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Director

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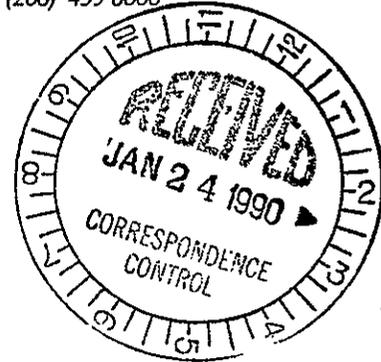
DEPARTMENT OF ECOLOGY

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JAN 19 REC'D

January 16, 1990

Mr. Steve Wisness
Hanford Project Manager
U.S. Department of Energy
P.O. Box 550
Richland, Washington 99352



Dear Mr. Wisness:

Re: Comments on the Simulated High-Level Waste Slurry Unit Closure Plan

This letter transmits Ecology's comments on the September 13, 1989 draft of the Closure Plan for the Simulated High-Level Waste Slurry Treatment and Storage (SHLWS T/S) Unit. The plan was reviewed for compliance with closure requirements of the state dangerous waste regulations (chapter 173-303 WAC).

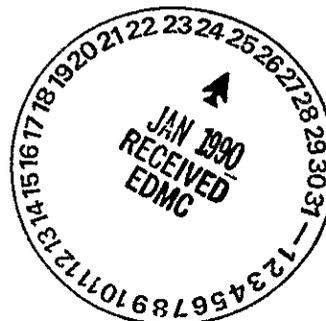
You will note that our comments are primarily concerned with technical aspects of the sampling and analysis plan for this unit. Continuing negotiations at the unit manager level are expected to resolve the deficiencies identified herein without adversely affecting the proposed closure schedule for this unit. Please extend my thanks to members of USDOE and PNL staff for their assistance in our review of the SHLWS Unit Closure Plan. Technical inquiries regarding this notice of deficiency should be directed to Mike Gordon at (206) 438-7024.

Sincerely,

Roger Stanley
Hanford Project Manager

Enclosures

cc: Paul Day
Jack Waite
Wayne Slater



DEPARTMENT OF ECOLOGY
 COMMENTS ON THE CLOSURE PLAN FOR THE
 SIMULATED HIGH LEVEL WASTE SLURRY TREATMENT AND STORAGE UNIT
 January 16, 1990

The following comments reference page and section numbers from the September 13, 1989 draft of the Simulated High-Level Waste Slurry Treatment and Storage (SHLWS T/S) Unit Closure Plan.

- | # | Page | |
|---|------|---|
| 1 | 1-6 | <p><u>Deficiency:</u> Section IV of the Part A application, "Description of Dangerous Wastes," does not fully designate the untreated waste material. Data in section 2.0 of the Sampling and Analysis Plan, Appendix A, indicate that PW0 and PW7A have toxic equivalent concentrations above 0.01%, making them extremely hazardous wastes by the dangerous waste mixtures designation in 173-303-084 WAC.</p> <p><u>Requirement:</u> Section IV should be revised to indicate that untreated PW0 and PW7A wastes would designate as dangerous waste mixtures. Waste code WT01 should be added to the table on page 1-6 and the text on page 1-7 of the Part A application.</p> |
| 2 | 1-9 | <p><u>Requirement:</u> The final closure plan for the simulated high-level waste slurry (SHLWS) unit must include an original photograph of the site. A photocopy is acceptable, however, for this and subsequent drafts of the closure plan.</p> |
| 3 | 2-8 | <p><u>Deficiency:</u> The contour lines in Figure 2-5, "Topographic Map for Area Near SHLWS T/S Unit", appear to be spaced at 50 foot intervals. As a result, it is difficult to tell whether this site is flat as described in the text. Site inspections confirm the flatness of the SHLWS unit, but documentation of this feature is required in the closure plan.</p> <p><u>Requirement:</u> Figure 2-5 should be replaced with a map that shows 2 foot contour lines for a distance of 1000 feet around SHLWS at a scale of 1 inch equal to not more than 200 feet.</p> |
| 4 | 3-5 | <p><u>Requirement:</u> In table 3-3, the total activity for PW7A waste should be corrected from <261.01 to <261.06 pCi/g.</p> |
| 5 | 3-5 | <p><u>Requirement:</u> Section 3.2 should be updated to include the results of acute rat toxicity testing.</p> |
| 6 | 3-8 | <p><u>Deficiency:</u> Table 3-5 lists the results of corrosivity testing on samples from 12 drums of grouted waste. Drums PW7A-272 is listed here, but was not selected in the random sampling schedule presented on page 9 of the "RCRA Plans 'Compliance Notebook' for SHLWS."</p> <p><u>Requirement:</u> Table 3-5 should be corrected or the text in section 3.2.3 should be modified with an explanation why PW7A-272 was sampled.</p> |

Comments on SHLWS
Closure Plan
January 16, 1990

- 7 3-8 Deficiency: Table 3-5 reports a mean pH from the PW0 samples at 11.5. This value disagrees with a pH of 12.01 for treated PW0 waste reported in Appendix A of the "RCRA Plans 'Compliance Notebook' for SHLWS."

Requirement: Explain this discrepancy.

- 8 4-6 Deficiency: Paragraph six (6) in section 4.0 states that a sampling frequency of one random sample from every 12 drums of grout "was selected based on a statistical analysis of sample rates necessary to provide 95% confidence that 99.5% of the treated drum contents would have the same characteristics as the analyzed drums." An earlier PNL document (Lokken 1989, as referenced in the closure plan) states that "grout slurry was sampled at random from 23 of the 306 drums," [approximately one sample from every 13 drums] but that "testing was conducted on samples from 6 drums of treated PW0 and 6 drums of treated PW7A." The reason for taking one sample from every 13 drums but analyzing only one sample from every 25 drums is not made clear in section 4.0.

Requirement: Section 4.0 should be revised to more clearly demonstrate that representative samples were obtained and analyzed from the grouted waste. This demonstration should specify the following:

- number of drums of grouted waste
- number of drums sampled
- number of samples taken
- number of samples analyzed
- number of drums analyzed
- whether the 23 samples were selected randomly from all drums (including secondary waste drums), or whether 12 samples were selected randomly from the PW0 drums and 11 samples were selected randomly from the PW7A drums

At a minimum, the closure plan must show that sampling and analysis procedures resulted in 95% confidence that the grouted wastes in each waste category are below designation limits for EP toxicity and corrosivity in 173-303-090 WAC.

- 9 6-1 Deficiency: Section 6.0 states that "as an interim status unit, the SHLWS T/S unit will be closed according to Section 6.3 of the Hanford Federal Facility Agreement and Consent Order Action Plan". This statement seems to suggest that the SHLWS unit will be closed under interim status closure standards. However, section 5.3 of the Action Plan requires "all TSD units that undergo closure, irrespective of permit status, shall be closed pursuant to the authorized State Dangerous Waste Program in accordance with 173-303-610 WAC [final status closure standards]."

Comments on SHLWS
Closure Plan
January 16, 1990

Requirement: Section 6.0 of the closure plan should be revised to clarify that although the SHLWS unit is now under interim status, it will be closed under final status standards in 173-303-610 WAC. This change is consistent with the citations in section 6.1 of the closure plan which reference closure requirements in 173-303-610 WAC.

- 10 6-3 Deficiency: Section 6.1.1.1 states that "if it is determined to be impractical to remove all," contaminated soils and other dangerous waste residues, "they will be stabilized on-site such that they will not pose a risk to human health or the environment." This risk-based closure performance standard is inconsistent with the closure performance standard of 173-303-610(2)(b) WAC and with the container system closure requirement of 173-303-630(10) WAC. Discovery of extensive or impracticably removed contamination at the SHLWS site will require revision of this closure plan, approval by Ecology, and preparation of a post-closure plan prior to beginning any closure activities.

Requirement: Section 6.1.1.1 should be revised to clarify that if the closure performance standard in 173-303-610(2)(b) WAC is not met by the planned closure activities, the SHLWS unit will not attain clean closure, and post-closure care will be required in accordance with 173-303-610(7) WAC.

- 11 6-9 Deficiency: Section 6.1.5 contains a survey plat notice wherein references are made to the regulations issued by EPA in 40 CFR Parts 265.116 and 265.119.

Requirement: These references should be replaced by 173-303-610(9) WAC and 173-303-610(10) WAC respectively. In addition, "EPA" should be replaced by "the state of Washington".

- 12 6-11 Requirement: Section 6.1.6.2 states that if it is necessary to close any portion of the SHLWS unit as a dangerous/mixed waste disposal unit, an appropriate notice for the property deed will be prepared. Section 6.1.6.2 need not be revised at this time, but USDOE/PNL should be advised that requirements on "an appropriate notice for the property deed" are being developed for other RCRA closures at the Hanford site (e.g., 300 Area Solvent Evaporator). If a notice in the deed is required for the SHLWS unit, it must conform to these requirements.

- 13 6-11 Deficiency: Sections 6.1.7, 6.1.8, 6.1.9, and 6.2, reference 40 CFR 265.140(c) for requirements on closure cost estimates, financial assurance, and liability coverage. This federal regulation does not apply to closure of the SHLWS unit.

Comments on SHLWS
Closure Plan
January 16, 1990

Requirement: These sections should be revised to reference the applicable state regulation in 173-303-620(1)(c) WAC.

- 14 6-15 Deficiency: Section 6.3.1.4 states that the "199 drums of SHLWS have been solidified within 306 drums." No reference is made to disposition of the 11 drums of secondary waste.

Requirement: Section 6.3.1.4 should be revised to clarify that the secondary wastes (drum liners, absorbent, soil) were also grouted within the 306 drums. If this is not the case, specify the disposition of this secondary waste.

- 15 6-15 Deficiency: Section 6.3.1.4 states that "the maximum inventory of dangerous wastes stored" in SHLWS container storage area was 306 drums of grouted waste, and that the maximum stored at the less-than-90-day storage area was 79 drums. Neither the size of these drums nor the total volume of wastes is given.

Requirement: Section 6.3.1.4 should be revised to indicate the maximum waste inventory (in liters) of the canister storage area and the less-than-90-day storage area.

- 16 6-16 Deficiency: Section 6.3.1.6 states that "sampling and analysis will be conducted according to a Quality Assurance Project Plan (QAPjP)". This quality assurance plan must be included in the next draft of the closure plan so that the sampling and analysis plan may be evaluated for compliance with 173-303-110(2) and (3) WAC. Chapter 1.1 in the *Test Methods for Evaluating Solid Waste, Physical/Chemical Method, SW-846* (third edition) describes the function and essential elements of a QA project plan.

Requirement: Before the SHLWS closure plan may be approved, a quality assurance project plan must be submitted. Section 6.3.1.6 and the sampling and analysis plan (Appendix A) should be revised accordingly.

- 17 6-21 Deficiency: Section 6.3.2.2 describes the management of wastes generated as a result of closure activities, and states that all wastes will be sampled to determine whether they are dangerous wastes. One such waste will be spent acetone from equipment rinsing. Because this material is a listed waste under 173-303-082 WAC, all spent acetone must be managed as a dangerous waste regardless of waste analysis.

Requirement: Section 6.3.2.2 should be revised to state that all spent acetone will be managed as dangerous waste, or that some other non-listed solvent will be used.

Comments on SHLWS
Closure Plan
January 16, 1990

- 18 6-23 Deficiency: Section 6.3.2.4 states that "soils beneath the drum storage areas having visual evidence of contamination will be removed." This soil decontamination criteria is incomplete, and seems inconsistent with the plans in section 6.3.1.6 for removal of soils which are not visibly contaminated, but which do not meet the closure performance standard.

Requirement: Section 6.3.2.4 should be revised to clarify that all contaminated soils will be removed, including those which are visibly contaminated and those which are found to be contaminated through the sampling and analysis effort.

- 19 A-4 Deficiency: Table 1 presents the results of a toxic mixture designation for PW0 waste. The toxicity category for $ZrO(NO_3)_2 \cdot 2H_2O$ is listed as "D". This compound is not found in either 40 CFR 302.4 (Spill Table) or the National Institute for Occupational Safety and Health's *Registry of Toxic Effects of Chemical Substances*.

Requirement: USDOE/PNL should identify the source of the given toxicity category for $ZrO(NO_3)_2 \cdot 2H_2O$.

- 20 A-5 Deficiency: Table 3 presents the results of a toxic mixture designation for the PW0/PW7A mixture. $NaNO_3$ is missing.

Requirement: Table 3 should be revised accordingly.

- 21 A-6 Deficiency: Section 2.0 contains a list of the minimum concentrations for individual toxic constituents which would cause a waste to be designated as dangerous. These values are proposed as designation limits for demonstrating compliance with the closure performance standard in 173-303-610(2)(b)(ii) WAC. This approach fails to consider the additive effects in designating waste mixtures with many toxic components. That is, the individual constituents may be present at levels below their designation limits, but the sum of their equivalent concentrations may be above the limit of 0.001% for the entire mixture. To account for this, no individual toxic compound should be present above 10% of its designation limit.

Beyond this standard, closure activities at SHLWS must also ensure that no wastes remain at concentrations above the standard soil cleanup levels specified in the "How Clean Is Clean" (HCIC) guidance document (attached).

Requirement: For constituents listed in 173-303-081, -082, and -090 WAC, the closure performance standard is background. For constituents with specified soil cleanup levels in the "How Clean is Clean" guidance, the closure performance standard is the specified level or background. For those toxic constituents not otherwise designated as characteristic or

Comments on SHLWS
Closure Plan
January 16, 1990

listed wastes, and for which there are not more stringent soil cleanup standards established, the following closure performance standards apply after final approval by Ecology:

<u>TOXIC CATEGORY</u>	<u>MAXIMUM ALLOWED CONCENTRATION</u>
X	1 ppm
A	10 ppm
B	100 ppm
C	1000 ppm
D	10000 ppm

It should be noted that these limits for wastes in category B, C, and D are the same as those proposed in the draft sampling and analysis plan. It should also be noted that all carcinogenic and persistent compounds, as defined in 173-303-084(6) and (7) WAC, must be removed to their designation limits. Section 2.0 should be revised accordingly.

- 22 A-9 Deficiency: Table 4, "Summary of Required Analyses and Required Detection Limits," proposes that for soils in the waste management units, contaminant concentrations need not be determined for arsenic, lead, mercury, selenium, organics, or pH. Because the types of wastes stored in the less-than-90-day storage area are not known, and because previous uses of the 1234 laydown yard are not well known, the sampling and analysis plan should be expanded to include analysis of the waste management unit soils and for all EP toxic metals, organics, and pH.

Requirement: Column 2 in Table 4 should be revised to show that soil from the waste management units will be analyzed for all EP toxic metals, volatile organics, semi-volatile organics, and pH.

- 23 A-9 Deficiency: Table 4 presents required detection limits for barium, cadmium, chromium, and silver. These levels are well above what should be expected for background concentrations of these metals (Watson 1983, as referenced in the closure plan). In order to determine that all EP toxic metals have been removed to background concentrations, in accordance with 173-303-610(2)(b)(i) WAC, the detection limits for soils in the waste management units may not be higher than the concentration found in background soils. If the proposed inductively coupled plasma atomic emission spectroscopy (ICP) cannot achieve this, then more sensitive methods will be required.

Requirement: Table 4 and table 5 should be revised to show that the required detection limits for barium, cadmium, chromium, and silver in soils from the waste management units will not be higher than concentrations found in background soils. Text in section 3.3 should also be revised accordingly.

Comments on SHLWS
Closure Plan
January 16, 1990

- 24 A-11 Deficiency: Footnote 6 in table 5 states that detection limits for semi-volatile organics are "generally in the low mg/kg range." This range seems too high.
- Requirement: Revise footnote 6 with a lower detection limit (in the range of 660 - 3300 ug/kg, as suggested in SW-846 method 8270), or justify the proposed higher limit.
- 25 A-12 Requirement: In the third sentence of the second paragraph of section 3.2, "effect" should be changed to "affect".
- 26 A-12 Deficiency: Section 3.2 states that pH of aqueous wastes will be determined using the methods in WDOE 83-13, "Chemical Testing Methods". It is not clear whether the corrosivity of soils will also be determined. This determination is required under 173-303-090(6)(a)(iii) WAC.
- Requirement: Section 3.2 should be revised to clarify that soils will be analyzed for corrosivity using the method in attachment 3 to Appendix B of WDOE 83-13.
- 27 A-14 Requirement: In the last sentence of the first paragraph, "mean population" should be changed to "mean concentration."
- 28 A-14 Deficiency: Section 4.0 states that the goal of the sampling plan is to demonstrate that there is not a statistically significant difference between the mean contaminant concentrations in the background population and in the waste unit population. This goal is appropriate, but the sampling plan must also demonstrate that no single waste unit sample contains contaminant concentrations significantly above background (for those constituents whose cleanup level has been identified as background in section 3.0 of the sampling plan).
- Requirement: Section 4.0 should be expanded to state that another goal of the sampling plan is to show that all waste unit samples contain hazardous constituents at concentrations less than 2 standard deviations above mean background (for those constituents whose cleanup level has been identified as background in section 3.0 of the sampling plan).
- 29 A-14 Deficiency: Section 4.0 states that soils will be sampled from 0 to 12 inches in depth. This large sample size may tend to obscure the presence of a narrow band of concentrated contamination (e.g., 1-2 inches thick). In addition, taking samples from only one depth (the surface) will not detect the presence of more mobile constituents which may have migrated to greater depths.

Comments on SHLWS
Closure Plan
January 16, 1990

Requirement: Section 4.0 should be revised to call for sampling over multiple depths and from narrower ranges in depth (e.g., samples from 3-9 inches deep and from 18-24 inches deep).

- 30 A-15 Deficiency: Section 4.0 states that sufficient samples will be taken to provide a 95% confidence interval equal to one standard deviation for the estimate of the difference between population means (background versus waste unit). It is not clear from this description what is meant by the "one standard deviation" (i.e., is this the pooled estimate of the common variance?).

Requirement: Section 4.0 should be revised to more fully explain the statistical basis for the SHLWS sampling plan.

- 31 A-15 Deficiency: Section 4.0 states that "the potential exists for the waste unit soils to have higher variability than the background soils" so twice as many samples will be sampled from the waste unit as from background. One of the assumptions used in Mendenhall (as referenced in the closure plan) is that the population variances are equal. If this is not the case, Mendenhall states that "an adjustment must be made in the test procedure and the corresponding confidence interval." It is not clear that simply doubling the number of samples from the waste unit will accomplish the adjustment referred to in Mendenhall.

Requirement: Section 4.0 should be revised to justify the use of the proposed sampling plan if the waste management unit soils have greater variability than background soils.

- 32 A-16 Deficiency: Section 4.0 states that "sample locations will be selected randomly from uniform grids within the background area and waste management unit." Because the three waste management units (SHLWS storage area, SHLWS treatment area, and less-than-90-day storage area) are known to have contained different types of wastes, simple random sampling may not be appropriate. Consideration should be given to the use of stratified random sampling as presented in chapter 9 of SW-846.

Requirement: Section 4.0 should either be revised to justify the use of simple random sampling, or some form of stratified random sampling should be implemented.

- 33 A-16 Deficiency: Section 4.0 states that "the waste management area is defined as the SHLWS T/S storage area, SHLWS T/S treatment area, and less-than-90-day storage area." The waste management area must also include all areas potentially affected by activities within the individual treatment and storage units. For example, waste which has leaked from a drum in the SHLWS storage area may contaminate soils

Comments on SHLWS
 Closure Plan
 January 16, 1990

outside the perimeter of the SHLWS storage area. To ensure that these potentially contaminated areas are included in the sampling plan, the waste management areas should be extended 5-10 feet beyond their current boundaries.

Requirement: Section 4.0 should be revised accordingly.

- 34 A-16 Deficiency: Section 4.0 states that "other activities within the 3000 Area may have resulted in background levels above native environmental background. The sampling will determine whether waste management activities have resulted in levels above the local background." For closure of the SHLWS unit, this approach is accepted. However, if sampling reveals that local background is significantly above what might be expected of native environmental background (e.g., elevated levels of synthetic organics), reevaluation of the SHLWS unit closure plan will be necessary.

Requirement: Section 4.0 should be revised to state that if local background concentrations of man-made hazardous constituents are significantly above natural background values encountered elsewhere at the Hanford site, the closure plan will be amended. Section 4.0 should also be revised to reference ongoing site characterization activities in the 1100-EM-1 operable unit. Some of the operable unit data may be evaluated against local background data for SHLWS.

- 35 A-18 Deficiency: The last sentence on page 18 states that "enough new samples will be randomly selected to equal one standard deviation at a 95 percent confidence level." The meaning of this sentence is unclear.

Requirement: The referenced sentence should be clarified.

- 36 A-21 Deficiency: Section 4.0 states that visibly contaminated soil will be excavated and analyzed for ICP metals, EP toxic metals, volatile organics, and semi-volatile organics. As noted in comment #26, potentially contaminated soils should also be analyzed for corrosivity.

Requirement: Section 4.0 should be revised to state that visibly contaminated soils will be analyzed for corrosivity.

- 37 A-23 Deficiency: Section 5.1 states that "soil samples will be limited to a homogenized composite sample of the first 12 inches of soil at each designated sampling location." As noted in comment #29, this sampling size and depth is inadequate.

Requirement: Section 5.1 should be revised to reflect changes recommended in comment #29.

WASHINGTON DEPARTMENT OF ECOLOGY

FINAL CLEANUP POLICY - TECHNICAL
Effective Date July 10, 1984

PURPOSE: The Cleanup Policy provides a framework to determine the cleanup level for releases of materials that threaten public health and/or the environment. The cleanup levels derived from this policy are goals that will be used in the feasibility assessment to evaluate the most appropriate remedial action and may be revised based on the feasibility assessment results.

SUMMARY: The Cleanup Policy identifies three types of cleanup levels: Initial Cleanup Levels, Standard/Background Cleanup Levels, and Protection Cleanup Levels. The three cleanup levels are described in Parts I, II, and III of this policy, and their relationship is shown in Figure 1. The purpose of the Initial Cleanup (Part I) is to eliminate all imminent threats to public health and the environment, and to eliminate situations where the difficulty of cleanup will be increased without a timely response. This may be done by either a Total Cleanup, a Partial Cleanup, Site Stabilization, or a combination of Partial Cleanup and Site Stabilization, depending on the site conditions. The feasibility of these options is determined in the Initial Cleanup Assessment. Standard/Background Cleanup Levels are described in Part II and are assigned to all sites where Total Cleanup is not implemented. The purpose of the Standard/Background Cleanup is to eliminate any potential threat to public health or the environment over the longer term. The Standard/Background Cleanup Levels are based on appropriate water quality and air quality standards, or, if standards do not exist, background. The technical feasibility of the Standard/Background Cleanup Levels is determined in the Preliminary Technical Assessment. If, based on the Preliminary Technical Assessment, the Standard/Background Cleanup Levels are judged not to be achievable or appropriate then Protection Cleanup Levels are assigned to the site. Protection Cleanup Levels are described in Part III and are based on the following: (1) multiples of appropriate standards or background (for soil with a threat to surface water or groundwater) or 2) Dangerous Waste Limits (for soil with a threat to air) or 3) site-specific characteristics. Predictive modeling may be used to define Protection Levels if sufficient site-specific information exists. If additional monitoring data is needed to further define the contaminant migration characteristics prior to determining a Protection Cleanup Level, the site may be assigned temporarily to Interim Monitoring status.

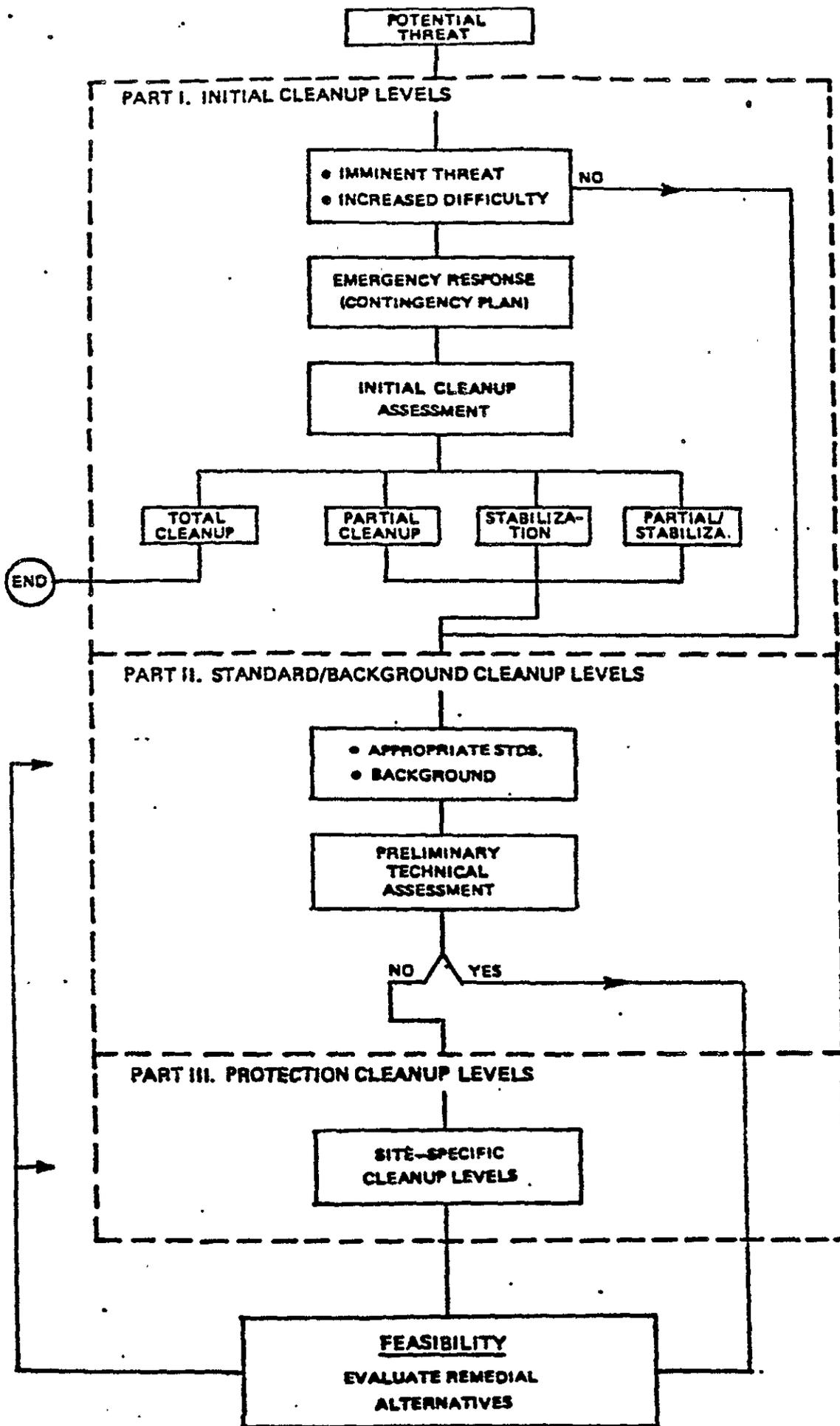


Figure 1

PART I

INITIAL CLEANUP LEVELS OF SOIL,
SURFACE WATER, GROUNDWATER, AND AIR

Description - An Initial Cleanup Level is implemented at a site when a release of material is an imminent threat to public health or the environment or difficulty of cleanup increases significantly without timely remedial action. Examples - spills, sites subject to overland transport or flooding. All sites must be evaluated to determine whether Initial Cleanup is needed. The goal of the Initial Cleanup is total cleanup, however, this will not be possible in all cases due to site conditions. A flow diagram for Initial Cleanup decisions is shown in Figure 2.

A. Remedial Options

1. Total Cleanup - Eliminate all public health and environmental hazards by removing and properly disposing of all known contaminants. Typical site characteristics where Total Cleanup is achievable are listed as follows:
 - a. Well-defined contamination boundaries.
 - b. Concentrated substances.
 - c. Limited extent of contamination.
2. Partial Cleanup - Eliminate imminent public health and environmental hazards by only removing those portions of the known contamination that represent an immediate hazard, or that significantly increase the difficulty of eventual cleanup.
3. Site Stabilization - Eliminate imminent public health and environmental hazards by removing all contaminant pathways that represent an immediate hazard or that significantly increase the difficulty of eventual cleanup.
4. Combinations of Partial Cleanup and Site Stabilization - Eliminate imminent public health and environmental hazards by removing portions of the contamination and contaminant pathways that represent an immediate hazard or that significantly increase the difficulty of eventual cleanup.

B. Methods to Indicate Contamination Boundaries

1. Discoloration, or
2. Broad indicator chemical tests: pH, Total Organic (TOC), Total Organic Halogen (TOX), Halogenated Hydrocarbons (HH), Polycyclic Aromatic Hydrocarbons (PAH), specific conductance, or

3. Odor/organic vapor detection, or
4. Mass calculations that compare the quantity of contaminants released to the quantity removed.
5. Vegetative impacts: withering, yellowing, etc.

C. Followup

1. Total Cleanup - Sampling and monitoring to verify Total Cleanup unless on-site inspection judges Total Cleanup to be complete based on site conditions and effectiveness of the cleanup indicator.
2. Partial Cleanup, Site Stabilization, or Combination - All partial cleanup and site stabilization programs must be followed up with sampling and monitoring to determine the appropriate remedial cleanup levels.

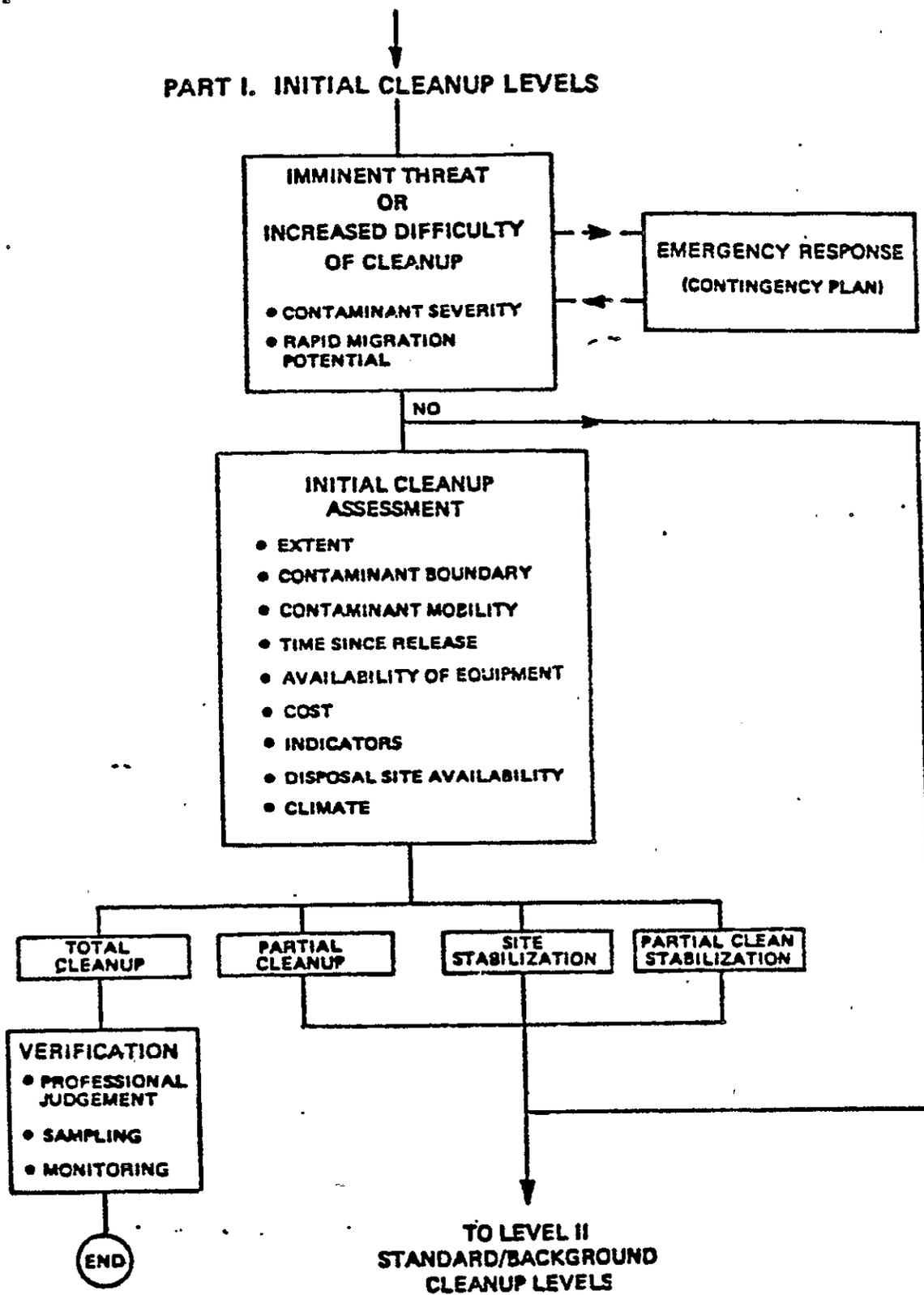


Figure 2

PART II

STANDARD/BACKGROUND CLEANUP LEVELS OF
SOIL, SURFACE WATER, GROUNDWATER, AND AIR

DESCRIPTION: Standard/Background Cleanup Levels are assigned to all sites when a release of material represents a threat to public health or the environment over the longer term or Total Cleanup was not implemented during Part I, Initial Cleanup. A flow diagram for Standard/Background cleanup level decisions is shown in Figure 3.

A. Cleanup Levels

1. Soil

- c. 10X the appropriate drinking water or water quality standard, or
- b. If no standard exists, 10X water quality background, or
- c. If water quality background is not detectable, soil background

2. Groundwater and Surface Water

- a. Appropriate drinking water or ambient water quality standard
- b. If no standard exists, background

3. Air

- a. OSHA/WISHA limits for air quality over the site prior to backfilling
- b. Ambient air quality standards at the site boundaries prior to backfilling
- c. If no standards exist, background

B. Followup

1. The technical feasibility of the Standard/Background Cleanup Level is evaluated in the Preliminary Technical Assessment. Site characteristics that should be considered in the Preliminary Technical Assessment are listed as follows:
 - Presence of sole source aquifers
 - Barriers to contaminant migration and degree of natural protection
 - Sorptive properties of soil and/or aquifer

- Contaminant mobility
- Depth to groundwater
- Groundwater and surface water existing and potential use, quality, and quantity.
- Occurrence of volatile contaminants (air)
- Susceptibility to wind erosion or reentrainment (air)
- Availability of alternate water supplies

If the Standard/Background Level is achievable and appropriate it is used to evaluate the alternative remedial actions in the Feasibility Assessment.

2. If the Standard/Background Level, based on the Preliminary Technical Assessment, is not achievable or appropriate, Protection Levels (site-specific cleanup levels) must be defined for the site in Part III of this policy.

II. STANDARD/BACKGROUND CLEANUP LEVELS

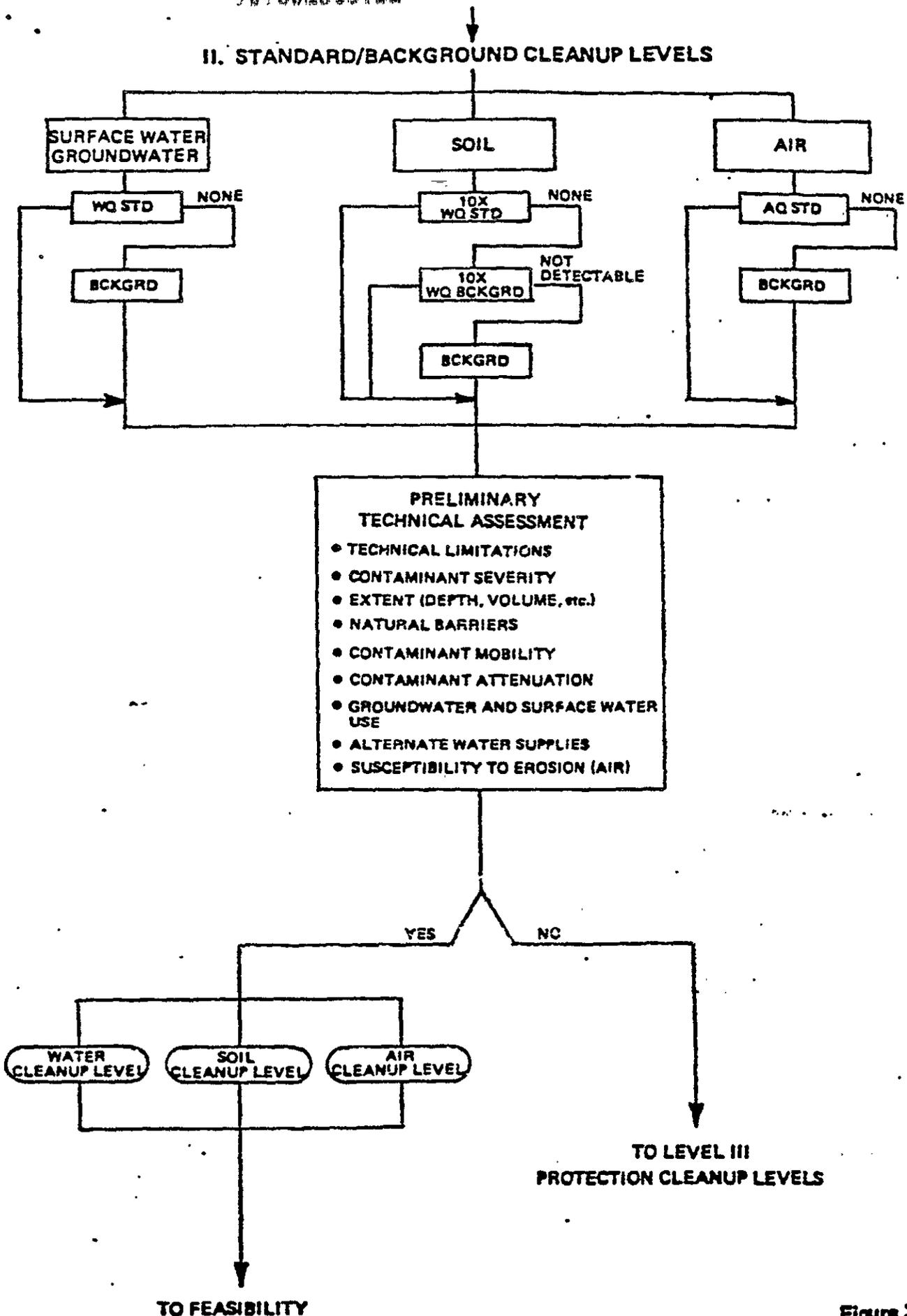


Figure 3

PART III

PROTECTION CLEANUP LEVELS OF
SOIL, SURFACE WATER, GROUNDWATER, AND AIR

Description: Protection Levels are site-specific cleanup levels that may be assigned only after the Preliminary Technical Assessment shows that Standard/Background Levels are not achievable or appropriate for the site.

Protection Levels are defined using one of the following:

1. Specified multiples of the appropriate water quality standard or background, (for contaminated soil with a threat to water), or
2. Dangerous Waste Limits (for contaminated soil with a threat to air), or
3. Site-specific information on contaminant migration characteristics, leaching tests, or biologic tests, etc. Predictive modeling may be used provided sufficient site-specific information exists to calibrate the models.

A flow diagram for Protection Cleanup Level decisions is shown in Figure 4.

A. Cleanup Levels

1. Soil Protection Level - Threat to Water
 - a. 100X the appropriate water quality standard, or
 - b. 100X water quality background, or
 - c. 10X soil background, or
 - d. Defined based on site-specific contaminant and soil characteristics, leaching tests, biologic tests, etc. If sufficient data is available predictive models may be used to define Protection Levels as follows:
 - 1) Define the maximum acceptable level of contamination in the groundwater directly underlying the contaminant source using:
 - a) The appropriate water quality standards or water quality background,
 - b) Biologic testing, or
 - c) The Groundwater Protection Level (defined below)
 - 2) Define the maximum acceptable concentration gradient with verified and calibrated transport models using site-specific contaminant, hydrologic, and soil

characteristics. The concentration gradient is used to determine the Soil Protection Level, the maximum acceptable concentration of soil contamination at the source.

2. Soil Protection Level - Threat to Air
 - a. Dangerous Waste Limit using equivalent concentration for LC₅₀ (inhalation) = .001 percent, or
 - b. Dangerous Waste Limit for respiratory carcinogens
 3. Groundwater and Surface Water Protection Levels
 - a. Defined based on site-specific information such as contaminant migration characteristics, site geology and hydrology, leaching tests, biologic tests, etc. If sufficient data is available predictive models may be used to define Protection levels as follows:
 - 1) Identify existing and potential receptors, then
 - 2) Define an acceptable concentration for the receptors using the appropriate water quality standards, background, or biologic tests, then
 3. Define the maximum acceptable concentration in the groundwater or surface water using site-specific characteristics in verified and calibrated contaminant transport models.
 4. Interim Monitoring - Interim Monitoring may be implemented when additional monitoring is required to define site-specific migration characteristics provided that:
 - a. A delay in cleanup will not increase the risk to public health or the environment, and
 - b. A delay will not increase significantly the difficulty of cleanup.
- B. Followup - The Protection Cleanup Levels are used to evaluate the alternative remedial actions in the Feasibility Assessment. Long-term monitoring must be conducted at all sites where Protection Levels are adopted for cleanup to verify that there is no threat to public health or the environment.

III. PROTECTION CLEANUP LEVELS

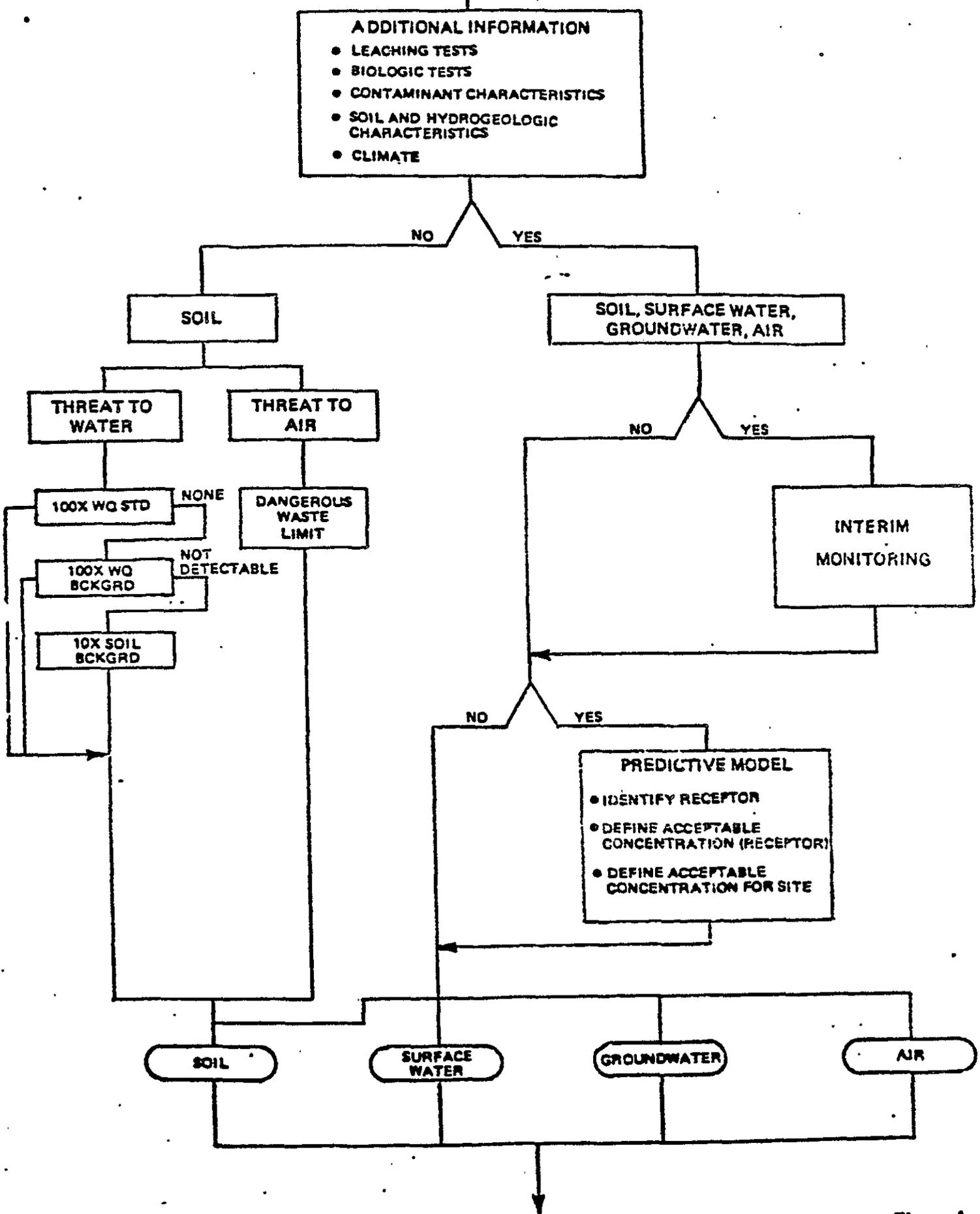


Figure 4

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DISTRIBUTION COVERSHEET

Author	Addressee	Correspondence No.
R. F. Stanley, Ecology cc: J. L. Waite	S. H. Wisness, DOE-RL	Incoming #9000366
Subject COMMENTS ON THE SIMULATED HIGH-LEVEL WASTE SLURRY UNIT CLOSURE PLAN		

01/24/90		Internal Distribution		
Approval	Date	Name	Location	w/att
		Correspondence Control	A3-01	X
		L. C. Brown	H4-51	X
		C. DeFigh-Price	B2-20	X
		C. J. Geier	H4-57	X
		K. L. Hoewing	B3-06	X
		R. E. Lerch (Assignee)	B2-35	X
		H. E. McGuire	B2-35	
		R. C. Nichols	B3-02	X
		J. E. Nolan	B3-01	
		L. L. Powers	B2-35	X
		S. M. Price	H4-57	X
		F. A. Ruck, III	H4-57	X
		D. E. Simpson	B3-51	X
		J. L. Waite	B2-35	X
		S. A. Wiegman	B2-19	X
		R. D. Wojtasek	B2-15	X
		TPA Integr. & Control	B2-35	X
		EDMC	H4-22	X

