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**Permitting Strategy for Hanford
Site Research, Development,
and Demonstration Activities
for Treatment, Storage, or
Disposal of Hazardous Waste**

Volume 2: Permit Options

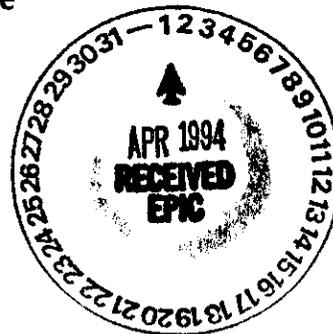
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September 1993

Prepared for the U.S. Department of Energy
under Contract DE-AC06-76RLO 1830

Pacific Northwest Laboratory
Operated for the U.S. Department of Energy
by Battelle Memorial Institute



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Permitting Strategy for Hanford Site Research,
Development, and Demonstration Activities
for Treatment, Storage, or Disposal of
Hazardous Waste

Volume 2 - Permit Options

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Prepared for
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Executive Summary

The Hanford Tri-Party Agreement (TPA) required that the U.S. Department of Energy (DOE), Pacific Northwest Laboratory (PNL), and Westinghouse Hanford Company (WHC) submit a Resource Conservation and Recovery Act (RCRA) Part B permit application for thermal treatment activities by December 31, 1993. The Part B permit application process is lengthy and not very compatible with the innovative, experimental, and dynamic nature of developing treatment and disposal technologies. Therefore, DOE has requested and received a one-year extension to explore and develop a strategy on other regulatory or permitting options which might be more appropriate to Research, Development, and Demonstration (RD&D) activities at the Hanford Site. The strategy will take advantage of existing options that offer flexibility and the opportunity to accelerate technology development; facilitate implementation of effective, innovative alternative technologies; implement non-redundant, cost-effective strategies; and assist DOE in meeting the TPA milestones while still ensuring protection of human health and the environment.

The options to be evaluated include the 1) treatability study exemption, 2) treatment by generator exemption, 3) permit by rule, 4) RD&D permit, 5) land treatment demonstration permit, 6) Part B permit, and 7) the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) on-site exemption. (Figure S.1 and Table S.1 illustrate and summarize these options.) The ongoing strategy should identify "targeted" technologies, activities, and facilities; identify permitting options; recommend permit and compliance options for each target; and define a schedule for permit development.

- 1. Treatability Study Exemption:** Samples sent to laboratories or treatment facilities for treatability studies are exempt from hazardous waste regulations, including permitting requirements, if certain provisions are followed. The existing limits on the amount of hazardous waste that can be handled under this exemption could limit the utility of this option for bench- or moderate-scale treatment studies. Changes proposed by the U.S. Environmental Protection Agency (EPA) on July 7, 1993 would increase those limits and facilitate use of this mechanism.
- 2. Treatment by Generator Exemption:** If certain dangerous waste notification, reporting, accumulation, and storage time limit provisions are complied with, EPA and Washington State Department of Ecology (Ecology) allow generators to treat waste in accumulation tanks or containers without a RCRA permit. Ecology has established administrative, performance, safety and cleanup standards as prerequisites for employing this option, and also uses toxicity and risk-benefit analysis to evaluate its applicability.
- 3. Permit by Rule:** Facilities which already have Underground Injection Control or National Pollutant Discharge Elimination System (NPDES) permits for discharges need only meet a subset of the RCRA regulatory requirements to be considered to have a permit under RCRA. Also,

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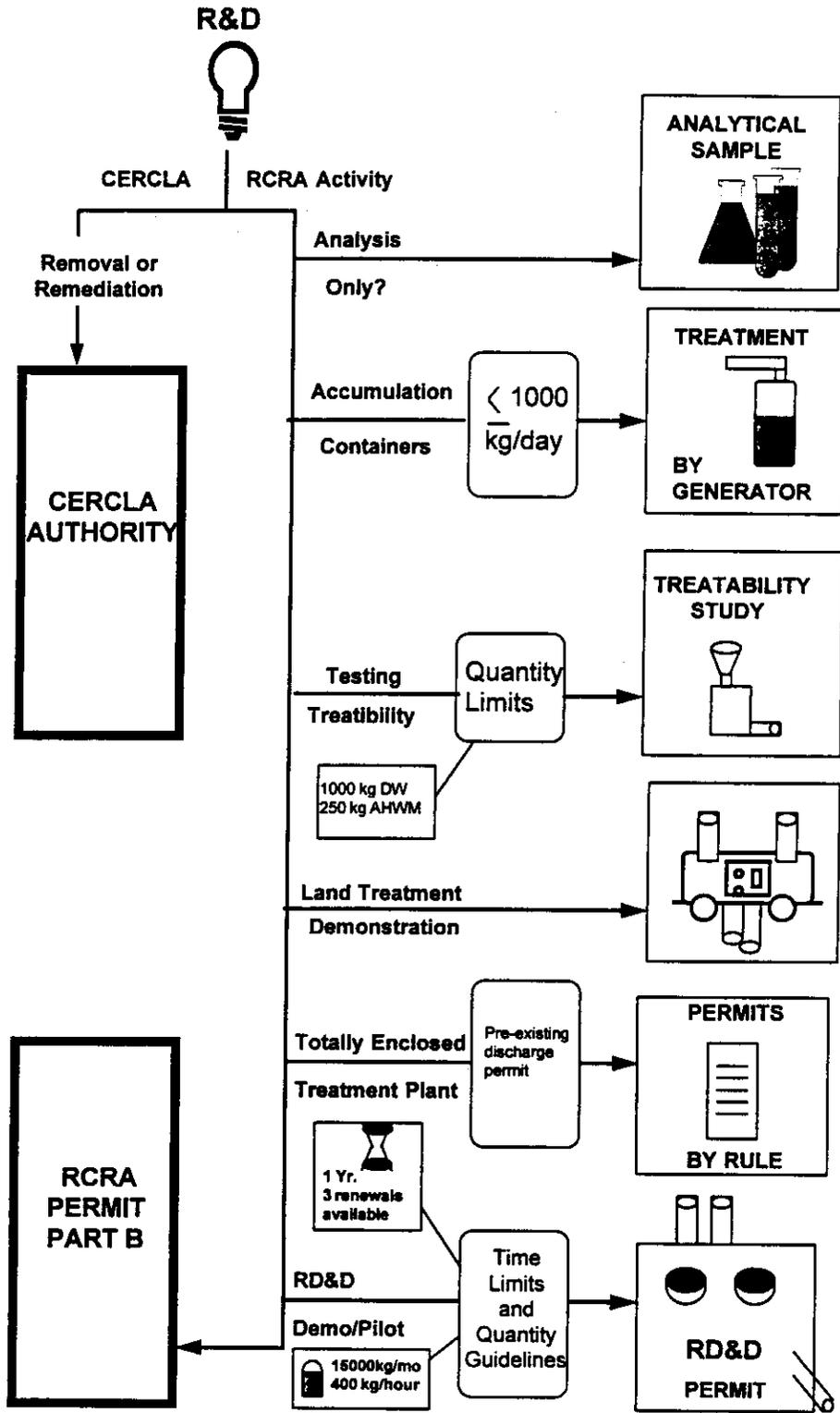


Figure S.1. Permit Options Pathway

Table S.1. Summary of Regulatory and Permitting Options

Regulatory Citation: State (WAC 173) Federal (40 CFR)	Lead	Regulatory or Permitting Option	Quantity Limits for Non-Acute Waste	Suitable Technology	Comments
303-040, 071(r),(s) 261.4(e-f)	WDOE	Treatability Study Exemption	1000 kg sample; 250 kg daily use	Treatment other than land disposal and open burning (e.g., tank waste pretreatment studies, NitRem process)	Can petition to handle larger amounts under certain circumstances.
TIM 86-3 303-200, 201 FR 3/25/86	WDOE	Treatment by Generator	None	Filtration, separation, evaporation, carbon adsorption, elementary neutralization, solidification	Must occur in accumulation tanks or containers. Storage time limits exist.
303-802 270.60, 270.1(c)(2)(iv&v)260.10	WDOE	Permit by Rule	None	Totally enclosed treatment/elementary neutralization, wastewater treatment of Dangerous Wastes	Discharges must have a NPDES permit, state waste discharge permit or pretreat- ment permit and be protective of health and environment.
Not delegated 270.65	EPA	RD&D Permit	Amount needed to demonstrate performance of technology	Innovative or experimental treatment (e.g., Ceramic melter vitrification)	Limited to 360 operating days (potential for 3 renewals). Storage incident to treatment also permitted under RD&D. Guidance limits treatment to 15,000 kg/mo, storage to 15,000 kg, and treatment to 400 kg/hr.
303-808 264.272, 270.63	WDOE	Land Treatment Demonstration Permit	None	Land treatment (e.g., in-situ vitrification)	Potential for two phase permit (1) testing; (2) design, construction and operation.
N/A CERCLA 121(e)(1)	EPA	CERCLA On- Site Exemption	None	CERCLA Past Practice Units	
303-806 270, Subpart B	WDOE	Part B TSD Permit	None	Treatment, Storage and Disposal	Separate process for modifications.

operations which meet the definition of elementary treatment units, totally enclosed treatment facilities, or wastewater treatment units, and have an NPDES permit, a state waste discharge permit, or a pretreatment permit for discharges are permitted by rule as long as they employ all known, available and reasonable methods of prevention, control and treatment prior to discharge.

- 4. RD&D Permit:** RD&D permits can be issued by EPA for innovative and experimental treatment technologies for which national standards do not exist. Permits are issued for up to 360 operating days, although they may be renewed three times. Issuance of RD&D permits follows a more streamlined process than a standard RCRA treatment, storage or disposal (TSD) permit and takes about 12 to 18 months (compared to 2 to 5 years for processing a Part B permit). EPA may modify or waive most of the usual permit application and issuance requirements as long as human health and the environment are protected.

The application procedure calls for a consideration of experimental purpose; waste material requirements and operating parameters; provisions for environmental protection, health and safety; evaluation methods; and eventual closure. While administrative authority for RD&D permits resides in EPA, the availability of such permits depends upon Ecology's decision not to require a RCRA permit for the activity. This highlights the importance of an effective working relationship and ready flow of information among DOE, Hanford contractors, EPA and Ecology.

- 5. Land Treatment Demonstration Permit:** The land treatment demonstration permit is an alternative to RD&D permits where the technology demonstrated involves land treatment. The permit is structured similarly to the RD&D and Part B permits. If enough information is available, permit issuance can be divided into two phases. (If not available, a permit for only the field test or laboratory analysis will be issued.) Phase I allows field test or laboratory analysis, similar to an RD&D permit. Once the first phase is complete, the data must be submitted to EPA, along with a certification that testing was in accordance with permit conditions. Phase II addresses design, construction, and operation of the land treatment unit in accordance with Subpart M requirements.
- 6. Part B Permit Applications:** Those activities which do not qualify for any of the above options will be subject to the Part B application requirements under the Hanford Facility RCRA permit. This application involves a detailed description of the environment, facility, components, process parameters, environmental health implications and other aspects of the activity. Significant changes in the activity would involve a detailed modification procedure which requires public notice and comment.
- 7. CERCLA On-Site Exemption:** Some (probably pilot- or demonstration-scale) experimental treatment or disposal activities may eventually take place on past practice units under CERCLA authority. CERCLA contains a permit exemption for on-site activities. This exemption does not excuse compliance from any substantive requirements that are otherwise applicable, and the TPA provides for a substitute administrative procedure for such "exempted" activities.

The technology survey necessary to enumerate and describe the activities that might be properly assigned to the permitting options and to illuminate the issues and impediments that may arise is ongoing.

This document is Volume 2 of four volumes. Volume 1 contains Initial Conclusions and Recommendations; Volume 3 contains Battelle Technology Summaries. These technology summaries reflect the results of the technology survey as of September 1993. Volume 4, Westinghouse Hanford Company (WHC) Technology Summaries, is being issued separately by WHC.

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Acronyms

CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
DOE-RL	U.S. Department of Energy, Richland Operations Office
DOT	Department of Transportation
DW	Subset of Dangerous Waste - NOT Dangerous Waste
DWR	Washington Dangerous Waste Regulations
Ecology	Washington State Department of Ecology (see also WDOE below)
EHW	Extremely Hazardous Waste
EPA	U.S. Environmental Protection Agency
FR	Federal Register
HSWA	Hazardous and Solid Waste Amendments
HWVP	Hazardous Waste Vitrification Plant
kg	kilogram
MTUs	Mobile Treatment Units
NCP	National Contingency Plan
NPDES	National Pollutant Discharge Elimination System
PNL	Pacific Northwest Laboratory
RCRA	Resource Conservation and Recovery Act
RCW	Revised Code of Washington
RD&D	Research, Development and Demonstration
RL	DOE Richland Operations Office
TBG	Treatment by Generator
TIM	Technical Information Memorandum
TPA	Tri-Party Agreement
TSD	treatment, storage or disposal
USPS	U.S. Postal Service
WAC	Washington Administrative Code
WDOE	Washington Department of Ecology

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1.0 Background

As required by the Hanford Tri-Party Agreement (TPA), Pacific Northwest Laboratory (PNL) must submit a RCRA Part B permit application for its thermal and physical/chemical treatment activities by December 31, 1994. (The TPA also requires submission of a Part B application for biological activities by December 31, 1995.) Preparation of this application has been complicated by the level of detail required in the explanation of treatment and storage technologies, many of which remain in the Research, Development and Demonstration (RD&D) stages and have yet to be defined. Part B permits were designed primarily for repetitive process operations, where the design of the process operations is well defined, and changes to process parameters occur relatively infrequently. Modifications to the Part B permit require a significant amount of time and a great deal of administrative proceedings. Many of the RD&D activities in which the Hanford Site is engaged involve experimental and innovative processes. These tend to evolve over time and, under a Part B scenario, the potential exists for frequent delays as permit modifications become necessary.

Other permitting or regulatory options (such as RD&D permits, permits by rule, special treatment by generator exemptions, and treatability study exemptions) exist, however, which may be more appropriate to the RD&D activities currently conducted by PNL and other Hanford Site contractors. There may be options with respect to the type of permit that may be required for certain activities. Alternatively, a permitting vehicle may be ideal for one stage of activities and yet be inapplicable for others. For example, a permit may not be required for the research stage of the technology life cycle, but may be needed for the development and demonstration stages. These options must be examined more carefully to determine the technical basis by which they may apply. PNL has therefore requested and received a one-year extension of the thermal treatment application deadline (to 1994) so that a strategy may be developed to determine appropriate permitting methods.

1.1 Permitting Strategy

The strategy should include the following:

1. identify "targeted" technologies, activities, and facilities
2. identify permitting options
3. recommend a permit and compliance option for each activity or facility based on the nature, duration, location, and the type and quantity of activities and/or wastes
4. define a schedule for developing appropriate permits, including any further recommended changes in the above TPA milestones.

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Taking advantage of these existing, somewhat flexible regulatory and permitting options would still ensure protection of human health and the environment. It would also accelerate technology development, which in turn would help address the special challenges presented by mixed waste, especially with regard to capacity assurance. In addition, it would facilitate implementation of effective and innovative alternative (non-land disposal) technologies and enhance DOE's ability to implement non-redundant, cost-effective remedies, thereby potentially saving millions in tax dollars. Furthermore, it would assist DOE in meeting the milestones established in the Hanford Federal Facility Agreement and Consent Order.

1.2 Scope of Technology Survey

The purpose of this project is to identify all RD&D storage and treatment activities planned or under way at Hanford which are potentially subject to permitting requirements under the Resource Conservation and Recovery Act (RCRA) or the Washington Administrative Code (WAC) Dangerous Waste Regulations (DWR). Treatment is defined under RCRA/DWR as physical, chemical or biological processing to reduce hazard or volume. This includes the application of experimental treatment technologies, even if the wastes are not successfully altered. Treatment activities, storage for more than a short period of time (generally 90 days), or disposal activities may be subject to RCRA or WAC permitting requirements, unless they fall within a specific exemption. This report identifies those exemptions or alternative permitting methods, and describes the requirements associated with each.

RCRA and WAC regulated wastes include both hazardous and mixed hazardous-radioactive wastes, but do not include wastes which are radioactive only, as these are managed under other regulatory schemes. Wastes which are radioactive only (and do not meet the definition of a hazardous or dangerous waste) are not within the scope of this report. In addition, this report does not address the use of "surrogate" materials (non-wastes) or use of non-hazardous materials or wastes in RD&D activities.

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2.0 Treatability Study Exemptions

The RCRA treatability study exemption allows the collection, transportation, storage and use of sample hazardous waste materials without a RCRA hazardous waste permit where these activities support treatability studies at appropriate testing facilities. There are limits on the amounts of material that can be transported, stored and treated and there are specific reporting and record-keeping requirements associated with this exemption. The treatability exemption is governed by the Washington State Dangerous Waste Regulations (DWR) [WAC 173-303-071(r-s)][see also 40 CFR 261.4 (e-f)]. Changes proposed in the July 7, 1993 U.S. Environmental Protection Agency (EPA) Notice of Proposed Rule-making, which increase quantity limitations, would facilitate use of this mechanism.

2.1 Definition of Treatability Study

A treatability study [WAC 173-303-040] is a study in which a hazardous waste is subjected to a treatment process to determine:

1. waste amenability, pretreatment requirements, optimal process conditions and/or process efficiency
2. residual volumes and characteristics
3. liner compatibility and other materials concerns
4. process-related toxicological and health effects.

2.2 Collection and Transportation Exemption

Collection, accumulation/storage prior to shipping, and transportation of hazardous waste samples to be used in treatability studies are exempt from DWR (RCRA) requirements for generators and transporters and from the RCRA permit process if the samples are being delivered to a facility which (1) has a RCRA permit, or (2) has interim status, or (3) is conducting the treatability studies in accordance with WAC 173-303-071(s). Samples must be packaged with appropriate integrity and must meet Department of Transportation/U.S. Postal Service (DOT/USPS) shipping regulations; or if those do not apply, the backup shipping and labeling requirements specified in the regulation must be met [WAC 173-303-071(r)(ii)(c)].

2.3 Exempt Facilities

A facility conducting a treatability study (including mobile treatment units [MTUs]) under the conditions of WAC 173-303-071(s) is exempt (for those studies only) from RCRA standards and permit requirements. Those conditions prohibit land disposal and open burning. In addition, to qualify for the exemption a facility must:

1. have an EPA/state ID number
2. notify Ecology of the commencement and termination of studies
3. file an annual testing plan with quantity estimates, maintain sample quantity and fate records, and observe labelling protocols
4. observe 90-day, post-study or maximum 1 year holding time
5. observe the quantity limitations (see Section 2.4)
6. return unused samples and residue to the point of origin (or characterize under the DWRs, potentially triggering manifesting, transportation and disposal requirements).

2.4 Quantity Limitations

The limitations on the quantity of waste are discussed in the following sections.

2.4.1 From a Generation or Collection Source

The maximum quantities of hazardous waste sample material that may be used from a generation or collection source are "1000 kg of any dangerous waste, 1 kg of an acutely hazardous waste, or 250 kg of soils, water or debris contaminated with acutely hazardous waste, *for each process being evaluated for each generated waste stream*" (emphasis added) [WAC 173-303-071(r)(ii)(A)]. The standard does not define a "source" for purposes of assessing the collection limit, but the preamble to the original rule states that the Agency's intent was to broadly define "...waste stream" such that a waste stream and the quantity limit are not based on the EPA waste code alone; rather the Agency will interpret and apply the quantity limit for each medium or physical form in which the waste appears...(since each)...might require a different treatability study...." In order to select the appropriate treatment technology, waste stream designation should occur at the point noted in Figure 2.1.

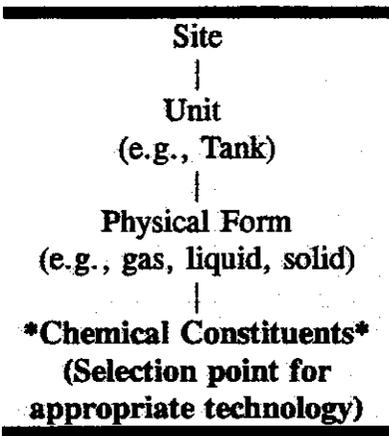


Figure 2.1. Point of Waste Stream Designation

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2.4.2 Authorization to Collect Additional Amounts

Requests may be granted on a case-by-case basis for collection of an additional 500 kg of any dangerous waste, 1 kg of an acutely hazardous waste, or 250 kg of soils, water or debris contaminated with acutely hazardous waste, or up to an additional 10,000 kg of wastes regulated only under the DWR and not regulated by the federal code, where the additional amounts are needed to complete a study because of equipment failure, validation requirements, or the need to evaluate alternative techniques or final specifications [WAC 173-303-071(r)(iii)].

2.4.3 Amount That May Be Shipped at One Time

The mass of each shipment may not exceed the quantities set out in the source collection limit provision [WAC 173-303-071(r)(ii)(B)].

2.4.4 Amount That May Be Stored at the Testing Facility

The quantity of dangerous waste stored at the testing facility for all treatability studies may not exceed 1000 kg, "the total of which can include 500 kg of soils, water, or debris contaminated with acutely hazardous waste or 1 kg of acutely hazardous waste." Note that these figures differ from the source and shipping limits. Study residues and treatment additives (including non-hazardous waste) are not counted in this limit [WAC 173-303-071(s)(iv)].

2.4.5 Amount That May Be Used in a Day

No more than a total of 250 kg of "as received" waste may be fed into all treatability studies at the testing facility in any single day [WAC 173-303-071(s)(iii)].

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3.0 Treatment by Generator Exemptions

3.1 Background

On September 22, 1986, Ecology issued Technical Information Memorandum (TIM) 86-3 (revised July 1993) to clarify the state's position on the issue of Treatment by Generator (TBG). This came in response to EPA's change in interpretation on TBG, published in the Federal Register on March 24, 1986. Neither federal nor state hazardous waste regulations address TBG directly. According to EPA's preamble discussion, "no permitting would be required if a generator chooses to treat their hazardous waste in the generator's accumulation tanks or containers in conformance with the requirements of 262.34 and Subparts J or I of Part 265."

3.2 Description of Guidance

The revised TBG option is intended to be self implementing, and stresses Ecology's intent to actively promote the use of TBG options for the following reasons:

1. TBG options promote on-site treatment over disposal and, therefore, better fulfill the Hazardous and Solid Waste Amendment's (HSWA's) waste management hierarchy.
2. TBG options better fulfill the Washington State Hazardous Waste Plan's "close to home" policy (January 1992), in which on-site hazardous waste management is preferred to off-site management to minimize transportation risks, limit risk transfer to other communities, and apply appropriate, waste-specific technologies.
3. TBG options specified in the original TIM lacked clear authority, were not self-implementing, and did not specify TBG administrative procedures.

TBG remains specifically restricted to wastes in accumulation tanks or containers, pursuant to WAC 173-303-200 and 173-303-201. Ecology states in the revised TIM: "(t)reatment by generator in ways other than tanks or containers (for example, by incineration, open burning, land treatment or treatment in surface impoundments) still requires a TSD facility permit."

The above sections establish standards for accumulation of dangerous waste in tanks and containers for a limited time without the need for a permit or interim status (90 days for over 1,000 kg/month generators and 180 days, or 270 days with a 90-day extension, for 100 to 1,000 kg/month generators).

The revised TIM includes six *possible* treatment methods for TBG, including filtration, separation, evaporation, carbon adsorption, elementary neutralization, and solidification (other technologies may also be used). Guidance for each of the six methods is covered by a "Focus Sheet" attached to the

TIM. According to Ecology "(t)reatment methods that are not one of these specific options must meet the standards in Section Four...(and future rule amendment when it becomes effective)." Section Four of the revised TIM covers "standards applicable to *all* generators who wish to perform treatment by generator." The only specific reporting requirements called out by the revised TIM under Section Four include Notification on Form 2 (must be submitted prior to beginning the treatment process) and Annual Reporting on Form 4.

The revised TIM will serve as formal guidance for application of TBG options until the DWR is amended to clarify generator treatment.

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4.0 Permits by Rule

Under certain circumstances, a facility or activity managing dangerous wastes may qualify for a "permit by rule," subject to WAC 173-303-802, and may not be required to submit an actual permit application. Certain general dangerous waste regulations apply in most cases: notification and identification numbers [WAC 173-303-060]; requirements for generators of dangerous waste [WAC 173-303-170]; maintenance of manifest [WAC 173-303-180 and 173-303-370]; preparation of dangerous waste for transport [WAC 173-303-190]; accumulation of dangerous waste on-site [WAC 173-303-200]; generator recordkeeping [WAC 173-303-210]; generator reporting [WAC 173-303-220]; special conditions [WAC 173-303-230]; operating records [WAC 173-303-380(1)(a)]; annual reports [WAC 173-303-390(2)]; and unmanifested reports [WAC 173-303-390(1)]. The activity described below comprises the "permit by rule" category which may be applicable to Hanford Site activities.

Totally enclosed treatment facilities or elementary neutralization or wastewater treatment units may qualify for a permit by rule if the owner or operator has an NPDES permit, state waste discharge permit, or a pretreatment permit which provides effluent limits for the hazardous constituents, and which also provides for the use of all known, available, and reasonable methods of prevention, control, and treatment of pollution pursuant to Chapter 90.48 RCW, prior to discharge. Note that if a totally enclosed treatment facility or elementary neutralization unit causes no discharge into the environment, Ecology does not require an NPDES permit, a state waste discharge permit, or a pretreatment permit as a prerequisite for permit by rule status. (See Hanford's 216 compliance agreement.) The owner or operator must comply with permit conditions and with the general regulations cited above [WAC 173-303-802(5)]. Ecology may require the owner or operator of a facility operating under permit by rule status to obtain a final facility permit (i.e., RCRA Part B) if he or she violates the above requirements; conducts other activities which require acquisition of a final facility permit; or does not comply with applicable local, state, or federal requirements pursuant to Sections 402 or 307(b) of the Clean Water Act, or Chapter 90.48 RCW. Ecology may also revoke permit by rule status for operations if it determines that the above requirements are not adequate to protect public health or the environment.

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5.0 RD&D Permits

5.1 Background

In 1985, the EPA issued a final rule that provided for the issuance of RD&D permits for certain hazardous waste treatment activities regulated under RCRA Subtitle C. This authority was granted to EPA by Section 3005(g) of the Hazardous and Solid Waste Amendments (HSWA) of 1984. Although Ecology has authority to regulate RCRA activities, they have not yet been delegated authority to regulate HSWA activities; EPA is therefore currently responsible for reviewing, approving, and issuing RD&D permits. EPA will defer to an Ecology decision to regulate the activity under the Part B process.

The RD&D permitting process [40 CFR 270.65] was specifically developed to streamline the permitting of novel and experimental technologies and processes for which permit standards [40 CFR 264 (Standards for Owners and Operators of Hazardous Waste Treatment, Storage, and Disposal Facilities) and 40 CFR 266 (Standards for the Management of Specific Hazardous Wastes and Specific Types of Hazardous Waste Management Facilities)] have not yet been promulgated.

RD&D permitting may further the use of innovative technologies for hazardous waste treatment and remediation. If granted, an RD&D permit is valid for up to one year, with the potential of up to three one-year renewals. This one-year period is presently defined administratively as 360 days of operations, with any operation during a day considered one day of operation. The 360-day time period does not include calendar days not in operation, including periods of construction, or operation using materials other than hazardous waste. The RD&D permit would limit the quantity of hazardous waste received to the amount deemed necessary to demonstrate technology performance.

5.2 RD&D Permit Description

To encourage the use of alternative treatment technologies, EPA may issue RD&D permits independent of existing RCRA Subtitle C regulations relating to hazardous waste treatment processes. The RD&D permit process is intended to be more streamlined than a standard RCRA Part B permit. Regulators may waive some of the usual permit application or issuance requirements under 40 CFR 124 (Procedures for Decision Making) or 40 CFR 270 (EPA-Administered Permit Programs: The Hazardous Waste Permit Program), with the exception of public participation and financial assurance (if not a federal facility such as Hanford), as long as the EPA or the authorized state maintains consistency with its mandate to protect public health and the environment. EPA is afforded considerable flexibility in crafting RD&D permit provisions that are appropriate in specific circumstances.

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Three examples of the types of circumstances in which RD&D permits might be appropriate, using specific Hanford technologies as examples, are provided in the preamble to the final rule codifying the RD&D permitting process [50 FR 28728]:

- PNL has designed in its laboratories an innovative ceramic melter vitrification technology. Further demonstration and testing is required to demonstrate the technical feasibility of the vitrification process on single-shell tank wastes, medical wastes, or hazardous wastes. Operation of a pilot-scale plan is needed to determine whether the new technology is technically and economically feasible.
- An equipment vendor has prepared a pilot-scale tank feed system of the hazardous waste vitrification plant (HWVP), and needs to test the equipment at Hanford with actual tank waste.
- To meet client needs, PNL wants to demonstrate the effectiveness and efficiency of its vitrification technologies, by scaling up from bench to pilot scale. This may involve construction and operation of a pilot-scale treatment unit that is operated in an experimental mode to test new wastes and/or alternate operating conditions.

In the HSWA legislative history, Congress made it clear how it expected EPA to issue RD&D permits. Under the RD&D provisions, EPA may permit 1) treatment technologies, processes, methods, or devices that are innovative and experimental, 2) for the sole purpose of gathering information to evaluate their technical or economic feasibility.

The significant amount of discretion that regulators possess in the permitting of hazardous waste research highlights the importance of effective working relationships with EPA Region X and Ecology. The type and extent of the approval process required before initiating an RD&D-type technology demonstration project can vary considerably, depending on the approach that regulators require.

5.3 Scale of Operation of RD&D Permit

RD&D permits may only provide for the receipt and treatment of those types and quantities of hazardous waste necessary to determine the cost effectiveness, efficiency, and performance capabilities of the technology or process and the effects of such technology or process on health and the environment. Because each RD&D process is unique, the types and quantities of hazardous waste used for the RD&D experiment are determined on a case-by-case basis. This decision considers the applicant's view of the necessary types and quantities of wastes, EPA judgment, and the limits suggested by the legislative history to HSWA Section 3005(g).

The legislative history of RD&D permits contains suggested guidance to ensure a reasonable scale for demonstrating the technical and economic feasibility of experimental technologies and processes:

1. treatment of a maximum of 15,000 kg/month of hazardous waste for experimental purposes
2. storage of a maximum of 15,000 kg of hazardous waste at any time intended for experimental purposes
3. treatment of a maximum of 400 kg/hr of hazardous waste in any experiment.

The second condition (above) indicates that the storage of hazardous waste at an RD&D facility, incident to the treatment, is permitted under the RD&D permit as well. If an RD&D unit or process is used to store or treat hazardous waste for any reason other than the hazardous waste management experiment, then those activities must be permitted and operated in accordance with all applicable sections of 40 CFR Parts 264 and 270.

Experience with processing RD&D permits has been limited to date, but EPA regional officials estimate that the permit approval process typically takes 12 to 18 months, compared with 2 to 5 years for a traditional RCRA Part B hazardous waste facility permit.

5.4 RD&D Permitting Process

Detailed procedures for obtaining RD&D permits are given in *EPA Guidance for Research, Development, and Demonstration Permits Under 40 CFR Section 270.65*. Additional information on the processing steps that the RCRA Subtitle C permitting process generally follows can be found in 40 CFR 124 (Procedures for Decision Making) and 40 CFR 270 (EPA-Administered Programs: The Hazardous Waste Permit Program).

Pursuant to 40 CFR 270.65, a complete RD&D permit application must provide information regarding facility construction, a schedule for operation for not more than 1 year, the specifically-identified types and quantities of hazardous waste that will be received, and possibly other requirements. EPA may waive certain of the normal RCRA hazardous waste permit content requirements, except those relating to financial assurance and public participation. Additional RD&D permit requirements may include but are not limited to monitoring, closure, remedial action, and other information which EPA may deem necessary.

In general, the applicant for an RD&D permit should consider the following questions as a basis for preparing the application:

1. What is the purpose of the project (e.g., experimental research or demonstration); what is the experimental design (e.g., variables to be tested, ranges for these variables, anticipated results); and what monitoring and record keeping will be done to document the success or failure of the project in terms of operating data and emissions data?

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2. What are the minimum quantities of hazardous waste and operating time needed to meet the RD&D objectives?
3. Using best engineering judgment, what are the emissions expected during operation; how will these emissions be monitored; and what criteria will be used for modifying or suspending operations if permit operating conditions should be exceeded?
4. What sampling and analytical procedures will be used to validate the feasibility or infeasibility of the experimental project?
5. Are the research personnel technically familiar with the type of research in order to respond to emergency situations in the event of experimental failure and to monitor and analyze experimental operations?
6. What type of emergency response procedures will be used to protect public safety and public health in the event of a fire, spill, or explosion during experimental testing?
7. How will the facility be closed after the research is completed (e.g., will the treatment units be decontaminated and will the residues be removed from the site)?
8. What amount of funds will be needed to properly close the facility and what type of insurance will be used during the operation of the facility (if not a federal facility such as Hanford)?

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6.0 Land Treatment Demonstration Permits

An alternative to RD&D permits where the technology demonstrated involves land treatment (e.g., in situ vitrification) is the land treatment demonstration permit. The guidelines and requirements for these permits are identified in 40 CFR Parts 264.272 and 270.63. The permit is structured similarly to the RD&D and Part B permits, with the additional potential for a two-phase permit allowing the field test or laboratory analyses during the first phase and the design, construction, and operation of the land treatment unit during the second phase [Section 270.63(a)]. The two-phase permit is available where substantial, although incomplete or inconclusive information, is available to support issuance of the final facility permit [Section (a)(1)]. If substantial information is not available, a permit covering only the field tests or laboratory analyses must be issued [Section (a)(2)].

Either the field test or laboratory analyses permits or the two-phase permits must, at a minimum, meet the requirements of 40 CFR Section 264.272(c), which include:

1. an accurate simulation of the characteristics and operating conditions of the land treatment unit, including waste characteristics, area climate and topography, soil characteristics, and operating practices to be used at the treatment unit
2. a likely showing that the hazardous constituents in the waste to be tested will be completely degraded, transformed, or immobilized in the treatment zone of the proposed land treatment unit
3. a showing that the operation will be conducted in a manner that protects human health and the environment, considering waste characteristics, operating and monitoring measures, test duration, waste volume, and the potential for migration of hazardous constituents to ground or surface waters.

Where not enough information is available to establish permit conditions which will attempt to provide compliance with 40 CFR Subpart M (Land Treatment) requirements, a land treatment demonstration permit covering only the field test or laboratory analyses must be issued [40 CFR 270.63(a)(2)]. If enough information is available to issue a two-phase permit, the first phase details the conditions for the field tests or laboratory analyses [40 CFR 270.63(b)]. Conditions in the second phase will attempt to meet all Subpart M requirements based on the substantial but incomplete information in the Part B application.

The first phase of the permit is effective either 30 days following the decision, or immediately if no comments were made. (40 CFR 270.63(b)(1) & 124.15(b)) Once the first phase is complete, the data must be submitted to EPA, along with a certification that the testing was carried out in accordance with

the permit conditions. (40 CFR 270.63(c)) Based on the results of the testing, EPA may modify the second phase of the permit to allow operation in accordance with Subpart M requirements (40 CFR 270.63(d)). If no modifications are required, notice will be given, and the second phase will become effective as the first phase was described above. (40 CFR 270.63(d)(2)).

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7.0 RCRA Part B Permits

The RCRA Part B Permit application consists of general information requirements listed in WAC 173-303-806 which are applicable to the TSD facility. These information requirements reflect the final facility standards which are enumerated in WAC 173-303-600. Owners and operators of a TSD facility may demonstrate that some information requirements of Part B cannot be provided to the extent specified, i.e., due to uncertainty in the technologies employed at the facility, and this submission will be considered by Ecology on a case-by-case basis.

Part B permits may be issued for a maximum of 10 years, and may not be extended except upon reapplication [WAC 173-303-806 (11)]. The RCRA Part B application process is generally estimated to require between 2 to 5 years; upon receipt of a final facility permit, construction of the facility may begin [WAC 173-303-806 (5)] (unless the facility has interim status).

7.1 Part B Permit Application Requirements (General)

WAC 173-303-806(4)(a) contains the general requirements of the Part B application. These general requirements include a description of the facility; chemical, biological, and physical analyses of the dangerous wastes to be handled; a waste analysis plan; a description of the security procedures and equipment, or a justification for a waiver; a copy of the general inspection schedule; a description of the procedures to comply with the preparedness and prevention requirements, or a justification for a waiver; a copy of the contingency plan; a description of safety procedures, structures, or equipment; a description of precautions designed to prevent accidental ignition or reaction; a traffic control plan; seismic risk consideration; a description of the training program; a copy of the closure (and if applicable, post-closure) plan(s); the most recent closure (and if applicable, post-closure) cost estimate, a copy of the insurance policy where applicable, and financial assurance documentation; a topographic map; and groundwater monitoring and protection programs.

7.2 Part B Permit Application Requirements (Specific)

WAC 173-303-806(4)(b-i) contains the specific detailed process information requirements of the Part B application for containers, tanks, surface impoundments, waste piles, incinerators, land treatment facilities, landfills and miscellaneous units.

The detailed information requirements generally encompass a detailed description of the facility; hydrologic, geologic, and meteorologic assessments; information on potential exposure pathways (both human and environmental receptors); for treatment units, a report of the effectiveness of the treatment

based on laboratory or field data; and any additional data Ecology determines is necessary for evaluation of compliance with WAC 173-303-600 et. seq. performance standards.

7.3 Modifications

Appendix I to WAC 173-303-830 identifies which modifications fall into the Class 1, 2, or 3 categories.

7.3.1 Minor Modifications

Certain revisions to the Part B application may be made after issuance of the unit Part B permit without issuance of a revised draft permit and public notice. These types of modifications are called "Class 1 modifications" per WAC 173-303-830. These modifications are further subdivided as follows:

7.3.1.1 Modifications Without Ecology's Prior Approval

Certain modifications may be made without Ecology's prior approval. After revision, however, the revised page(s) must be incorporated in all outstanding controlled copies of the document.

7.3.1.2 Modifications with Ecology's Prior Approval

Certain modifications may be processed as "Class 1 modifications" per WAC 173-303-830, but require prior submittal for Ecology's approval. If Ecology does not respond within 60 days from their receipt of the proposed modification, the modification will take effect as a Class 1 modification. At the end of the 60-day period, the revised page(s) must be incorporated in all outstanding controlled copies of the document.

7.3.2 Other Modifications

Modifications not allowed to take place as "Class 1 modifications" per WAC 173-303-830 must follow the Class 2 or Class 3 modification procedures specified in WAC 173-303-830, which involve public notice and comment requirements.

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8.0 CERCLA On-Site Permitting Exemption

Hanford contaminated sites slated for cleanup include CERCLA remedial action units.

8.1 CERCLA Permit Exemption and NCP Authority

To streamline the remedial action process and provide incentives for on-site cleanup, CERCLA contains an on-site permit exemption. Section 121 of the Act states that CERCLA cleanup actions, conducted at the waste site, including RD&D activities, require no Federal, State or other permits. Please note that this exemption applies *only* to the procedural (permitting) requirements; any substantive provisions of other laws must be met [CERCLA Sec. 121(e)(1), 42 U.S.C. Sec. 9621].

The implementing regulations within the National Contingency Plan (NCP) (40 CFR Part 300) detail the permit exemption for CERCLA "on-site response actions" [40 CFR 300.400(e)]. "Response actions" include any "removal" and/or "remedial" actions which are in turn broadly defined to include any activities "necessary to" or "consistent with" site cleanup [40 CFR 300.5]. Treatability studies, RD&D activities and other investigations that have a direct relationship to CERCLA site cleanup actions are clearly included in these broad definitions.

"On-site" means "the areal extent of contamination and all suitable areas in very close proximity to the contamination necessary for implementation of the response plan" [40 CFR 300.400(e)].

8.1.1 Tri-Party Agreement Provisions for CERCLA On-Site Permit Exemption

Article XVII of the TPA recognizes the CERCLA on-site permit exemption and sets out an alternative procedure for administration of those activities which would otherwise be subject to permit procedures [TPA para. 54 et. seq.]. The alternative procedure requires submittal of the following items regarding exempted activities:

1. identification of each permit which would otherwise be required
2. identification of the standards, requirements, criteria or limitations which would have had to have been met
3. explanation of how the proposed action will meet all such standards, requirements, criteria or limitations.

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