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August 7, 1995



Mr. Kevin Oates
U.S. EPA
712 Swift Ave, Suite 5
Richland, WA 99352

COMMENTS ON 100 AREAS SOURCE OPERABLE UNIT FOCUSED FEASIBILITY STUDY

Dear Mr. Oates:

This letter provides Geosafe Corporation's comments on the subject study which has been released for public review. Geosafe has reviewed the study report in depth with the primary objective of determining whether or not the In Situ Vitrification (ISV) technology received a fair and accurate evaluation in the study. Our review has led us to believe that the ISV technology was not properly evaluated in the study. We hereby request that a proper evaluation be performed, since publication of erroneous statements regarding ISV may be expected to result in serious damage to Geosafe's corporate health and investment in commercialization of the ISV technology. Furthermore, an accurate assessment could lead to further consideration of utilizing ISV for portions of the 100 Area cleanup. 41375 41891

We believe that the ISV technology evaluation was probably performed with limited and out-of-date information. This belief is based on statements about ISV that are completely inappropriate for the Hanford site (e.g., water problems, soil composition, etc.). It is likely that the evaluation was limited to information from the DOE ISV program history. Geosafe has been successfully applying the technology on a large-scale commercial basis for over three years now; and we have taken the technology far beyond the point that the DOE development and demonstration program has taken it. Three major EPA supported projects have been conducted, including one here in Washington State, yet Geosafe was not requested to provide input to the study.

We believe that the ISV technology was also considered for application in only a true in situ (undisturbed) application mode. This assumption unnecessarily restricts the potential application of ISV. Geosafe has developed application concepts involving pretreatment, staging of materials for treatment, batch waste processing, and post-processing removal/disposal scenarios that greatly expand the flexibility of ISV for a broad range of application types. In fact, there are few contaminated soil, debris, and buried waste applications in the 100 Areas that cannot be handled

by ISV with some adaptation of the in situ application mode. Geosafe would like to discuss the merit of potentially including a non-traditional application of the ISV technology in this study.

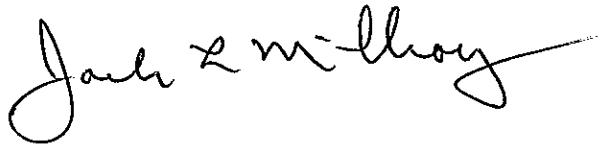
There is no question that ISV offers a superior environmental result relative to overall treatment effectiveness and overall protection of human health and the environment. However, we understand that there are other evaluation criteria to be considered. We recognize there is a predisposition within the Hanford regulatory community to clean up 100 Area sites by excavation and disposal in the ERDF with minimal, if any, treatment. While this predisposition may have been largely developed in response to political and stakeholder interests, it does not satisfy the intent of CERCLA/SARA or RCRA/HWSA regarding treatment, permanence, volume reduction, and use of innovative technologies. In fact, these factors, which are the underlying priorities of Congress, are purposefully given diminished importance in the study through the highly questionable use of low weighting factors. We think that this is a serious mistake.

Nevertheless, while we understand the process and recognize our limited influence upon it, but we do feel that we have the right to insist that the ISV technology be accurately evaluated, using up-to-date information, in this study. Since the current state of the technology is held by Geosafe, we must necessarily be consulted for input to the study. We stand ready to meet with study principals for such purposes.

In addition to the above summary comments, please find attached more detailed comments regarding specific portions of the study report.

Sincerely,

GEOSAFE CORPORATION



Jack L. McElroy
President

cc: Nancy Werdel DOE-RL

# GEOSAFE COMMENTS ON THE 100 AREA FOCUSED FEASIBILITY STUDY



The following comments apply to the study report location cited at the start of each comment. Words in italics are quoted from the report.

1) Page vi, 2rd par. - *"Because it removes contaminants from the waste site and disposes of them in a central disposal facility, it provides a high degree of overall protection."* This is a weak argument for justifying a removal/disposal alternative. Vitrification provides a much higher degree of immobilization than any containment option. Material that has been vitrified will be transformed into a leach resistance material that has a life span in excess of 10,000 years. The vitrified waste form will immobilize contaminants regardless of any sort of natural catastrophe or inadvertent intrusion by man or animal.

2) Page 1-9, 2nd par. - *"Another example is that the In Situ Vitrification Alternative can be used only at sites where the zone of contamination is equal to or less than 5.8 m (19.03 ft)"*. This statement is technically incorrect, In Situ Vitrification (ISV) can be applied to deeper waste sites using special configurations and staging methods. ISV has been selected and is being applied to a seepage pit at the Oak Ridge site that is greater than 25 feet deep.

3) Section 4.1.2 Removal - It is unacceptable that a greater level of detail is provided for the Removal Alternative than the other alternatives. The Removal Alternative provides a discussion of how this alternative will be applied to various waste groups while this level of detail is not provided for the other alternatives.

4) Page 4-16, 1st par. - *"However, specific site characteristics must be considered..."* This is a general statement that is applicable to any treatment technology; the sentence should be more specific or deleted.

*"The presence of excessive moisture or groundwater can limit the economic practicality of In Situ Vitrification ."* This statement may be true for some extreme sites, but is not reflective of the arid site conditions and depth to groundwater at Hanford. If there is a specific site in the 100 Areas where water intrusion is a consideration it should be discussed or this sentence should be deleted. Numerous types of engineering controls can also be used to stop or limit groundwater infiltration thereby allowing ISV to be economically implemented.

*"Soils with low alkaline content may be unable to effectively carry a charge and thereby diminish the applicability of In Situ Vitrification."* This statement has no relationship to Hanford soils and should be deleted. It implies that low alkalinity soils may be expected at Hanford which is not supported by the numerous ISV tests and demonstrations that have been conducted here. Results from these tests show Hanford soil to be ideal for ISV processing.

*"Large quantities of combustible liquids or solids may increase gas production rate beyond the capacity of the off-gas system."* This statement is too vague, it would be clearer to say; current ISV equipment can treat up to 10 weight percent organics but higher concentration can be handled by pretreating the site or by using a larger off-gas treatment system.

*"In addition, the presence of metals in the soil can result in a conductive path that would lead to electrical shorting. However this problem can be avoided by innovative electrode feeding techniques."* This statement is not technically accurate, the electrode feeding system used by ISV systems feed from the top-downward; if shorting becomes a problem the electrodes are merely lifted up and the melting process will continue with no shorting. Electrical shorting has been demonstrated by Geosafe to no longer be a technical problem. Geosafe has vitrified over 20,000 tons of soils with high weight percent metals and has never experienced a shorting problem that stopped a melt. This consideration should be no problem for the 100 Area applications.

*"In Situ Vitrification is currently limited to a maximum depth of 5.8 m (19 ft)."* This comment has been previously addressed (2).

5) Page 4-16, 3rd par. - The discussion of treatability studies is not up to date and should include the latest results from DOE/PNL and Geosafe work.

6) Section 4 - An unbalanced number of figures are used to explain the various alternatives; the Removal Alternative has 4 four figures while the ISV Alternative has none. One or more figures of the ISV Alternative should be included in this section. Photographs and figures of ISV equipment are available from Geosafe upon request.

7) Page 5-8, par. 1 - *"However, the Containment, Removal/Disposal, In Situ Treatment and Removal/Treatment/Disposal Alternatives will generate fugitive dust."* This statement is not accurate in that it implies that the dust generation from In Situ Treatment Alternatives is in the same order of magnitude as the Removal Alternatives. This is not true.

8) Page 5-12, par. 1 - *"Although contamination left in place could be removed in the future, such removal would waste money spent on a surface barrier or in situ treatment, and would be more expensive than immediate removal."* This sentence should be deleted. Sufficient facts have not been presented to justify this statement. Geosafe believes most Hanford sites can be treated by ISV in the cost range of $500 to $700 per ton. This cost may be significantly less than the cost to excavate the contaminated material, transport the material to ERDF, provide long term monitoring for ERDF and reclaim the remediation site. Also, no scientific justification has been given for the need to place a surface barrier over a treated site, to the contrary; Table 5-7 on page 5-37 states that

Alternative SS-8A (ISV) will require minimal maintenance and long term risks are low. In addition, the EPA has never required that a surface barrier or cap be placed over a site treated by ISV.

9) Table 5-7, page 5-39 - *"SS-8A .. Potential success of long-term development of natural ecosystem is low."* This statement is not accurate; most sites treated by ISV will have 3 to 5 or more feet of soil cover placed over the site to level the site to natural grade. HELP Model studies conducted for the Hanford barrier show 3 ft of soil cover is more than adequate to restore natural vegetation. The presence of monolithic vitrified material in the subsurface in not a factor of significance to the environment or future land use.

10) Table 5-7, page 5-39 - *"SS-8A.. Also 4,000 Amps of electricity are required at the beginning of the melt."* The following comment should be added, "This quantity of power is readily available at the Hanford site and its consumption will provide an economic benefit to the region and the stakeholders."

11) Table 5-7, Page 5-42 - "SS-8A.. Of all options, this treatment has the most negative effects in regards to natural resources.." No significant impacts on natural resources will result from leaving a vitrified monolith in the ground. Native vegetation can be reestablished over a treated site, and burrowing animals can inhabit the site with no threat of destroying the integrity of the vitrified monolith.

12) Table 5-7, Page 5-43 - *"SS-8A.. Yes , long-term maintenance and monitoring will be required to ensure that revegetation and restoration efforts are successful."* This alternative will require the least amount of long-term monitoring and maintenance. Vegetation has already been naturally reestablished at Geosafe's test facility, over a large scale melt, that is indistinguishable from the surrounding undisturbed areas.

*"SS-8A.. Some uncertainty with respect to off-gas emissions."* This statement is not accurate, the ISV off-gas treatment system has been designed to meet regulatory requirements with a high degree of certainty. Geosafe has successfully met all regulatory air emission requirements on three commercial ISV projects. Our off-gas treatment system employs a wet scrubber to remove acid gases, a HEPA filtration system to remove particulates (including radionuclides) and a thermal oxidation unit to destroy trace orgainics to better than six-9's DRE. The system can be tailored to meet variable project needs.

13) Table 5-7, Page 5-44 - *"SS-8A: Investigation(s)..."* Many of the statements made in this paragraph are not accurate and have been previously discussed in this letter.

14) Table 5-8, Page 5-46 - Geosafe strongly disagrees with the cost number presented in this

table for Alternative SS-8A (ISV). For example, mobilization/demobilization costs for the ISV Alternative are unrealistically low. Sufficient cost backup information has not been provided in Appendix B to evaluate the other items in the estimate. Geosafe requests that the cost backup information be included in Appendix B.

15) Page 6-2, Section 6.1.1 - Long term effectiveness and permanence ratings are improper because they fail to take into consideration the uncertainties associated with land disposal of residuals and untreated wastes as discussed in Guidance for Conducting Remedial Investigation and Feasibility Studies Under CERCLA (EPA 1988).

16) Page 6-2, Section 6.1.2 - This section should acknowledge EPA's preference for selecting remedial actions that employ treatment technologies that permanently and significantly reduce toxicity, mobility or volume of the hazardous substances as their principal elements (EPA 1988). Geosafe strongly disagrees that the key discriminator for this comparative evaluation are limited to (1) the reduction of mobility and (2) reduction of volumes of wastes.

17) Page 6-4, Section 6.3.1.1 - Geosafe strongly disagrees that a weighting factor of 0.5 should be used for reduction in toxicity, mobility, and volume. This goes entirely against EPA preference for permanent treatment alternatives and biases in favor of containment or removal alternatives.

18) Tables 6-6, 6-7, 6-8 and 6-9 - Geosafe believes the short term effectiveness of the ISV Alternative should be rated significantly higher than the Removal Alternatives because the air quality impacts are significantly lower than the dust associated with excavation. ISV is performed entirely under a containment hood which is connected to an off-gas treatment system. A similar level of protection for an excavation alternative would require a containment structure which is not proposed for these alternatives. ISV uses significantly less heavy equipment than the other alternatives and hence is much less susceptible to worker injuries.

The implementablitly of the ISV Alternative is rated unfairly low when compared to the Removal/Treatment Alternative. ISV has been demonstrated at full scale on Hanford soils, ISV has been commercially available for 3 years, ISV equipment can be implemented at Hanford with no additional research and development, if required an entire ISV system can be fabricated in less than 12 months, and the ISV technology is extremely reliable and is effective for all organic comtaminants and a wide range of inorganics and radionuclides. Conversely, the soil washing technology described in Figure 4-2 has not been demonstrated at full scale, additional research and design would be required to build a full scale soil washing system, it's doubtful that a full scale soil washing system could be brought online in less than 12 months, and the reliability of the technology is variable

depending on soil types and contaminants.

19 Appendix B - The $70/cy disposal cost used in these cost estimates for a RCRA compliant facility is unreasonable low. Currently quoted Hanford disposal costs for low-level waste in unlined trenches is substantially higher than this cost. This report should use either: 1) a commercial disposal cost for low-level waste, or 2) a referenced disposal cost for ERDF that includes long term monitoring and routine maintenance of the facility.

Material quantity take-offs should be provided for the cost estimates.

It is unclear why onsite laboratory costs are higher for the ISV Alternative.

Project Management/Construction Management, General and Administrative, and contingency appear to be substantially higher for the ISV Alternative. Supporting cost backup information should be supplied to support these claims.

Geosafe see no reason why long term monitoring would be required for the In Situ Treatment Alternative. A quality assurance program can be undertaken that would ensure all wastes have been treated.