

March 1, 2019

Shannon Ortiz
Lifecycle Report Project Manager
U.S. Department of Energy- Richland Operations Office
P.O. Box 550, Mailstop HS-20
Richland, WA 99352

Dear Ms. Ortiz:

I am writing in response to the public comment period for review of the 2019 *Hanford Lifecycle Report* (comments due by April 15, 2019). Context surrounding this report includes:

Per the DOE Hanford Events Calendar Web Page¹:

- The 2019 Lifecycle Report *information reflects scope, schedule and cost status that is current as of August 31, 2018, and the costs shown have been escalated for inflation by DOE.*

On February 1, 2019, per the Tri-City Herald²:

- DOE has issued a statement to say: "The findings of this [the 2019 life Cycle] report, and the developments on which it is based, show that a new approach is needed for the mission at Hanford."
- Also: "The cost to develop nuclear weapons at Hanford and other sites across the U.S. was about \$9 trillion in today's dollars. said John Price, Ecology's Tri-Party Agreement section manager." ... "So the cost to clean it up is a fraction (of that)." [said Alex] Smith [Department of Ecology Nuclear Waste Program Manager].

The 2019 Life Cycle Report states:

- "DFLAW, in various forms (e.g., TSCR and LAWPS), which is the first step in the phased startup of the WTP, is planned to operate for 10 years beginning in December 2023 and completing in December 2033, at which time the WTP is required to initiate hot commissioning ."

¹ <https://www.hanfordgov/pageaction.cfm/calendar?IndEventId=10369>

² <https://www.tri-cityherald.com/news/local/hanford/article225386510.html>

With regard to the 2019 life cycle report, including the context above, I would appreciate if you would consider the following, as DOE prepares the "new" approach for Hanford's mission.

1. The 2019 and previous Life Cycle Reports do not appear to meet the Life Cycle Cost Definition. Life Cycle Costs for prior spending are missing.

DOE's Life Cycle Cost Estimate Guide, DOE Guide 430.1-1, Chapter 23, explains that Life-cycle Costs (LCCs) are *all* the anticipated costs associated with a project or program alternative throughout its life. Contrary to this definition, the Life Cycle Report only provides the estimated costs-to-go and not total life cycle costs. It also is a confusing mix of constantly changing alternatives. To correct this requires the addition of a discussion of the amount of money spent to date, and the material differences (changes in flow sheet and consequences of the various "accelerations") since the beginning of the program, which originated in about 1988, after Hanford's defense mission was converted to Hanford's cleanup mission.



Figure 1. Hanford Spending In 2018 Dollars (2009 Includes ARRA funding)

The sum of the costs expended to date are missing from each of the Life Cycle reports. This could be easily corrected by adding the data. The figure above was compiled from cost data published in PNNL-18896, "Hanford and the Tri-Cities Economy: Historical Trends 1970-2008," and data provided by DOE for prior years in the several available Budget Justification Supporting Documents, Volume 5 for FY2009 to FY-2018.³ The chart above has converted the PNNL data dollars from 2008 dollars to 2018 dollars using the consumer price index, and the DOE original data are similarly presented in 2018 dollars. 2007 data are available from

³ <https://www.energy.gov/cfo/listings/budget-justification-supporting-documents>

both sources, and, checking for consistency, are in agreement to 0.5%. (Data from the PNNL report had to be read from a graph.) The spike in 2009 is from the American Recovery and Reinvestment Act, ARRA.

Summing the spending from 1988 to 2018 shows that about \$63.8 Billion was spent on Hanford Cleanup in the 30 years prior to the 2019 life Cycle Report. This value should be included and updated in every future life Cycle Report.

2. The 2019 Life Cycle Report Omits Important Scope

DOE's life Cycle Cost Estimate Guide, DOE Guide 430.1-1, Chapter 23 includes the following:

"Life Cycle Cost analysis is an integral part of strategic planning. Therefore, we need to understand the common errors made during LCC analysis so effective decisions can be made. The following lists some of the common errors made when performing LCC analysis that could affect the outcome:

- *omission of data,*
- *lack of a systematic structure or analysis,*
- *misinterpretation of data,*
- *wrong or misused estimating techniques,*
- *a concentration of wrong or insignificant facts,*
- *failure to assess uncertainty,*
- *failure to check work,*
- *estimating the wrong items, and*
- *using incorrect or inconsistent escalation data.*

... A culture of honesty should be promoted so that it is not necessary to bury contingency."

Contrary to the DOE's cost estimate guidance, the statement that the scope, schedule, and cost status of the FY 2019 life Cycle Report *is current as of August 31, 2018* appears to be materially incorrect, and omits high cost items.

The 2019 life Cycle Report states that it is based on ORP's System Plan, Revision 8, for scope. System Plan Revision 8 (ORP-11242, Rev 8)⁴ was issued *October 31, 2017*, so the life Cycle Report scope is already 10 months out of date with respect to the August 31, 2018 report benchmark. There are material differences as compared to today's contract scope.

For example, in the 2019 life Cycle Report and in System Plan Revision 8, the cesium extracted to create feed to the early LAW vitrification (DFLAW) has a flow sheet that dumps the cesium back into the tank farms. You can see this by looking at Figure 5-1 of the 2019

⁴ https://www.hanford.gov/files.cfm/ORP-11242_System_Plan_Rev._8.pdf

Life Cycle Report, which shows the high cesium eluate being returned to Double Shell Tanks (where it would have to be extracted again!).

Contrary to this approach, contract documents show that as of July 31, 2018, DOE had suspended the original LAWPS flow sheet with elutable ion exchange resin and had replaced it with non-elutable resins, which require a different and unknown disposal path (orphan waste): The scope as of August 31, 2018 included: *Complete the delivery of the completed or partially completed Elutable LAWPS design documents resulting from the ORP Direction to suspend the LAWPS Design and Testing activities by September 30, 2018. The Contractor shall earn \$250,000 upon submittal to ORP. Further, the contractor would earn \$750,000 by awarding the tank side cesium removal (TSCR) design by July 31, 2018*⁵. Tank side cesium removal uses non-elutable resin, requiring storage of the extracted cesium in shielded columns. The change to non-elutable resin (which is not returned to double shell tanks) had been made as early as March 2018 as documented in a DOE presentation to the State of Oregon⁶.

The life cycle report omits these fundamental issues, although non-elutable orphan waste should be there based on the status as of August 31, 2018.

Indeed, for the baseline case, System Plan Rev 8 page A-12 states - The IX resin is replaced after 30 loading/elution cycles. **Resin disposal is not modeled...** The System Plan continues to use elutable resin, and fails to evaluate the disposal of even that, much less fully loaded, non-elutable resin. This may not be the only omission or error. The System Plan should therefore be reviewed for additional missing scope or unverified assumptions that affect the life cycle costs (extent of condition).

The Tank Closure and Waste Management EIS decision is that tank waste cesium will be removed in the WTP Pretreatment Facility and then incorporated in HLW glass. However, the identified production of non-elutable resin creates an orphan waste form for which no technology exists in the WTP to handle it. There is no capability at WTP or in the EIS to open and dump loaded IX resin into the HLW melters. This pathway requires remote mechanical handling and glass formulation studies which for which, once again, the technology is immature (technology readiness level of 1?). As a result, the Life Cycle report has a material omission that under-reports major life cycle costs and misrepresents the status to the public. It also underestimates the doses to workers as the cesium is processed, monitored, stored, and processed again, in violation of ALARA principles for minimizing doses to personnel and the public. And this indifference has occurred as DOE has had to increase costs for monitoring and responding to health concerns among exposed workers.

⁵ Tank Operations Contract No. DE-AC27-08RV14800, Section J, Attachment J.4, Modification No. 493, July 31, 2018.

⁶ Decision documented in March of 2018.

<https://www.oregon.gov/energy/safety-resiliency/Documents/2018-03-19-0HCB-DFLAW-Update.pdf>

3. Despite DOE's statement about the 2019 Life Cycle Report (via the Tri-City Herald) that A New Approach is Needed at Hanford. DOE Published a "business-as-usual" Supplement Analysis for LAWPS that contains technical errors and abuse-of-discretion misrepresentations.

At the same time as publishing the 2019 Life Cycle Report DOE, on January 17, 2019, DOE published a "Supplement Analysis of the Final Tank Closure and Waste Management Environmental Impact Statement for the Hanford Site, Richland Washington ⁷." The Supplement Analysis was followed promptly on January 28, 2019 by an amended Record of Decision⁸ for the Tank Closure and Waste Management EIS, claiming NEPA coverage exists for DFLAW for all portions "except" the storage pad for the non-elutable, high activity cesium-loaded ion exchange columns, which are created while producing low activity waste for DFLAW vitrification. (Production, storage, and disposal of the loaded cesium ion exchange columns are new actions that are not addressed in the Tank Closure and Waste Management Environmental Impact Statement.)

What is "business-as-usual" is that DOE took the optional approach that writing a supplement analysis was sufficient to underpin an amended record of decision to implement DFLAW design, construction, and operations. This approach avoided public comment on the supplement analysis or on the amended ROD. I believe that there are material errors in the supplement analysis that make the amended ROD not valid. There is a lack of a "culture of honesty" that continues at DOE, and it appears the Assistant Secretary for Environmental Management was given bad advice by the ORP Field Office. Here's why:

- a) In the supplement analysis, DOE makes a unilateral, unreviewed, determination that no new NEPA analysis is required for the changes between the original plan to start the WTP as a whole (with minimal sequencing), and instead operating the WTP on a DFLAW flowsheet with alternative feed for a period of 10 years (which is the "new" plan). Contrary to DOE's determination (which contained no objective evidence), there are significant new circumstances that should require a complete and publicly reviewed supplemental EIS.
- b) To accomplish DFLAW, DOE states (Section 2.1 of the Supplement Analysis) that DOE would need to complete construction of the following facilities: the EMF, a cesium removal system (initially a tank side cesium removal (TSCR) unit followed by either an additional TSCR unit or construction and use of a permanent cesium removal capability-all under the LAWPS project), necessary transfer lines, and a

⁷ <https://www.energy.gov/sites/prod/files/2019/01/fSS/sa-eis-0391-sa-02-direct-feed-law-2019-01-17.pdf>

⁸ <https://www.federalregister.gov/documents/2019/01/28/2019-00230/amended-record-of-decision-for-the-direct-feed-low-activity-waste-approach-at-the-hanford-site>

loaded IX Column Storage Pad.

In order to pursue DFLAW fill elements of the process must be present. Absent the loaded IX columns, there can be no feed to the plant or the new EMF evaporator. Because the flowsheet requires the IX Column storage pad to operate, and the IX Column storage pad has no NEPA coverage, none of the elements of this approach should be allowed to have construction, according to the National Environmental Policy Act (NEPA). DOE is not allowed to implement a decision via construction without this coverage. As a result, DOE is already violating the law by constructing the new effluent management facility without having NEPA coverage for the entire flowsheet decision.

- c) The Supplement Analysis (Section 2.3) contains DOE's determination that the cesium removal system for DFLAW proposes to use non-elutable IX columns that permanently bind the cesium to the IX media; therefore, the spent IX columns are to be stored *"until the media containing the cesium could be sent to the HLW Facility for vitrification."* No analysis exists for processing cesium ion exchange loaded media in HLW vitrification at WTP, and no such process was evaluated in the TC&WM EIS. This omission is another area that lacks NEPA coverage (beyond the storage pad).
- d) The Supplement Analysis (SA, Section 1.2) contains DOE's determination that the sequenced startup of WTP as analyzed in the Tank Closure and Waste Management EIS, Appendix E, has "no significant difference" from and bounds the 10+ year operation of DFLAW that will occur without the startup of the Pretreatment Facility or HLW vitrification Facility.

Contrary to DOE's determination, Appendix E of the TC&WM EIS was written consistent with the contract provisions at the time (which were pre-DFLAW). The Supplement Analysis omits discussion of the difference in time (and cumulative flow rates and discharges) between sequenced startup as defined in the TC&WM EIS and the 10+ years long HLW delay instituted by DFLAW. The Supplement Analysis omits discussion of the increasing subsidence risk of not stabilizing single shell tanks while they wait to be emptied of HLW.

At the time of the TC&WM EIS, the "Phased" startup of WTP was to result in the final turnover of Pretreatment to Operations on 11/30/2015 and the final turnover of HLW vitrification to operations less than a year later (per contract Modification 216, May 19, 2011). Further, in 2012, the ORP Project Execution Plan (MGT-PM-PL-06 Rev 1, March 2012) documented the planned full operations of PT, LAW and HLW together by November 2019. The consent decree milestone for Hot Start of the combined WTP (following the phased readiness review) was established pre-DFLAW as occurring by December 31, 2019 (Case 2:08-cv-05085-FVS, Document 59, Milestone A-17, October 25, 2010.)

Using the baseline WTP flowsheet, LAW could not operate without Pretreatment, and Pretreatment could only operate for the amount of time required to fill the LAW and HLW feed tanks before it would have to stop. As a result, the "sequenced" startup of WTP envisioned and analyzed in the TC&WM EIS was substantially different from the 10 year disconnect between PT/HLW and LAW that DOE claims is covered by NEPA in the Supplement Analysis. There is a big difference between phased readiness reviews, and a 10-year absence of HLW treatment while the low activity waste is processed.

- e) The Supplement Analysis (footnote 14) also states that "*Cesium is the primary contributor to annual worker dose. Removing and segregating the cesium into the self-shielded IX columns would gradually reduce the radiation risks to personnel from continued operations and maintenance activities in the tank farms.*" Once again, no life cycle integrated dose evaluation is provided. The concern is expressed only for tank farm maintenance and operations, but not for Ion Exchange Storage Pad Operations or for WTP ion exchange media exposures from the *unknown* process that will receive and discharge the loaded ion exchange resin to the HLW melters and on to the off-gas system. Cesium is not just the primary dose in the tank farms, but elsewhere as well. The ion exchange columns will have a source term in the hundreds of thousands of curies .
- f) In the Supplement Analysis the statement is made that "DOE did not identify any, past, present, or reasonably foreseeable additional future projects, beyond the demonstration testing phase" [in support of DFLAW]. This is an incorrect statement and an unverified assumption, given the need to develop a whole process for IX resin disposal to HLW. Perhaps another example of "business-as-usual."
- g) The Supplement Analysis presents no objective evidence - no life cycle material balance or flow sheet to evaluate quantitatively the consequences of de-coupling HLW from LAW, or to quantify impacts to personnel doses and environmental releases over the life cycle. The differences are significant, and DOE has failed to analyze them. Was *any* aspect of nuclear quality assurance used to evaluate the data underlying DOE's arbitrary determination?

4. **Despite DOE's statement to the Tri-City Herald that "A New Approach is Needed at Hanford." the DOE OIG deleted scheduled oversight scope. This also appears to be "business as usual."**

The DOE Office of Inspector General (OIG) publishes an annual work plan. A review of the last several annual work plans shows that the OIG started, renamed, and cancelled, a

planned audit of WTP commercial grade dedication (a quality assurance process). Here are the changes in scope over the years:

After 2012, the OIG's annual work plans included QA-related Commercial Grade Dedication for WTP, and then left it out as shown below.

- FY 2015: **Waste Treatment and Immobilization Plant: Commercial Grade Dedication** of Items Relied on for Safety.
- FY 2016: **Department of Energy** Quality Assurance, *Commercial Grade Dedication* of Items Relied on for Safety.
- FY 2017: *Quality Assurance-Commercial* Grade Dedication Audit [scope undefined].
- FY2018: *Los Alamos National Laboratory's Commercial Graded Dedication Process*
- FY 2019: *Los Alamos National Laboratory's Commercial Graded Dedication*

For context, the OIG published a Semi-Annual Report to Congress for the period April 1, 2012 to September 30, 2012. In this report the OIG stated:

*'The OIG received allegations concerning aspects of the **quality assurance program** at the Department's Waste Treatment and Immobilization Plant (WTP) project in Hanford, Washington. Bechtel National Inc. (Bechtel), is responsible for construction of the Department's \$12.2 billion WTP. The WTP mission is to treat and encapsulate in glass the majority of the 53 million gallons of waste that amassed from decades of plutonium production at the Department's Hanford Site.*

Our review substantiated the allegation. We found that the Department procured and installed vessels in WTP that did not always meet quality assurance and/or contract requirements. For the vessels that we reviewed, we identified multiple instances where quality assurance records were either missing or not traceable to the specific area or part of the vessel. We also found that the Department paid the WTP contractor a \$15 million incentive fee for production of a vessel that was later determined to be defective. Although the Department demanded return of the fee, it did not follow up on the matter and the fee was never reimbursed."

OIG's follow-on audit of Commercial Grade Dedication (CGD) of the WTP never occurred. Instead it was deferred and updated until WTP was not part of the CGD audit topic at all. This appears to be reduction of oversight - again based on discretion. Was lobbying involved, as has happened in other reviews? {Bechtel was fined \$165,000 in 2007 by DOE

for previous WTP CGD failures⁹, and DOE *promised to watch this carefully.*] CGD failures are a repeat issue, showing the corrective actions failed. Why has the 2015 audit scope for WTP been dropped? The report to Congress above shows that Quality Assurance problems result in defective and unsafe equipment.

5. The Government Accountability Office has made multiple recommendations of which DOE has ignored many. Will these be addressed in the "New Approach,, envisioned by DOE?

The baseline for WTP was over-target long ago, but corrections have been made piecemeal. Will DOE look again at the overall life cycle alternatives in light of GAO's recommendations?

For reference, GAO has 109 open recommendations for DOE, some of which DOE has prematurely considered closed¹⁰.

As examples, recent reports include:

GAO-19-207, February 2019, *DOE Should Take Actions to Improve Oversight of Cleanup Milestones*

GAO-19-28, January 2019, *Program-Wide Strategy and Better Reporting Needed to Address Growing Environmental Cleanup Liability [and Risk Management]*

GAO-19-25, December 2018, *DOE and NNSA Should Improve Their Lessons-learned Process for Capital Asset Projects*

GAO-19-14, December 2018, *Additional Guidance Needed to Improve Oversight of Agencies with Noncompliant Programs - Improper Payments*

GAO-19-34, December 2018, *OMB Should Improve Guidelines and Working-Group Efforts to Support Agencies' Implementation of the Fraud Reduction and Data Analytics Act*

GAO-18-241, April 2018, *Hanford Waste Treatment Plant- DOE Needs to Take Further Actions to Address Weaknesses in Its Quality Assurance Program*

GAO-18-374T, February 2018, *Department of Energy- Continued Actions Needed to Modernize Nuclear Infrastructure and Address Management Challenges*

⁹ PNOV EA-2007-05, <http://energy.gov/sites/prod/files/hss/Enforcement%20and%20oversight/Enforcement/docs/eas/EA-2007-05.pdf>

¹⁰ [https://www.gao.gov/reports-testimonies/recommendations-database/?q=%22Department+of+Energy%22&field=orgdesc_s&list=1&rec_type=""all+open#results](https://www.gao.gov/reports-testimonies/recommendations-database/?q=%22Department+of+Energy%22&field=orgdesc_s&list=1&rec_type=)

And

GAO-17-306, May 2017, *Opportunities Exist to Reduce Risks and Costs by Evaluating Different Waste Treatment Approaches at Hanford*

GAO-17-235, March 2017, *DEPARTMENT OF ENERGY- Use of Leading Practices Could Help Manage the Risk of Fraud and Other Improper Payments*

GAO-15-354, May 2015, *HANFORD WASTE TREATMENT-DOE Needs to Evaluate Alternatives to Recently Proposed Projects and Address Technical and Management Challenges*

And, going back a very long time, to 2003:

GAO-03-593, June 2003, *NUCLEAR WASTE Challenges and Savings Opportunities in DOE's High-Level Waste Cleanup Program*

"After investing more than 20 years and about \$18 billion, DOE acknowledged that the program to clean up *its high-level waste was far behind schedule, far over budget, and in need of major change*. In February 2002, DOE began an initiative to accelerate the schedule and reduce the costs of cleaning up high-level and other radioactive and hazardous waste, while focusing its resources on reducing risks to human health and the environment at its sites. Although this initiative covers DOE's entire cleanup program, it may have the most significant impact on DOE's plans for high-level waste, which is the highest cost component of DOE's cleanup program. DOE's initiative to accelerate the cleanup is evolving, and its savings estimates are changing accordingly, although we have concerns about the reliability of those estimates. DOE originally estimated it could shorten the waste cleanup schedule by 20-35 years and achieve up to \$34 billion in savings at its three high-level waste sites.

Regarding technical challenges, key elements of DOE's accelerated cleanup strategies rely on technologies for separating the waste components that have not been fully developed or tested. For example, because of schedule constraints and concerns about cost increases, *the Hanford Site plans to forgo full integrated testing of its proposed process for separating wastes into high-level and low-activity portions until after facility construction is complete.*"

GAO's observation contradicts the WTP Federal Project Director, who stated that "some design verification" [which could have been accomplished by an integrated pilot plant] "cannot be performed until commissioning." [See letter 18-WTP-0041, which almost reads as if the contractor wrote it]. "Cannot" differs materially from GAO's observation of "will not." And "some" has become a greater and greater share of equipment.

The expectation and spirit of NQA-1 is to verify the design (using testing if appropriate)

before procuring or installing equipment. This "loophole" example of abuse of discretion is documented in 24590-WTP-CAR-QA-03-192-B, and the acceptance of the loophole is documented in 24590-WTP-PAAA-QA-05-005, where the "as-late-as-possible" approach was approved not because it was right, but because it was not prohibited. [The attachment to letter 18-WTP-0041 reads as if the contractor wrote it.] GAO-06-602-T¹¹ more honestly expressed concern about the consequences of Fast-Track Design-Build, which DOE has ignored. Instead, as an example, DOE has proceeded with construction of the Effluent Management Facility without benefit of an integrated pilot plant process to verify the design to process novel, corrosive, feeds it will receive from DFLAW. This was an expedient option, not a necessity. DOE also has no pilot plant capability to see if loaded cesium ion exchange columns, which are currently in design, can be verified to be capable of being emptied into the HLW melters.

6. The Department of Ecology's claim in the Tri-City Herald article, that the costs to cleanup Hanford are fraction of the nuclear weapons program, are unsubstantiated.

The *\$9 Trillion* cost quoted by the Department of Ecology for the entire cost of the Manhattan Project is a very large number, for which no basis was given. (See the Tri-City Herald Life-Cycle Report Article). I looked to see if I could verify the amount. Below is what I found.

The Brookings Institution publishes costs for the Manhattan Project, which developed nuclear weapons at Hanford and other sites across the U.S. Estimated total costs and specific costs for Hanford and other locations are included at their web page:

<https://www.brookings.edu/the-costs-of-the-manhattan-project/>

In total, the Manhattan Project Costs in 1996 dollars are reported by Brookings as \$21,570,821,000 (approximately \$21.6 Billion). Using the Consumer Price Index (CPI) for 1996 (156.9) and the CPI for 2018 (251.107) allows the estimate to be updated to today's dollars, with the result that the total costs in today's dollars should be $\$21.6B \times (251.107/156.9) = \34.5 Billion (not \$9 Trillion).

The estimated Hanford costs for the Manhattan Project reported by the Brookings Institution were \$4,453,470,000 in 1996, which converts similarly to \$7.13 Billion dollars in today's dollars.

As a result, even the "low end" \$323 Billion cost to complete Hanford cleanup in the FY2019 Life Cycle Report is not a "fraction," of the original spending, but rather it is a multiple - it

¹¹ GAO-06-602T, April 2006, *HANFORD WASTE TREATMENT PLANT: Contractor and DOE Management Problems Have Led to Higher Costs, Construction Delays, and Safety Concerns*. Located at <http://www.gao.gov/products/GA0-06-602T>

appears to be 9 times the cost of the entire Manhattan Project and 45 times the cost of the Hanford-specific Manhattan Project work. This is not consistent with Ecology's understanding and claim that Hanford funds have been used well (to get us to this point).

The Department of Ecology's complaisance regarding the extreme costs of the all-glass, LAW-first baseline, appears to be misinformed. And the risk-informed costs-to-go are even higher - **at \$677 Billion**.

7. Hanford's share of EM's Liability Costs are Confusing

On December 27, 2018, DOE published an *Agency Financial Report*¹², which stated that the **\$110.2 Billion** dollar increase in DOE's environmental liability was *primarily from the WTP* construction, operating costs, tank farm retrieval, and closure costs at Hanford, indicating a total Environmental Management (EM) Liability of \$377 Billion (See Chart 4 of the Agency Financial Report).

But just a month later, the Hanford Liability in the January 31, 2019 Life Cycle Report appears to outstrip EM: The Life Cycle Report identifies risk-informed to-go costs for Hanford alone (not including other sites) of \$677 Billion. This is far in excess of the December 2018 overall \$377 Billion DOE EM costs. Which is correct?

8. Fundamental Work has Not Been Completed, despite Hanford Spending of \$64 Billion in the 30 years since 1988.

Despite all of the money spent, GAO-19-123 shows that stabilization and protection of the groundwater over most of Hanford's industrial area has not occurred. Per Appendix I of GAO-19-123, Hanford, after all this time, does not have groundwater migration under control in the 200 Areas, where the tank farms are located. While spending billions, DOE has done nothing to prevent subsidence in aging waste tanks, and has done almost nothing to restrict water migration to the ground water of already spilled waste, and has not controlled human exposure pathways.

The opposite appears to be true. According to meeting minutes¹³ from November 15, 2018, document RPP-9937 formerly contained requirements to identify sources of water intrusion to Hanford Tanks, and to "stop" the water intrusion. In 2014, these actions were reduced to just monitoring the tanks and responding to intrusions after the fact. The requirement for prevention of water intrusion was eliminated.

¹² <https://www.energy.gov/sites/prod/files/2018/12/f58/fy-2018-doe-agency--financlal-report.pdf>

¹³ <https://pdw.hanford.gov/arpir/pdf.cfm?accession =0064063H>. See attachment A, page 23 of 24.

Please note that controlling the migration to the ground water does not require WTP, but can include other disposal options, including barriers and in-place disposal.

Root Cause Analyses by an Independent Agent are needed, and should include the whole life cycle flow sheet and the long list of technical and organizational failures, including why improper payments are made, (should an escrow system be used for fees until DOE or some other agency can adequately review?); and why unsuccessful (kick the can down the road) personnel selection approaches are still in use.

Root cause analyses should also examine why the most complex process always seems to be selected, followed by repeated excuses that "it's hard because the process is so complex."

9. What happens when the Life Cycle Report is cancelled or out of date?

The Hanford Events Calendar states that the "Lifecycle Report serves as a foundation for preparing federal budget requests." This year's report appears to be incomplete and the report was cancelled altogether in FY2017 and in FY2018. Were the budget requests in FY2017 and 2018 unsupported? System Planning underpins the Life Cycle Report, yet the next version of the System Plan (following System Plan Rev 8) has had negotiations delayed multiple times. The "new" negotiations were supposed to conclude by April 30, 2018 per Letter 17-NWP-162. And yet, Inter-Agency Management Integration Team (IAMIT) Meeting Minutes from December 20, 2018, show that negotiations are still not complete. Will this cause a delay or inadequate data in the next Life Cycle Report? GAO noted recently, in Report GAO-19-207 ¹⁴, that DOE frequently renegotiates milestones, but does not track the performance problems that the renegotiations hide. Milestones are consistently met, but the actual performance is poor. What will be the validity of the next budget request?

I agree there is a need for a new approach at Hanford. In 2003, per GAO-03-593 ¹⁵, there was a prior need for "major change." Yet, implementation of that change did not go well. Demonstrating a "culture of honesty," by actions, starting from the top down, rejecting contractor lobbying, making good, integrated technical decisions, and including accurate reporting of progress and failure, might be an alternative approach.

¹⁴ GAO-19-207, February 2019, *NUCLEAR WASTE - DOE Should Take Actions to Improve Oversight of Cleanup Milestones*.

¹⁵ GAO-03-593, June 2003, *NUCLEAR WASTE - Challenges and Savings Opportunities in DOE's High-Level Waste Cleanup Program*.

Cherry, Mark J

From: Tom & Clede Galioto <tagcvlg@charter.net>
Sent: Tuesday, February 5, 2019 8:45 PM
To: ^Lifecycle Report
Cc: tagcvlg@charter.net
Subject: Clarification of 2019 Life Cycle Scope, Schedule and Cost Report

DOE Representative,

The DOE letter transmitting the Subject Report (DOE letter 19-AMB-0005) mentions the report as "DOE/RL-2018-11," but the 2019 LCSSC report attached to that letter is "DOE/RL-2018-45." Is the letter reference incorrect?

Thank you.

TA Galioto

Cherry, Mark J

From: Tom Burke <tandjburke48@gmail.com>
Sent: Thursday, April 11, 2019 3:55 PM
To: ^Lifecycle Report
Subject: Comments on 2019 HANFORD LIFECYCLE SCOPE, SCHEDULE AND COST REPORT

I am a former Hanford employee and I offer the following comments on the 2019 HANFORD LIFECYCLE SCOPE, SHCHEDULE AND COST REPORT (primarily the portions related to final disposition of the Fast Flux Test Facility):

1 – I believe the plan to use the FFTF sodium (converted to sodium hydroxide) in waste pretreatment at the Waste Treatment Plant is the right solution (from both a technical and cost standpoint) for the Hanford site. While it certainly would result in some impact on the design and operation of the WTP, given the long time that has passed since FFTF last operated (allowing significant reduction in the sodium radioactivity level), I believe that these impacts would be relatively small if properly addressed during the design of the WTP. And since this has been “the plan” for many years, then this should have indeed been considered during the WTP design process.

2 – If the bulk sodium (as hydroxide) will not be used in WTP, then other potential options, besides conversion to an acceptable waste form and disposal, should be investigated. For example, the DOE is currently considering the construction of a new sodium cooled test reactor (called the Versatile Test Reactor). The FFTF (and Hallam and SRE) sodium currently stored at Hanford could probably provide a significant portion of the sodium needed for such a new test reactor. This re-use would probably result in a significant cost savings for Hanford cleanup and (to a lesser degree) a cost savings for the proposed new facility.

3 – I am concerned that the current “plan” is to continue to delay the start of final disposition of FFTF until ~2031. It has already been about 10 years since completion of plant deactivation and many of the people who were intimately knowledgeable of the plant design and the deactivation process are no longer available to assist with the final disposition. In another 12 years there will probably be very few left. This is much more problematic with a sodium cooled reactor than with typical water cooled reactors due to the unique and significant hazards associated with the disposition of the sodium systems, in particular in dealing with the thousands of gallons of residual sodium that remain in the plant systems. And of course if the final disposition is completed sooner rather than later, there is a cost savings associated with the reduced period of safe and compliant maintenance of the facility.

4 – While I am sure some will find this suggestion irresponsible, given that the “plan” is to entomb the entire lower portion of the FFTF reactor containment building in concrete, I think that the option of entombing the systems with much, maybe even all, of the associated residual sodium left in place should be evaluated. The cost (and schedule) associated with cleaning the residual sodium from the in-containment systems represents a significant fraction of the ~\$1B total remaining estimated cost. Furthermore, the act of reacting and removing the sodium residuals may in fact represent a greater risk than leaving them entombed in place (certainly to the workers, and perhaps even to the environment and public as a whole).

5 – Of a more general nature, I need to say that I am concerned about the overall cost and schedule for completing cleanup of the Hanford site, and especially the fact that they continue to increase with every passing year. The DOE and the public need to seriously consider options that bring these cost and schedule increases under control. Prime examples are the treatment of the tank waste and the final disposition of the tanks. While I understand that much of the tank waste could probably be treated and disposed of using less expensive alternative processes, some “special interest groups” insist that it all be vitrified and sent off site. While restoring the Hanford site to pristine conditions sounds nice, it may not be practical and is certainly not necessary. As a US and Washington state resident, citizen and taxpayer, I think we need to be both environmentally and fiscally responsible. The wide range of estimates for completion of

Hanford site cleanup (\$232 billion to \$677 billion and 60 to 80 years) does not seem acceptable to me, especially since history says that these estimates are likely to continue to increase.

Tom Burke
Prosser, WA

Subject: Public feedback on “2019 Hanford Lifecycle Scope, Schedule and Cost Report,” published January 2019, DOE/RL-2018-45 Revision 0

From: James N. Paglieri

The following comments regarding the Fast Flux Test Facility (FFTF) are provided on the subject report:

1. Whether or not the Maintenance and Storage Building (MASF) is covered by the report should be clarified.
2. The schedule for starting cleanup should be moved up by a number of years. Based on Figures 4-7 and 4-8 (pages 4-15 and 4-16) and Table C-16 (page C-35) the cleanup does not really start until 2031 and work with sodium continues until 2039, when personnel knowledgeable of FFTF are no longer available. Delay will result in higher cost, equipment degradation (e.g. the heating system for melting of the sodium in the Sodium Storage Facility), and increased risk of unsafe cleanup. Based on the past cleanup of a similar facility that was delayed, the lesson learned was to not put off cleanup.
3. The Fuel Storage Facility (FSF) should not be demolished to at least three feet below grade due to safety concerns (confinement) and cost reduction. Also, removing the concrete floor of the Reactor Service Building (RSB), which abuts the Reactor Containment Building (RCB) and whose floor will be left in place, offers very little benefit and would reduce the cleanup cost. The statement is made on pages 4-13 and C-34 that “All structures in the 400 Area Protected Area, except for reactor containment, will be demolished to at least 3 feet below grade...”

Thank you for the opportunity to comment on the report,
James N. Paglieri
1734 Horn Ave.
Richland, WA 99354
April 15, 2019

Cherry, Mark J

From: Jack McElroy <jacklmc@aol.com>
Sent: Saturday, February 2, 2019 1:48 PM
To: ^Lifecycle Report
Subject: Fwd: Hanford Cleanup

To Whom it May Concern

As a retired Chemical Engineer (PNNL), and waste treatment expert who led the development of waste vitrification, I believe removing and vitrifying all of the waste in the so called HLW tanks is gross overkill!

The proposed new HLW definitions should be immediately adopted. Then each of the Hanford waste tanks should be evaluated. Treat the real HLW by vitrification. Treat the less hazardous LLW waste by some less costly means, which could include grout or even bulk vitrification. Some of the tanks may be so innocuous that simply filling the tank in place with grout and capping it will suffice.

Thank you.

Jack L McElroy, Chemical Engineer, Waste Technology Consultant

JackLMc-Sent from my iPad

Cherry, Mark J

From: Tom Burke <tandjburke48@gmail.com>
Sent: Thursday, April 11, 2019 4:07 PM
To: ^Lifecycle Report
Subject: RE: Comments on 2019 HANFORD LIFECYCLE SCOPE, SCHEDULE AND COST REPORT

One additional comment: The “contingency” of \$100 million (10%) on the FFTF final disposition cost seems rather low considering the list of Key Risks listed on Page D-9 of the report.

Tom Burke

From: Tom Burke [mailto:tandjburke48@gmail.com]
Sent: Thursday, April 11, 2019 3:55 PM
To: lcssc@rl.gov
Subject: Comments on 2019 HANFORD LIFECYCLE SCOPE, SCHEDULE AND COST REPORT

I am a former Hanford employee and I offer the following comments on the 2019 HANFORD LIFECYCLE SCOPE, SHCHEDULE AND COST REPORT (primarily the portions related to final disposition of the Fast Flux Test Facility):

1 – I believe the plan to use the FFTF sodium (converted to sodium hydroxide) in waste pretreatment at the Waste Treatment Plant is the right solution (from both a technical and cost standpoint) for the Hanford site. While it certainly would result in some impact on the design and operation of the WTP, given the long time that has passed since FFTF last operated (allowing significant reduction in the sodium radioactivity level), I believe that these impacts would be relatively small if properly addressed during the design of the WTP. And since this has been “the plan” for many years, then this should have indeed been considered during the WTP design process.

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Tom Burke
Prosser, WA