

HLW & FD  
EIS PROJECT - AR/PF  
Control # DC-09

Rev2 EISreview

Comments on "Draft INEEL HLW EIS, Idaho High-Level Waste & Facilities Disposition"

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What was said and done at the 7Feb00 Idaho Falls public hearing on the "Draft INEEL HLW EIS" has inspired a revision of my original review. Here it is:

9-1 IX.A(2) [Thanks for asking for my opinions of your "Draft INEEL HLW EIS". It's nice to see that the effort I've put into my hobby (HLW management) qualifies me to be one of the Site's "key stakeholders". Since the National Academy of Science's (NAS)'s Board on Radioactive Waste Management seems to feel the same way (they've sent me a personal copy of their review of the Site's HLW program), I've decided to put my thoughts about both of these reports together into one note.]

Since the NAS's report is apt to have greater impact on INEEL's future, I'll start off with it.

9-2 XI(3) [I sympathize with the NAS Panel's frustration with the DOE management "symptoms" that make doing nothing seem more sensible than trying to implement any of the EIS alternatives consistent with today's HLW management paradigm. (These symptoms are identified in another recent NAS Report, "Barriers to Science", 1996.) However, while I agree with that Panel's reservations about the management approach championed by INEEL's decision-makers (separations/vitrification), I do not agree with its conclusion that it would be best to abrogate the two main provisions of the "Batt agreement", i.e., to not render existing calcines "road ready" by 2035 AD and to not calcine the remaining liquid waste by 2012 AD.

Since DOE could honor its promises if it were simply willing to eschew some of its "symptoms", a more constructive conclusion would have been to suggest that it do so and identify specific changes that need to be made.

I also disagree with the Panel's rationalizations for its conclusions. First, it is not necessary to delay decision-making until we know more than we do already about the chemical composition of INEEL wastes<sup>1</sup>; today's uncertainties have to do with traces of materials of significance only to the waste's classification, not to implementing its solidification. Second, it is not necessary for INEEL to know every conceivable detail about the waste's ultimate resting place (repository) to keep its promise (convert its waste to transportable monoliths). It can and should make waste form materials suitable for disposal in any of the already sufficiently-characterized & technically competent potential repository sites available to the US Federal government - the same assumption made by the people who designed the "historic waste" solidification system at the UK's new fuel reprocessing facility at Sellafield, Cumbria<sup>2</sup>.

9-65 III.E(2) <sup>1</sup> Because the amount and chemical composition of the wastes put into the tanks/binsets was both known and recorded, we already know everything genuinely relevant to implementing any of several candidate rock-making processes.

9-66 III.D.1(2) <sup>2</sup> In 1982, the British government directed its prime nuclear contractor, British Nuclear Fuels, Limited (BNFL), to design an up-to-date commercial fuel recycling facility at Sellafield (aka Windscale). It mandated that the new facility must not only be able to immediately process all newly-generated reprocessing wastes to disposable waste forms, but also to similarly deal with a 30 year backlog of "temporarily" stored reprocessing waste generated before. Unlike the situation here in the USA, the British government did not impose a "preferred technology" - only that finished waste forms must satisfy performance based standards; i.e., be suitable for disposal in any of the possible repository systems that it might choose to implement within the next 50 years or so. Five years worth of collaborative effort



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9-3 V(3) [In practice, much of the "characterization" now being done in the DOE complex is unnecessary. It's popular with decision-makers because it provides them with another excuse for putting off politically tough decisions and/or substantive actions while continuing to spend "programmatic" money. A properly designed and implemented waste management system is "rugged" enough to work with a substantial degree of uncertainty in its feedstream.]

9-4 XI(4) [What we genuinely don't know enough about yet are specific details of how to go about applying alternative treatment/solidification technologies to INEEL's wastes. The reason for this is that DOE-ID has refused to insist that its M&O contractor spend "programmatic" money on actual R&D - virtually all the money spent on alternatives to its pet separation/vitrification-based scheme went to produce "group think" exercises similar to today's Draft HLW EIS.]

9-5 X(5) [There is an important factual error in the NAS report (it isn't the Panel's fault - it was pulled verbatim out of an INEEL technical publication.) Figure 11.1 (p 99) suggests that ICPP/INTEC calcines are about ten times more radioactive than they really are (i.e., that they possess a total radioactivity of about 60,000 curies/m<sup>3</sup>). In this case, the number is important because it suggests that it would take more than one hundred years for those calcines to decay down to a level now considered to be "low". The fact is that typical ICPP/INTEC calcines generate only about 40 watts worth of radioactive heat/m<sup>3</sup> (due primarily to <sup>90</sup>Sr & <sup>137</sup>Cs) which corresponds to a radioactivity of ~7,000 Ci/m<sup>3</sup> - which, in turn, means that they're about at "Class C" LLW limits now & definitely will be below them (fission-product-wise at least), by the time that we've promised to have 'em ready to be shipped offsite.]

9-67 III.D-1(4) [Of course, in a more rational environment it really wouldn't make much difference exactly how "hot" these wastes are because any facility built to treat/dispose of them would certainly be "remoted" anyway - where specific numbers make a difference is when decision-makers decide what they are going to do based solely upon arbitrary (and therefore subject to change) criteria such as the radwaste classification numbers listed in Table II of 10 CFR 61. DOE's infatuation with legalistic hair-splitting ("classification") rather than common-sense implementation of the intent of regulations (another of its "symptoms") is evinced by INEEL's insistence that SBW is fundamentally different than the reprocessing waste that's already been calcined. If/when we ever screw up enough to calcine SBW, we'll discover that the product is just as nasty as the other calcines - it'll have a higher percentage of plutonium, less fission products, more mercury, less cadmium, etc., etc.. The fact that somebody decided to label one of them "high" and the other "incidental" does not constitute a valid reason to treat them differently. They should be turned into one type of waste form and disposed of in one repository.]

9-6 V(6) [The NAS apparently wasn't told that there's enough room in the binsets (set #7) to accept any calcine made from SBW without having to mix it with existing calcines and thereby render it "high". That's

9-7 V(9) [By technologists from BNFL and the British Government's Department of Environment led to a consensus that "inorganic cements" would be appropriate for all radwaste streams generating less than ~500 w/m<sup>2</sup> worth of radioactive heat; i.e., in England the choice of solidification technology is determined by a measurable and technically relevant characteristic of the waste - its history and any arbitrary labels that may have been applied to it in the past (e.g., "high-level", "low-level", "mixed", "incidental", "transuranic", etc.) don't matter. This conclusion is consistent with sound technical and economic reasoning, IAEA guidelines, and the opinions of US technologists willing to assume the professional risks inherent in taking an unblinkered look at the issue. By 1991, BNFL had completed the new reprocessing plant and its cementitious solidification facilities started "hot" operation two years later - it has since converted Sellafield's >15,000 m<sup>3</sup> accumulation of historic reprocessing waste (~150 distinguishable "streams") to 500-liter stainless steel canisters filled with concrete.]

9-66 III.D.1(2) (cont'd) <sup>3</sup> US taxpayers are now paying their government ~\$60,000 (roughly the cost of a four-year degree at a good college) to "characterize" individual barrels of waste being prepared for shipment from INEEL's RWMC to WIPP. The nominal purpose of this activity is to "assign codes" to the waste - the actual analyte concentrations so-determined do not determine how the barrel is shipped or what will be done with it at the repository.

<sup>4</sup> For instance, a "rugged" grout-based solidification system for liquid waste would assume that the waste was "mixed", not over-emphasize waste loading, and incorporate a calcination/incineration pretreatment step. The reason for the latter is that "devolatilization" (which includes denitration) of liquid waste reduces the mass/volume of grout that will have to be made/stored/transported, destroys organics (including things like "listed" wastes and chelating agents), and invariably produces a final product with superior leach resistance. (Unfortunately, most DOE grout is made from uncalcined wastes.)

important because one of its rationalizations for recommending that DOE-ID break its promise to calcine SBW (which wouldn't be good for INEEL's credibility) is that so-causing it to become "high" would make it more difficult to deal with. It wouldn't, making any kind of durable "rock" out of SBW (concrete, HIPed glass-ceramic, or glass) would be facilitated by first burning out the volatile stuff.

Now, let's turn to the EIS itself.

9-8 VII.D(4) DOE has promised to calcine all of INEEL's reprocessing waste. Doing so would simplify its conversion to good-quality waste forms and can be done on time (by 2012 AD) for a reasonable number of dollars. Why does this EIS devote so little attention to ways of actually accomplishing it?

9-12 III.C(2) The "technical" reason that INEEL has managed to calcine only about 10% of its SBW during the last eight years is that its decision-makers deliberately decided to not use the only efficient approach available to do it; i.e., add some sugar to the waste just before squirting it into the calciner. This is a well-established and safe way to calcine SBW if you arbitrarily reject it (today's excuse is "safety") then you either have to dilute the SBW with massive amounts of easily-denitrated stuff such as aluminum nitrate - which makes the calcination process extremely slow, unnecessarily "NOx-ous", and creates a lot more calcine than we need to - and/or run the calciner at a temperature that generates so much "fines" that its offgas system eventually plugs up with dust (the reason why the last "high temperature" calcination campaign had to be terminated). The fact that our decision-makers have also refused to do such things as recover/recycle mercury (electroplate it from the offgas scrub solution) and NOx (via water-scrubbing) from the calciner's offgas has made calcination much less attractive to INEEL's stakeholders (& that mission less viable) than it ought to be. Some modifications to NWCF would cost a lot of money but these ought to be cheap.

9-13 III.C(2)

9-14 III.C(2) Since NOx is the probably the most toxic gas emitted by NWCF (& certainly the most visible one), don't you think that an EIS ought to mention that there's a cheap way to ameliorate the situation? [Cheap? @ 20 cents/pound, enough table-quality sugar to sugar-calcine all SBW would cost about \$0.5 million - "running" NWCF costs ~\$50 million/year & sugar-calcination would cut the required operational time by at least a factor of two.]

9-15 III.C(2) There are two reasons why sugar calcination would significantly reduce (probably by a factor of more than ten) the amount of NOx emitted by NWCF. First, much less "cold" aluminum nitrate would have to be added to the waste (we'd need an Al:Na ratio of ~1:1 instead of the ~3:1 required by the "basis approach" - each mole of Al so-added adds another three moles of nitrate). Second, sugar calcination reduces most of the nitrate in the feed to harmless elemental nitrogen, not NOx.

9-16 III.D.4(7) Since the NAS Panel apparently agrees with me that homogenizing INEEL's radwastes would facilitate the implementation of any subsequent waste form-making process, why isn't the waste coprocessing alternative that I suggested six years ago (i.e., slurry SBW with existing calcines, add some sugar, and then feed both phases into NWCF - immediately "grout" the new calcine) seriously considered in this EIS? It was certainly deemed feasible by Fluor Daniel (1998). The University of North Dakota's fluidized bed combustion research facility ("Energy & Environmental Research Center") offered to do a pilot plant scale demonstration for us for a nominal sum. So did STUDSVIK. Why didn't we look into it?

9-17 III.D.4(4) Why doesn't this EIS mention that STUDSVIK also offered to sell INEEL a brand new, already MACT-compatible SBW calcination system (including a building to put it in) for considerably less than what it's now spending every year trying to "run" NWCF?

<sup>3</sup> The rest of the world (e.g. BNFL at Sellafield) routinely sugar calcines SBW & we successfully tested it in our own fluidized bed calcination pilot plants here at NRTS/INEEL/INEEL thirty-five years ago and again ~ 3-4 years ago. In 1995, a Hanford contractor, VECTRA, had one of its subcontractors, Procede, "reinvented" fluidized-bed sugar calcination of SBW. For some reason, none of those "pro-sugar" reports were cited in INEEL's recent review of SBW calcination options (H. J. Welland, LMITCO INTERNAL REPORT, "NWCF Process Modification for Sodium Bearing Waste Project Conceptual Design", INEL/INT-97-00075, dated April 1997.)

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Incidentally, I've just heard through the company grapevine that most of BBWI's radwaste experts have been cloistered up in town for the last 3-4 weeks trying to decide upon a way of dealing with SBW consistent with all of DOE's customs/policies/assumptions - apparently someone's pushing for a decision on a "preferred alternative".

9-19 III.F.3(1) I've also heard that the SBW treatment being viewed with the most favor invokes running it through centrifugal contactors to separate it into streams labeled called "non-contact handled TRU" and "Class C" LLW, grouting both of 'em, and then shipping both off to be buried in differently-labeled holes at WIPP. Apparently, somebody's decided that there's only so much "room" for one of these waste categories at WIPP (I forget which one) so it would, therefore, make good sense for us to spend a few tens (hundreds?) of million taxdollars separating the stuff before we ship it all off to the same place.

9-20 III.D.4(7) Again, according to the grapevine, none of the NAS report's suggested SBW treatment options are being considered. Why not?

Here are some questions/comments about how the alternatives are represented in the EIS.

9-21 III.C(a) First, most of your process options invoke the grouting of one or more liquid waste streams - most of which would be strongly acidic. None of the figures you've shown depict that those streams will be calcined/incinerated prior to being solidified. Why not? Are you hoping that "declassification" will make the manufacture of top-quality concrete unnecessary?

9-22 III.D.2.a(1) Second, your Hot Isostatic Pressed (HIP) Waste option (Fig. S-9) invokes the HIPing of ion exchange resin. You can't put gas-forming materials into HIP cans. The figure needs to indicate some sort of heat-pretreatment step.

9-23 III.D.3(4) Third, your "Planning Basis" (Fig. S-7) and "Minimum INEEL Processing alternatives (S-12) suggest that Cs-loaded ion exchange resin will be "separated" along with the calcines. Would a process designed to dissolve/extract calcines work with ion exchange resins? Wouldn't it be better to burn those resins and treat the ash? If that's to be done, your figures should depict the required incinerator. Ditto that for all of the "separation" alternatives.

9-24 IX.A(B) In general, it would appear that all of the figures depicting the various separations-based treatment alternatives are greatly simplified relative to that representing "direct cement"; i.e., a considerably higher fraction of the unit operations required to implement them have been left out.

Next, let's discuss the management scenarios that I've had some hand in bringing to the Public's attention - all those that would convert stuff now considered "high" into concrete.

9-25 III.D.2.b(4) First, I'm disappointed that the folks you've hired to produce this EIS have somehow managed to conclude that the "direct cement" option - turning a pile of sand-like calcine into cans full of "rock" by mixing it with cementing agents & water, injecting that grout into steel canisters, and then curing it/then in a pressure cooker (which step might not even be necessary - only some hands-on research can really tell) - would be as "dangerous" as your M&O Contractor's pet separations-based "Planning Approach" - which of course, would require far more unit operations, more time, more people, (a lot) more toxic chemicals, much higher (>2000 F) processing temperatures, multiple waste forms, an extra incinerator, transport to multiple repositories, etc., etc..

9-26 X(4) Second, I was also disappointed to discover at last night's (7Feb00) Public Hearing that DOE and its contractors have persisted in artificially inflating the cost of the "direct cement alternative" by saddling it with a ridiculously high volumetric disposal cost - a figure which has risen from the ~\$300,000/m<sup>3</sup> assumed five years ago to today's even more fantastic \$850,000/m<sup>3</sup>. Here's why this is both irrelevant

<sup>4</sup> A description of one alternative did suggest that its LLW would be "denitrated" before grouting. No indication of how that might be accomplished was given.

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- New Information -

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9-27 I (a) and wrong.] First, INEEL's mission is to make waste forms, not to dispose of them.] Second, the EIS suggests that INEEL's ~5,000 m<sup>3</sup> of HLW (today's calcines plus the additional 500-800 m<sup>3</sup> that could be made from SBW if it were to be efficiently calcined) will create 13,000 m<sup>3</sup> of "grout". Based upon my experience in grouting INEEL calcines, that figure is probably ~30% high.] Third, and much more important, the "supplementary information" in the booklet on the table last night (the necessary figures weren't in the EIS itself) indicates that DOE is still unable to grasp the fact that disposal will be an incremental cost. In other words, that the cost of disposal will not be directly proportional to the geometric volume of waste forms.] Why? 1) Formal analyses have repeatedly concluded that the transport of waste forms to a repository will represent a small fraction of total management cost irrespective of their volumes.] 2) Today's official hypothetical HLW repository site, Yucca Mountain (YM), is large enough (several cubic miles - several tens of billions of cubic meters) to accommodate any type of material(s) that DOE might choose to make from its reprocessing wastes.] 3) YM's "size" is defined in units proportional to the amount of radionuclides to be buried there (the equivalent of that in 70,000 "metric tons of heavy metal"), not the waste's geometric volume.] 4) The drilling/boring equipment necessary to create storage volume in it is already paid for.] 5) SANDIA's "1994 Performance Assessment" indicates that all of INEEL's reprocessing waste adds up to only 320 "metric tons of heavy metal" - 0.46% of YM's capacity.] and, of course, 6) YM is going to cost US taxpayers billions of dollars whether or not any real waste is ever buried there - like all DOE facilities, the cost of actually using YM for its intended purpose will add only a relatively small incremental cost.]

9-31 III.F.2.(1) Third, and finally, the same supplementary information also indicated that the actual processing of ICPP/INTEC waste into finished waste forms via "Direct Cement" would be about as expensive as the "planning approach" (separation/vitrification). That's just plain hogwash - the NAS has produced several reports that point out the relative cost effectiveness of cementitious solidification and cost is one of the main reasons why the UK chose to treat its "historic" reprocessing waste that way.] Also, let's not forget that one of the primary goals of "separations" is to reclassify waste so that a higher fraction of can be grouted instead of vitrified ("cause it's cheaper").

9-32 III.F.2.(1) Considering the degree of "command influence" that goes into the production of DOE-EM technical reports (often reflected by the deliberate omission of data, literature citations, etc., inconsistent with a desired conclusion, see footnote 5), I'm not really surprised how the EIS characterizes "direct cement".

9-33 III.F.2.(1) Here's why a properly implemented "Direct Cement" alternative would have low environmental impact. First, let's define "properly". I've consistently advocated that it be implemented in such a way that all of ICPP/INTEC's waste regardless of "classification" is converted to the same type of waste form and goes to the same repository.] That's not the way the EIS interprets it; its authors propose making a large separate LLW waste stream that's apt to end being left in Idaho - an unnecessary assumption that makes this option much less attractive to stakeholders.] A one-process/one-waste form/one-repository management scenario would be much simpler than any of the other alternatives that would keep the promises made to stakeholders. Simplicity means less equipment, fewer personnel, less chemicals, less paperwork, less confusion, fewer lawyers, etc., etc., - all characteristics that tend to make doing things less "impactful" to both the environment and the taxpayer's pocketbook.]

9-42 VII.D.(3) Our mission is simply to render ICPP/INTEC reprocessing waste ready for transport to a repository that the Federal Government has promised to provide and to then clean up the place, period. It is not to "make work" for another couple of generations of DOE/contractor/subcontractor/regulatory personnel or to justify poor decisions made elsewhere with respect to implementing repositories, categorizing radwastes, or rendering them ready for transport.] My assumptions are that, 1) there's plenty of suitable "Federal

<sup>5</sup> The NAS Panel also pointed this out - and then went on to suggest that it's unwise to base a choice of HLW solidification technology on guesses about what it might cost to dispose of waste forms several decades off in the future.

<sup>6</sup> If reasonable attention is paid to minimizing the solids content of the liquids generated in cleaning up the place (termed NGLW in this EIS), the amount of radioactive "ash" that would be produced by drying/calcining those liquids will be very small with respect to that represented by today's calcines and SBW. Consequently, I proposed that these liquids be processed/disposed of in exactly the same manner - no additional equipment, repositories, assumptions, or paperwork would be required.

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9-44 III.E.(1) Land available (notably at the NTS) for a practical repository for defense-type reprocessing waste<sup>6</sup> (meaning one that is not situated over a huge aquifer (INEEL) and which doesn't assign a phony premium to "volume reduction" (YM)).] 2) the politicians who can decide to implement such a repository will eventually do so.] 3) cement-solidified calcine would meet the "letter of the law" (10CFR-60 & 40CFR-191) as a HLW disposal form.] and, 4), that until a suitable repository actually materializes, we should simply emulate the UK's approach to "historic" reprocessing waste management.]

9-45 III.D.2.b.(6) Concrete-making is intrinsically safer than is either glass-making or HIPing (it's done "wet" - generates less dust - and requires much lower temperatures) and is much easier/cheaper to do on an appropriate (large) scale. The improvements that I and my academic colleagues at PSU have recommended ("hydroceramic" (HC) rather than Portland cement-based grout formulations and the calcination (incineration) of everything that would be rendered more suitable for cementitious solidification by doing so) are to ensure production of top-quality products - materials distinctly more durable than those which BNFL has made out of the UK's "historic" waste and probably also superior to typical radwaste-type glasses. The "Lead lab" should make the DOE Complex's best waste forms.]

9-48 III.D.2.b.(1) BNFL has recently become a prominent player in the US radwaste technology marketplace because it has been able to leverage its tangible successes at home to successfully compete with US-owned firms (many of whose employees work at DOE sites) for US tax dollars. A cornerstone of its reputation is that it devised a practical way to make the UK's "historic" reprocessing waste road-ready and then saw the project through to completion - all done via "direct cement". US taxpayers would be well-served if USDOE would permit its contractors to apply a version of the same technology to its wastes.]

9-49 III.D.2.b.(1) "Direct Cement" makes especially good sense at INEEL for the following reasons:

9-50 III.D.2.b.(1) 1) INEEL has not yet formally committed itself to any particular "preferred alternative".

9-51 III.D.2.b.(1) 2) Because INEEL calcines do not contain excessive concentrations of soluble salts, it would be possible to satisfy the HC "sodalite formulation" rule-of-thumb with high waste loadings.]

9-52 III.D.2.b.(1) 3) Since two of the three elements making up HC binder phases (Na & Al) are high-percent constituents of INEEL calcines, there is no need to separate them (or anything else) prior to solidification. This means that everything would be prepared for offsite disposal - the expressed wish of local stakeholders. (A primary goal of the "volume reduction" practiced at WVDP and SRS is to transfer those elements to "low level" fractions that aren't vitrified.)

9-53 III.C.(2) 4) Simple changes to the existing calcination facility would permit it to efficiently calcine the remaining liquid reprocessing waste - either by itself or (preferably) after it's been slurry-mixed with existing calcines.]

9-54 III.D.2.b.(1) 5) It would also provide a good way to deal with other INEEL radwastes. For example, INEEL must find some way to dispose of ~1000 metric tons of radioactive NaOH generated by reacting metallic sodium reactor coolant with water. Since this just happens to be the same amount of "activator" that would be required to turn ICPP/INTEC's calcines into HC concrete,

<sup>6</sup> Its decision to confound disposal of its own waste with that produced by the commercial nuclear power industry constitutes another reason why the US Federal Government has failed to honor its promises to Idaho (the first official promise to prepare our waste for disposal said it'd be done by 1980). Due to DOD insistence that DOE's civilian waste management responsibilities not interfere with its own interests at NTS, the Federal government chose to "withdraw" another ~600 km<sup>2</sup> of land from Nevada for today's official HLW repository modeling exercise (YM). This plus the assumption that all commercially-produced HLW is to be sent there engenders enough litigation to indefinitely block implementation of that repository - which means that linking these problems causes total paralysis. The most reasonable place for the Federal Government to site a repository dedicated to cold-war defense-type waste is at its cold-war defense-type test range, the Nevada Test Site (NTS). The NTS makes good sense because, a) it's already "federal land" (no new "withdrawal" required) b) it receives less precipitation than do other DOE sites, c) it possesses the USA's deepest water table, d) it has already been the object of more than thirty years worth of immediately relevant hydrological research, e) it's already been irremediably "crapped up" by ~350 nuclear "events", and, finally, f) a little-publicized real example of a practical (cheap) repository for this sort of waste has already been implemented and (then) exhaustively tested (the "GCD" in area 5). However, it is not necessary to wait for a repository siting decision to begin rendering INEEL waste road-ready (the UK didn't) - regardless of exactly where that waste might eventually end up. It is reasonable to assume that HC-type concrete would be at least as durable as glass due to the fact that its mineralogical similarity to natural soil minerals provides less thermodynamic driving force for alteration.

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coprocessing these wastes would solve two problems. If the changes to the existing calcination facility I've alluded to were to be implemented, virtually any sort of liquid or particulate waste (e.g., contaminated soils) could be readily converted to HCS.

6) It is probable that a formal proposal to properly implement an HC-type solidification process would satisfy INEEL's stakeholders.

9-55 7) If a future generation deems it to be both politically expedient and affordable, HC-type concrete monoliths could be hot-isostatically-pressed into "vitrified" ceramic monoliths without removing them from their original canisters. (In other words, today's decision-makers would not have to make an irrevocable commitment to not "vitrify" this waste.)  
III.D.2.b(1)

9-56 8) To retain its "lead lab" status, INEEL needs to succeed at doing something. Direct Cement would permit it to be the first DOE reprocessing site to render its waste road-ready.  
III.D.2.b(1)

Since this EIS is just a draft, let me suggest the following changes for the final version.

9-57 First, make it very clear up front just exactly what it is you're trying to accomplish. If it's already been decided that it's OK to not honor the commitments made in the "Batt Agreement", say so. (For instance, some of the scenarios in the Draft that still propose that SBW will be calcined, assume a completion time of 2014 AD, not 2012 AD - does this two-year "slip" reflect a change in policy?)  
VII.D(2)

9-58 Second, when you present/discuss treatment scenarios that don't make much sense, be sure that you explain the assumptions/conditions that would make them plausible.  
IX.A(3)

9-59 Third, you might want to consider integrating some of INEEL's other waste treatment/disposal problems into your final version (e.g. using ANLW's waste caustic as the activator for "hydroceramics" made out of INTEC calcines.) Doing so would prevent a lot of unnecessary duplication, cause a higher percentage of INEEL's radwaste to be prepared for offsite disposal (which would delight local stakeholders), and save taxpayers a lot of money. (The "stove piping" of EM projects to match existing organizational structures/definitions is another of the "symptoms" identified in "Barriers to Science".)  
III.D.1(b)

9-60 Fourth, when you present/discuss treatment scenarios that have not received programmatic research support, e.g., "Direct Cement/Hydroceramics", make it clear to the reader that that's indeed been the case & also that information about them can be obtained from sources other than therefore non-existent official Government reports. (For example, I've co-authored/published a dozen open-literature research papers that anyone interested in why "direct cement" makes sense might want to see - the "Draft EIS" doesn't acknowledge that non-government report-type technical literature even exists.)  
III.D.4(b)

9-61 Fifth, to ensure that your EIS-preparation subcontractors do a fairer job of representing alternatives such as "Direct Cement" in the final version, insist that they actually contact the persons responsible for developing/championing them - the "draft" doesn't accurately represent what my colleagues & I have done or would recommend.  
III.D.4(b)

9-62 Sixth & finally, please don't characterize DOE's decision to tell its employees/contractors to assume that all waste forms made from its reprocessing waste will have 0.5 MTHU per m<sup>3</sup> as being merely "controversial" (p. S-21). A policy that is inconsistent with both the intent and letter of the law (see 40 CFR 191) and which is largely responsible for DOE's inability to deal efficiently with its own "high level" waste requires a more forceful adjective.  
III.F.2(1)

9-63 Do not change your Publisher. The quality of the photography, printing, general layout, etc. of this EIS is the best I've ever seen in a large government-sponsored document.  
IX.A(2)

<sup>10</sup>For instance, the "Minimum INEEL Processing Alternative" suggests that we are to bundle up our calcines into some sort of transportable (you can't ship powders) temporary waste form (RTV-type rubber cement is being studied for this purpose) & then ship it all off to Hanford where they will somehow undo our solidification process, separate the stuff into various fractions, vitrify(?) all of them, and then ship it all back here for a few(?) more decades worth of "interim" storage. This is too clever to make much sense to the casual reader unless considerable additional background information is provided

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9-64 If you would like to read some technical literature that's not in a DOE-sponsored report, I've written up another research paper (at this point, it's also just a "draft") discussing why "Direct Cement" makes especially good sense for INEEL. It goes into some detail about vitrification's drawbacks (one of which is that its prohibitive cost encourages folks to do "separations") and compares the leach test performance of radwaste type glasses and hydroceramic-type concretes. It's an "easy read" because it's written like the stuff you find in trade journals like *Radwaste Magazine*. Its literature references (35 of them) support the "controversial" contentions I've made in this review. I'll be happy to send you a copy. Want more? I'll also be happy to send you another copy of the report I wrote up for the M&O contractor's HLW department in 1997.  
III.D.2.b(1)

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