design and regulation of operations – unlike the DNFSB which performs more of a review function only. NRC and USDOE were negotiating an agreement for NRC oversight under the BNFL contract but terminated this effort in 2001 – after the critical reports by NRC, ostensibly because the USDOE would self-regulate itself instead of having a private contractor operate the facility under the privatization contract with BNFL. However, there is no benefit that the public can see in comparing USDOE's relationship with BNI and its relationship with BNFL when it comes to the risks from self-regulation.

Before termination of NRC's role, the NRC found very high risks and a disregard for external standards defining acceptable likelihood of accidents and acceptable risks from those accidents:

> In its June 2001 report the NRC identified over two dozen significant safety issues and over 50 specific topics in the current design and approach which remained to be resolved.76 "Several scenarios involving large radiochemical inventories (in tanks), flammable gases, organic ion exchange resin interactions,
> glass melters, and cold chemical effects," according to the NRC, "were found to have potential accident consequences to the workers and the public of
> significant severity and risk."77
>
> The NRC found that plant "has more stored chemical energy for prompt potential events directly involving the radionuclides in their mobile forms,"78 and thus, radiological consequences to members of the public could result in doses in the hundreds or thousands of rem.[xxxvi]

For comparison, a dose of 250 to 400 rem is lethal in a short period of time to 50% of all adults exposed, and EPA rules limit radionuclide particulate emissions from facilities to an annual dose of just 10 millirems (.01 rem).

> "In this context, the NRC estimated the total unmitigated risk of major accidents involving large radiation releases, such as a melter steam explosion or a resin fire, at the Hanford vitrification plant was 2.4E-2/yr (annual risk of 2.4 percent).82 This translates into a 50–50 chance of a major accident over 28

years of operation."[xxxvii]

Stop "Enabling Stupidity" – Recommendations for Action:

Stupidity is doing the same thing over and over again and expecting a different result.
Enabling is providing an addict with the means to keep self medicating and denying.
Continuing to provide USDOE and Hanford contractors with $690 million per year for the vitrification plant is enabling stupidity.

We urge the Northwest Congressional Delegation to insist that the full Army Corps report on Bechtel's Estimated Cost and Schedule be provided to the public; and, that the House Energy and Commerce and Senate Energy Committees hold hearings on the costs, safety risks and findings of mismanagement and failure of USDOE to adequately oversee this massive contract.

Suspend funding for construction of the Vitrification Plant HAW and Pre-Treatment plants until:

- design is validated and costs are estimated with reliability
- alternative glass and separations technology and melter configurations that offer greater reliability and the potential to treat more waste sooner at lower cost are reviewed in both a technical forum and the Tank Closure Environmental Impact Statement
    - a third melter should be installed in the LAW Vitrification plant under construction to increase reliability, total capacity and the capacity factor (also referred to as Total Operating Efficiency) and enable more waste to be vitrified by 2028.
    - thorough reviews of Iron Phosphate glass replacing borosilicate glass, and of LAW melter configurations to accomplish the mission of vitrifying all waste by 2028 must be considered.
    - All alternatives in the EIS must consider how to meet the legal requirements to retrieve all wastes; and, to characterize and cleanup, to the extent practicable, the million gallons of wastes which have leaked.
    - USDOE should not assume that it will rename wastes – either as incidental or as transuranic – to avoid treatment. Baselines and plans should consider that all 53 million gallons of tank wastes will be vitrified.
- Independent safety regulation is established with public input on appropriate safety standards to be applied
- management and contract reforms are instituted
    - do not renegotiate Bechtel's contract to provide new profit payments (proposed at $225-$25 million) in disregard of the "reform" which was supposed to hold Bechtel fee accountable for both cost and schedule performance.

    - Congressional scrutiny of the fee negotiation with BNFL for its terminated contract.
- Suspension of construction also applies to the bulk vitrification "supplemental technology", as well as for HWVP
    - require USDOE to report to Congress on the full costs of the bulk vitrification project and the cost overruns since it began to be funded under operations
    - compare the benefit of using those funds for a third LAW melter and Iron Phosphate glass instead of bulk vitrification
    - independent safety regulation of any mobile or uncontained vitrification system.

End Notes and Citations:

[i] Defense Nuclear Facilities Safety Board, March 30, 2001 TO: K. Fortenberry, Technical Director, FROM: D. Grover and M. Satan, Hanford Site Representatives, SUBJ: Activity Report for theWeek Ending March 30, 2001 (Hereafter known as DNFSB Staff Report) According to this report: "Corrosion has reduced the thickness on the interior side of the primary liner as much as 19.4 percent at a corresponding to a former waste level. The waste was out of specification for years at that level. The current waste level is below this band. The actual thinning may be substantially larger since there was extensive pitting on parts of the annulus side of the primary liner and this pit depth was not quantified by this analysis."

[ii] RCW 70.105E.060(3)

[iii] US Government Accountability Office : "Nuclear Waste: Absence of Key Management Reforms on Hanford's Cleanup Project Adds to Challenges of Achieving Cost and Schedule Goals", GAO-04-611, June 9, 2004. See P. 3 for cost summary. GAO reported that in 2000, USDOE estimated the cost of treating Hanford's High-Level Nuclear Wastes would be $56 Billion and take until 2043. USDOE revised its estimate because it was based on the plant to be built under privatization and not in accord with the Hanford Clean-Up Agreement schedules. USDOE claimed its new baseline eliminated $20 Billion and reduced the time to 2035. However, this estimate has been abandoned by USDOE in the face of criticism, including a subsequent GAO report which found it was not based on any reality.

[iv] SEE Scope for Tank Waste Closure EIS, USDOE presentations to Hanford Advisory Board, Sept-November 2005.

[v] March 2003 baseline and cost estimate to Congress.

[vi] In February, 2002, the Bush Administration and USDOE formally adopted a national strategic goal to "reduce by 75% the amount of waste to be vitrified". "Top to Bottom Review" accompanying the FY 2003 Congressional Budget Request for USDOE. This goal was adopted without any technical basis solely to reduce the total cost and timeline for cleanup of USDOE facilities. USDOE had repeatedly chosen to utilize expensive, unproven pretreatment technology to separate out wastes in order to reduce the amount of vitrified glass to go to a repository due to the high cost of the repository and the fact that federal law prohibits disposal in Yucca Mt. of the full amount of vitrified HLW expected from USDOE sites (if Yucca ever opens).

In February, 2004 USDOE formally stated: "Yucca Mountain does not have the space for all defense HLW waste." Statement of Jurisdiction, U.S. Ninth Circuit Court of Appeals, Re: *NRDC v. Abraham*, 244 F.3d 742 (9th Cir. 2003), January 29, 2004, p. 40. This has driven USDOE to seek to utilize unproven separations technology with and high technical risk to increase the amount of waste to be left onsite at Hanford and decrease the volume of High-Activity Waste required to go to a repository.

Nevertheless, even with the proposed pretreatment separations process at Hanford, and even if Yucca Mt does open, ***there will not be enough capacity in Yucca Mt for at least 40% of the vitrified glass logs produced at Hanford's High-Level Waste Vitrification Plant.*** Yet, the hypothetical cost of disposing of vitrified glass containers in a hypothetical repository which will never be big enough to take much of Hanford's waste has been the key technical criteria determining that the vitrification plant utilize high risk, and high cost, technologies to reduce the amount of waste that does not qualify to remain on site.

In its June, 2004 Report, the GAO specifically criticized USDOE for failing to develop a plan that was not based on minimizing the amount of vitrified HLW to go to the hypothetical Yucca Mt. GAO specifically recommended that such a plan be developed and presented to Congress. USDOE formally refused to accept this recommendation.

[vii] Figures provided to Gerald Pollet at briefing by USDOE-ORP Manager Roy Schepens and Deputy Manager Howard Gnaan on December 8, 2005. ORP management asserts that these costs now include all safety requirements, including containment, likely to be recommended by the Defense Nuclear Facilities Safety Board. Sensibly, USDOE informed GP on that date that it has responded to criticism by Heart of America NW, the Hanford Advisory Board, the GAO, and others and stopped construction until completion of pilot testing and design.

[viii] ORP responded that the bulk vitrification plant was considered, in its opinion, an R&D project, not a capital facility despite the cost and fact that it involved construction. Thus, ORP claimed it did not have to report the cost increases. ORP's determination is not decisive for compliance with Congressional requirements. On December 8th, GP was informed that USDOE had been told by OMB to reclassify the project and disclose its cost separately to Congress in the next budget request. We will await to see if USDOE discloses the cost overrun at that time or claims the new cost estimate as if it is the original.

[ix] USDOE –ORP presentation of ORP Manager Roy Schepens to State of Site meeting, Portland, OR September 2005. Similar claim in other presentations. Viewable at www.hanford.gov/orp/uploadfiles .

[x] GAO 05-123: "Further Actions Are Needed to Strengthen Contract Management for Major Projects."; March, 2005; Cover letter to Rep. Henry Waxman.

[xi] US Government Accountability Office : "Nuclear Waste: Absence of Key Management Reforms on Hanford's Cleanup Project Adds to Challenges of Achieving Cost and Schedule Goals", GAO-04-611, June 9, 2004; quoted from GAO official Abstract (viewable at: http://www.gao.gov/docsearch/abstract.php?rptno=GAO-04-611).

[xii] GAO 04-611 at 4.

[xiii] USDOE has responded recently to the advice saying only that it will have a range of alternatives that reveal a range of impacts. USDOE says that an alternative for 2034 is as good as one for 2028. Ecology failed to object as well – reflecting an oft stated attitude that its job is not to object to mismanagement, cost overruns or failure to consider alternative technology approaches that can get the job done more safely and cheaply.

[xiv] Hanford Advisory Board, June 4, 2004 Advice #164. USDOE responded that it intended to meet the TPA – although the actual scoped alternatives belie USDOE's claims that it has any alternative completing the retrieval and treatment of 99% of the wastes by 2028, much less 2024 as claimed in this response: "The 2028 timeframe is incorporated in the range of treatment dates analyzed, specifically the 2024-2034 periods, and is consistent with TPA commitments for completion of tank waste treatment.

"As ORP has briefed the HAB on several occasions, the River Protection Project baseline achieves the completion of tank waste treatment in 2028 – a TPA commitment ORP intends to meet or exceed." USDOE July 7, 2004 to Hanford Advisory Board.

Even if USDOE did intend in 2004 to study one alternative that ended in 2024, it was not an alternative that retrieved and treated 99% of the wastes and cleaned up leaks. However, the actual alternatives that USDOE proceeded to study did not include any that completed vitrification or supplemental treatment in 2028, and USDOE issued a directive in April, 2005, to assume that hot start of all treatment would have to be delayed at least four years. USDOE failed to disclose this directive to the public, Congress, regulators or the advisory board.

[xv] Alternative 5 USDOE Presentation Draft Tank Waste Closure EIS Alternatives and Scope; October 13, 2005.

[xvi] Richard Smith and Al Boldt; December, 2005 report provided in advance to GP for review and now publicly transmitted to Hanford Advisory Board. The Report by these two engineers – one of whom was formerly Project Manager for vitrification alternatives – shows that the third melter alone increases the capacity factor by 20%.
[xvii] Smith and Boldt at 2.
[xviii] "Analysis of Alternatives For Treating Hanford Low-Activity Wastes"; Allyn L Boldt; Richard I Smith prepared for presentation to Hanford Advisory Board Jan. 10, 2006 at 2.0. Boldt's and Smith's report rebuts USDOE's presentations justifying their refusal to consider the Iron Phosphate and 3 melter configuration.

Boldt and Smith calculations show that an Iron Phosphate 2 melter LAW plant could process 75% of LAW by 2028 and a 3 melter system could complete all LAW. Further, they show that the heat limiting factor for throughput capacity for the LAW vit plant using BoroSilicate glass is not as limiting for Iron Phosphate. This allows for three melters – each with higher throughput and reliability.

[xix] Nuclear Waste: Better Performance Reporting Needed to Assess DOE's Ability to Achieve the Goals of the Accelerated Cleanup Program, GAO-05-764, July 29, 2005. Also SEE: GAO 05-123: "Further Actions Are Needed to Strengthen Contract Management for Major Projects."; March, 2005.
[xx] Cost increase history from Army Corps Report 1-2 through 1-4.
[xxi] Table 1-2 Army Corps of Engineers Independent Review of Bechtel's EAC Report May 20, 2005.
[xxii] Hanford Site – Richland, Washington Waste Treatment and Immobilization Plant (WTP) Independent Review of WTP Estimate at Completion (EAC), May, 13, 2005; Army Corps of Engineers (ACE)at ES-3.
[xxiii] Id At Es-2.
[xxiv] SEE ACE Report Table 1-2. The Report indicates that the $225 million fee figure does not include $200 million in cost performance fees. The total fee available under schedule and performance was $335 million. The report also does not indicate the total amount paid or deemed awarded to Bechtel to date.
[xxv] Some cost increases are, of course, expected to be passed right on to the government such as for the increased cost of fire proofing structural steel under a new design basis threat assessment ($66 million estimate reviewed by Army Corp), while the increased costs due to revised ground motion studies – which was a flaw known under BNFL – is estimated to add to the plant cost by $753 million. Yet, adding direct costs is different than whether the profit payment agreement should be revised. Unless the contractor had no reason to know of a problem when it submitted its bid, or a delay is caused solely by new requirements, then the loss of fee provisions should be maintained. In any event, any adjustment to fee should be on the basis of keeping the same penalty and incentive system in place as under the initial contract.
[xxvi] ACE at ES-3.
[xxvii] GAO 05-123, quoting Abstract.
[xxviii] October 17, 2005 DNFSB to Energy Secretary Samuel Bodman at page 1.
[xxix] "Reducing the Risks of High-Level Radioactive Wastes at Hanford"; Bob Alvarez; in Science and Global Security, 13:43-86 (2005) at 43. SEE NRC: NUREG 1747, p. 26.
[xxx] Alvarez at 44.
[xxxi] Id at 44.
[xxxii] October 17 letter at 2.
[xxxiii] DNFSB October 17, 2005 at 3.
[xxxiv] E.g.: USDOE uses an allowable dose to the public of 100mrem from releases at the site boundary – whereas EPA limits emissions to 10 mrem and has formally found that 25 mrem dose "is not protective of human health" at Superfund sites. USDOE uses a groundwater acceptable contamination level (Derived Concentration Guideline) of 100 mrem, whereas Drinking Water Standards are 4 mrem. USDOE views doses with cancer risks of 2.5-10% in children as acceptable.
[xxxv] Id at 4.
[xxxvi] Alvarez at 58.
[xxxvii] Id.

USDOE Office of River Protection (ORP) slide (September, 2005) showing "mission" of retrieving and treating waste from Hanford's High-Level Nuclear Waste Tanks (53 million gallons in 149 Single Shell Tanks and 28 Double Shell Tanks). 20% of the waste volume with 80-90% of the radiation would go to the High-Activity portion of the Vitrification Plant, and 80% of the volume is designated Low Activity Waste (LAW).

USDOE shows mission as including reclassifying a number of SST Tanks as Transuranic (TRU) waste to be sent to New Mexico's WIPP repository for disposal. New Mexico has objected and threatened legal action to block this. GAO as well as New Mexico has noted that current permits and laws do not allow this, and GAO has been critical of USDOE for assuming that any of Hanford's tank wastes can be renamed to avoid treatment.

USDOE also shows "supplemental treatment" (bulk vitrification) instead of building a second LAW vitrification plant to glassify 40-60% of the LAW waste. The Tri-Party Agreement (TPA) presumes that this LAW waste will be vitrified in the LAW vitrification plant. USDOE must still prove that bulk vitrification is safe, lower cost and produces glass and secondary wastes that pose no greater environmental risks than glass from HWVP.