PNL-10068
UC-510

Subcontractor Report

300 Area Dangerous Waste Tank Management System: Compliance Plan Approach

Final Report

March 1996

Prepared for Pacific Northwest National Laboratory
and Westinghouse Hanford Company
by Ebasco Environmental and Hart Crowser, Inc.
under Ebasco Subcontract
No. 093713-A-G1, Task 3

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Available to DOE and DOE contractors from the
Office of Scientific and Technical Information, P.O. Box 62, Oak Ridge, TN 37831;
prices available from (615) 576-8401.

Available to the public from the National Technical Information Service,
U.S. Department of Commerce, 5285 Port Royal Rd., Springfield, VA 22161

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Richland, Washington 99352

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April 30, 1990

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P.O. Box 1970
Richland, WA 99352

Dear Sirs:

SUBJECT: FINAL 300 AREA DANGEROUS WASTE TANK MANAGEMENT SYSTEM: COMPLIANCE PLAN APPROACH

The following document contains a compliance plan approach for facilities associated with the Radioactive Liquid Waste System (RLWS) in the 300 Area. It also contains 10 appendices which were developed as bases for preparing the compliance plan approach. These appendices contain compilations of information provided by PNL and WHC and preliminary assessments of regulatory issues based on that information.

Submittal of this document completes our obligations under Work Order No. 3 of PNL Subcontract No. 093713-A-Gl. Please feel free to contact me at 943-0550 with any questions you may have.

Yours very truly,

R. L. Treat

R.L. Treat, Manager
Richland Operations

RLT:mfj

Attachments

cc: S.I. Muller, PNL (w/o attachment)

300 AREA DANGEROUS WASTE TANK MANAGEMENT SYSTEM

COMPLIANCE PLAN APPROACH

EXECUTIVE SUMMARY

On December 5, 1989, Ecology requested DOE-RL to prepare a plan evaluating alternatives for storage and/or treatment of hazardous waste in the 300 Area. The team of Ebasco Environmental and Hart Crowser, Inc., was subsequently contracted to prepare a draft compliance plan approach to assist DOE-RL and its contractors, PNL and WHC, in meeting Ecology's request. Based on guidance and information received from PNL and WHC, a compliance plan approach was prepared for a segment of 300 Area operations referred to as the Radioactive Liquid Waste System Facilities.

The compliance plan approach identifies a preferred set of compliance alternatives as well as other actions that were considered. The preferred compliance alternatives address:

- A comprehensive waste survey and review of compliance status;
- Regulatory exclusions for samples and treatability studies;
- Generator satellite accumulation of RMW in containers;
- Generator accumulation of RMW in tanks;
- Treatment of RMW;
- Regulatory status of RMW transfer to railroad tank cars; and
- ALARA and tank compliance issues.

In addition, 10 appendices discussing pertinent information and preliminary analyses were also produced. These appendices serve as bases from which the preferred compliance plan approach was developed.

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300 AREA DANGEROUS WASTE TANK MANAGEMENT SYSTEM

COMPLIANCE PLAN APPROACH

In its December 5, 1989 letter to the Department of Energy-Richland (DOE-RL) Operations (R. Stanley to R.D. Izatt), the Washington State Department of Ecology (Ecology) requested that DOE-RL prepare "a plan evaluating alternatives for storage and/or treatment of hazardous waste in the 300 Area...". This document was prepared in response to that letter.

1.0 INTRODUCTION

This document presents our proposed approach to addressing compliance of the 300 Area with the federal Resource Conservation and Recovery Act (RCRA) and Washington State's Chapter 173-303 WAC, Dangerous Waste Regulations. This section is an introduction providing an overview of 300 Area activities and a general discussion of achieving regulatory compliance. Section 2.0 of this document presents our preferred compliance alternatives. Section 3.0 describes other compliance alternatives that were considered but not preferred.

1.1 Overview of 300 Area Activities

The 300 Area, located on the southeast corner of the Hanford Site, approximately six miles north of downtown Richland, encompasses approximately 100 facilities which provide a variety of support functions for programs conducted at the Hanford Site and elsewhere. Construction and operation of the 300 Area began in the mid-1940s. Its mission, which until the mid-1980s included the production of fuel elements for powering Hanford defense reactors, is now primarily focused on research and development (R&D) programs. Some of the R&D activities conducted in the 300 Area yield dangerous waste, radioactive waste, and/or radioactive mixed waste (RMW).

Several of the 300 Area facilities were designed for conducting R&D and analyses of highly radioactive materials and processes, as well as handling the radioactive liquid effluents generated by those activities. These facilities, which include Buildings 324, 325, 326, 327, 329, 340, 340A, and 340B, are linked by an underground piping system. This piping system is known as the Radioactive Liquid Waste System, or the RLWS (Figure 1). The linked complex of Buildings 324, 325, 326, 327, 329, 340, 340A, and 340B, and the RLWS piping system are referred to in this document as the RLWS Facilities.

Buildings 324 through 327 and 329, which are managed by Battelle Pacific Northwest Laboratories (PNL), generate liquid radioactive wastes which are accumulated and managed in Buildings 340, 340A, and 340B. Westinghouse Hanford Company (WHC) manages Buildings 340, 340A, and 340B, and the underground RLWS.

Radioactive liquid wastes generated by PNL activities are accumulated in containers or tanks, or are directly discharged to the RLWS. The only PNL facilities containing waste tanks are Buildings 324 and 325. In some cases, before the waste is discharged it is neutralized, filtered, or otherwise treated to render the waste acceptable for handling in the RLWS.

The discharged waste is collected in two tanks in Building 340, where additional neutralization may also occur. Six tanks in Building 340A provide backup accumulation capacity. The accumulated waste is transferred to railroad tank cars within Building 340B. Filled tank cars are subsequently transported across the Hanford Site and unloaded into Building 204AR. The waste is stored in double-shell tanks (DSTs), a permitted storage facility.

Although the RLWS Facilities were built primarily in the 1940s and 1950s, they employ design features required or encouraged under RCRA. These design features, which provide protection against releases of waste to the environment, include: corrosion-resistant stainless steel tanks and ancillary equipment; predominant use of welded pipe connections; tanks with only top-entering penetrations to avoid leaky side fittings; sealless (and leak-proof) jet pumps; secondary containment around all tanks and piping; and the use of highly reliable instruments to control the fill level of tanks and to detect leaks. RLWS Facilities tanks are enclosed by thick concrete walls and cover blocks, and pipes are buried several feet deep to shield workers from the harmful effects of radiation.

The RLWS Facilities have played, and will continue to play, a major role in meeting remediation and compliance objectives at the Hanford Site. This role includes supporting the Hanford Waste Vitrification Plant (Tri-Party Agreement [TPA] Milestone M-03-00), the Hanford Grout Plant (TPA Milestone M-01-00), *In Situ* Vitrification (ISV), and the Catalytic Electrochemical Plutonium Oxide Dissolution (CEPOD) process. Both ISV and CEPOD are highly successful remediation technologies nearing mature states of development for treating Hanford Site wastes.

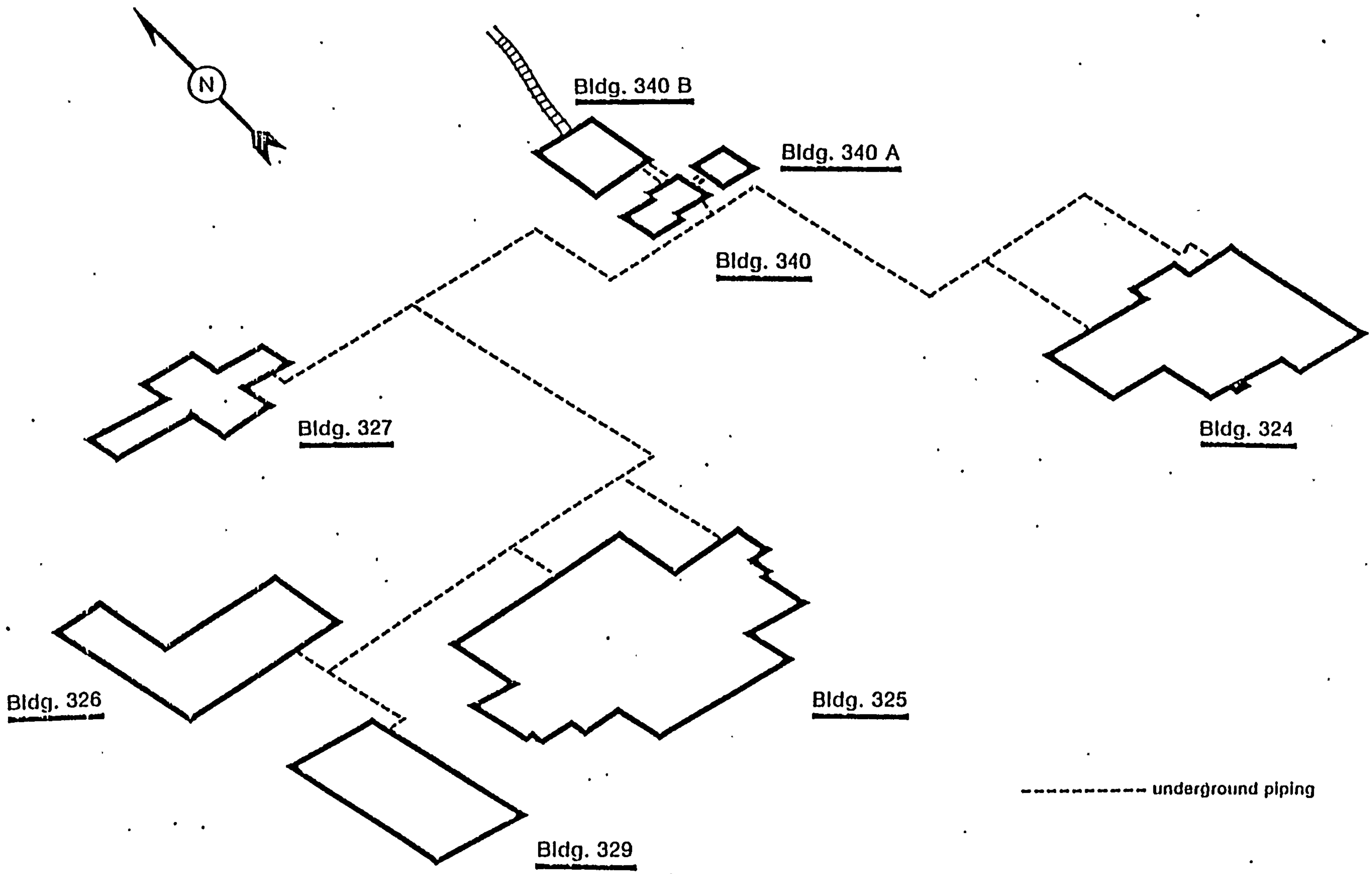

Figure 1. RLWS Facilities and Piping in the 300 Area of the Hanford Site.

Samples of wastes from single-shell tanks (SSTs) and DSTs, and from Hanford Site groundwater are also routinely analyzed in the RLWS Facilities. Tank waste analyses are keys to meeting virtually all TPA milestones related to SSTs and DSTs. Groundwater monitoring data are critical for tracking aquifer contamination at the Hanford Site. The relationship between R&D activities conducted in the RLWS Facilities and waste issues in the 200 Areas is shown graphically on Figure 2.

Although the RLWS Facilities were originally designed to provide for safe handling of radioactive waste, it has recently been determined that RMW must also be handled in the system. As a result of discussions with Ecology on December 14, 1989, DST and SST wastes are now categorized by the listed F003 dangerous waste code. RLWS Facilities waste streams combined with SST and DST sample wastes may now be considered F003 listed RMW.

In addition, PNL has indicated that certain of its wastes discharged to the RLWS may exhibit corrosivity, EP toxicity, and state-only criteria. Due to the multi-year mission of analyzing SST and DST samples and the varied and unpredictable nature of R&D activities conducted by PNL, it is likely that RLWS Facilities waste streams will include RMW components for years to come. Thus, DOE-RL and its contractors, PNL and WHC, recognize and acknowledge the applicability of RCRA and Chapter 173-303 WAC to the RLWS Facilities.

1.2 Achieving Regulatory Compliance

DOE-RL and its contractors are committed to conducting their operations in an environmentally safe and sound manner, and in compliance with applicable federal, state, and local environmental laws and regulations, including RCRA and Chapter 173-303 WAC. To comply with these regulations, significant steps have already been taken in the 300 Area to upgrade manuals, procedures, and practices that deal with compliance issues. These compliance issues pertain to waste designation, waste accumulation, inspections, training, contingency planning, and preparedness and prevention. Also, a Hanford Tank Task Force has developed a proposed compliance strategy for performing the required tank system integrity assessments, to be negotiated with Ecology.

The Hanford Site's ability to achieve compliance with specific requirements under RCRA and Chapter 173-303 WAC will be complicated by the presence of radioactivity in the RLWS Facilities waste streams. The regulation of radioactive materials at Hanford is conducted by DOE as authorized under the Atomic Energy Act (AEA). On May 1, 1987, DOE issued an interpretive ruling under AEA that, in effect, recognizes the applicability of RCRA to the dangerous waste portion of RMW.

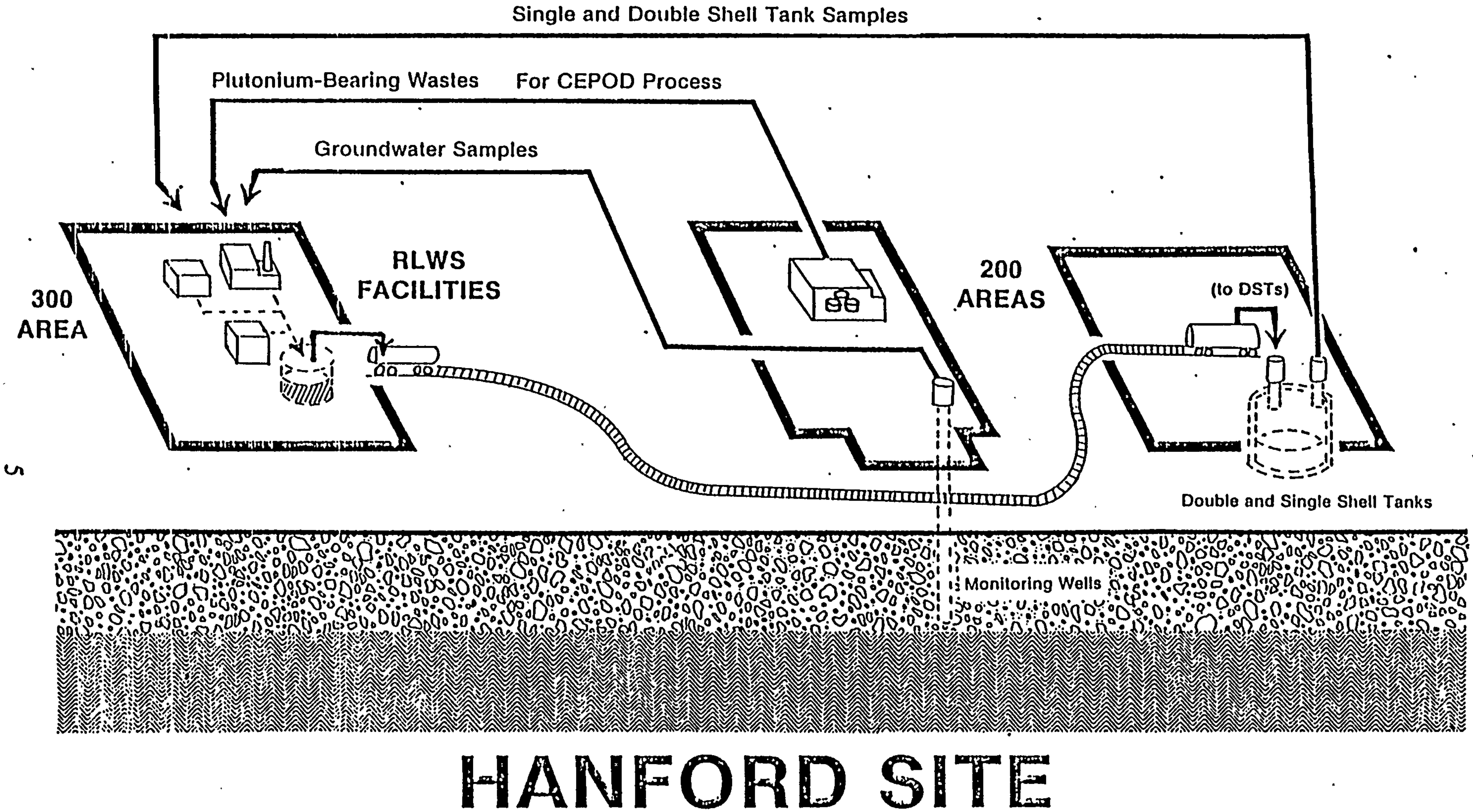

Figure 2. Relationship of RLWS Facilities to Hanford Remediation and Compliance Activities.

However, because RCRA regulations were formulated without regard to the occupational hazards of ionizing radiation, the potential exists for achieving compliance with RCRA requirements while coincidently violating AEA requirements. An example of a potential RCRA/AEA conflict involves RCRA-required labeling of some tanks containing RMW. The action of applying the labels could cause workers to receive radiation exposures that are not consistent with acceptable radiation exposure levels.

The primary philosophy that underlies AEA's compliance approach is that radiation exposure to workers and to the public should be As Low As Reasonably Achievable (ALARA). This ALARA principle is also being applied at the Hanford Site to workers exposed to hazardous chemicals. In order to expeditiously resolve conflicts between RCRA and the ALARA principle, DOE-RL believes that the interests of Ecology and DOE would be best served by agreeing at this time to an overall approach for dealing with such conflicts.

Our recommended approach is two-fold:

1) Achieve compliance to the spirit and letter of each requirement under RCRA and Chapter 173-303 WAC where no conflict exists; and

2) Attain conformance to all intents and purposes of each requirement where unnecessary radiation exposure can be avoided.

When the potential exists for unnecessary exposures, conformance with RCRA and Chapter 173-303 WAC would be attained by alternate, but equally protective measures. In these cases, we would provide supporting evidence on the rationale and effectiveness of alternate approaches and negotiate with Ecology on their acceptability. We consider an agreement with Ecology on how to deal with AEA/RCRA conflicts as a key step in successfully negotiating a plan and schedule to achieve full regulatory compliance in the 300 Area.

2.0 PREFERRED COMPLIANCE ALTERNATIVES

This section describes the compliance alternatives that we propose for the RLWS Facilities. The following compliance alternatives are addressed: a comprehensive waste survey and review of compliance status; regulatory exclusions for samples and treatability studies; generator satellite accumulation of RMW in containers; generator accumulation of RMW in tanks; treatment of RMW; regulatory status of RMW transfer to railroad tank cars; and ALARA and tank compliance issues. Regulatory compliance alternatives that were considered but not selected are discussed in Section 3.0 of this document.

2.1 Waste Survey and Compliance Review

We will perform a comprehensive survey of our various waste streams at RLWS Facilities. The purpose of this survey will be to identify those waste streams that are RMW, non-radioactive dangerous wastes, and non-dangerous radioactive wastes. To the extent possible, we will also try to predict wastes that may be generated in the future (e.g., treatability studies, R&D activities).

Coupled with the waste survey, we will review the regulatory compliance status of our waste streams and waste handling practices. This compliance review will focus on RMW and non-radioactive dangerous wastes, and will be used to evaluate in detail the procedures and actions necessary for complying with Chapter 173-303 WAC requirements.

By performing the waste survey and compliance review, we will be able to determine which of the current and anticipated RLWS Facilities waste streams are subject to the requirements of Chapter 173-303 WAC.. The information will be used for waste segregation and to minimize RMW and non-radioactive dangerous waste generation. We will also be in a better position to evaluate regulatory options (e.g., elementary neutralization) for these waste streams. Finally, we will be able to begin modifying procedural guidance and operating manuals addressing the proper handling and management of these wastes.

2.2 Regulatory Exclusions

Certain wastes and activities at RLWS Facilities are excluded from regulation under Chapter 173-303 WAC, provided certain conditions are satisfied. These wastes and conditions are discussed below.

2.2.1 Samples and Treatability Studies

Primary missions of the RLWS Facilities include analyses of RMW samples, and R&D studies of the effectiveness of experimental treatment technologies on RMW. WAC 173-

303-071 provides regulatory exclusions for samples undergoing analytical testing, and for samples used in the performance of treatability studies. Many of the waste samples at RLWS Facilities qualify for these exclusions, and are handled in accordance with the exclusion conditions.

2.2.2 Exclusion Conditions

The conditions that must be satisfied to qualify for the sample exclusions are described in WAC 173-303-071 (3) (l), for samples, and (3) (r) and (s), for treatability study samples. Samples are brought to (and, in the case of R&D work, generated at) RLWS Facilities for testing and analysis. Operations and procedures for handling samples at RLWS Facilities are generally consistent with the conditions of the regulatory exclusion. These operations and procedures will be evaluated as part of the overall compliance review (see Section 2.1), and a schedule will be developed for correcting identified deficiencies.

2.3 Satellite Accumulation in Containers

Many of the RMW at RLWS Facilities can be accumulated in containers at satellite accumulation areas in the buildings and laboratories. Satellite accumulation will be used to the maximum extent possible to allow aggregation of efficient waste volumes and to minimize adverse impacts on the 90-day generator accumulation time limit.

2.3.1 Establishment of Satellite Accumulation Areas

The buildings and laboratories at RLWS Facilities generate small quantities of RMW and non-radioactive dangerous waste during testing, analyses, and R&D activities. Although generation rates can vary, wastes tend to be generated on a continuous or frequent basis. The frequency of generation is likely to increase as the level of analytical and R&D work at RLWS Facilities increases.

The volumes of waste generated at a particular building or laboratory, or at specific areas within the buildings, are typically small. Thus, it is appropriate that these small volumes of waste be aggregated in containers, at or near their points of generation. By aggregating these wastes, rather than continuously discharging them to the RLWS tank system, we will be able to utilize the RLWS and the existing tank system more efficiently. Wastes can be purged from the satellite areas on a scheduled, rather than continuous basis. In addition, satellite accumulation will provide us with better opportunities for characterizing and tracking the wastes generated at RLWS Facilities.

We intend to establish satellite accumulation areas in Buildings 324, 325, 326, 327, and 329. These areas will be selected on the basis of proximity to regulated waste streams, ability to comply with the satellite accumulation requirements, and ability to satisfy ALARA's worker protection criteria. Aggregated wastes collected in the satellite areas will periodically be purged to the RLWS and tank systems, typically via hot cell drains. It is expected that these purges can be scheduled to coincide within approximately the same time period (e.g., one week). This will greatly simplify the 90-day time counting, and will allow sufficient time to coordinate shipment via railroad tank cars to a permitted TSD facility.

Selection of satellite accumulation areas will depend on information that will be developed during the waste survey and compliance review (see Section 2.1), and additional buildings may be identified as requiring satellite accumulation.

2.3.2 Compliance Actions

Once established, satellite accumulation areas will be operated in accordance with the generator accumulation requirements specified in WAC 173-303-200. Because of the radioactive nature of many of the wastes, most of the satellite accumulation areas are likely to be in hot cells. By the nature of their design and operation the hot cells will provide secondary containment, will utilize closed containers, and will be subject to frequent inspection. Procedural guidance (e.g., contingency plan, personnel training) will be supplemented or developed as necessary to satisfy WAC 173-303-320 through 173-303-360. Part of the compliance review (Section 2.1) will address actions needed to comply with the satellite accumulation requirements.

2.4 RLWS Facilities Tanks

RMW is accumulated in tanks at RLWS Facilities. These tanks are located in Buildings 324, 325, and 340. In addition, tanks in Building 340A have in the past been used to accumulate RMW. We intend to continue using these tanks to accumulate RMW for periods of less than 90 days.

2.4.1 Generator Accumulation in Tanks

The Building 324 and 325 tanks will be used to receive RMW and non-radioactive dangerous wastes generated in those buildings. It is expected that the regulated wastes discharging to these tanks will come from purges of the satellite accumulation areas in the buildings (see Section 2.3). The Building 340 tanks will receive RMW from the Building 324 and 325 tanks, and RMW purged from satellite accumulation areas in Buildings 326, 327, and 329. Tanks in Building 340A would not be used unless some unusual event (e.g., excessive Retention Process Sewer diversions) could result in the Building 340 tanks exceeding their design capacity. Proper scheduling of building and laboratory discharges will allow adequate accumulation time in the Building 340 tanks to arrange for shipment to a permitted TSD facility within the 90-day generator accumulation time limit.

2.4.2 Compliance Actions

The tanks in Buildings 324, 325, 340, and 340A will be subject to the generator accumulation requirements of WAC 173-303-200. Procedural guidance (e.g., contingency plan, personnel training) will be supplemented or developed as necessary to satisfy WAC 173-303-320 through 173-303-360. Compliance with the tank standards of WAC 173-303-640 is discussed in Section 2.7, below. In addition, the compliance review (Section 2.1) will identify other actions needed to comply with the generator accumulation and tank requirements.

2.5 RMW Treatment

Some treatment of RMW occurs in the buildings and laboratories. This treatment is primarily intended to prevent corrosion of the RLWS and tank systems, to allow for safe transport, and to meet radioactive and chemical criteria imposed by the receiving TSD facility.

2.5.1 Elementary Neutralization

Some of the RMW and non-radioactive dangerous wastes generated at RLWS Facilities are designated dangerous solely due to their corrosivity. Treatment of these wastes to neutralize them would qualify for an elementary neutralization permit-by-rule under WAC 173-303-802(5). After treatment, these wastes would no longer be designated (i.e., they would not exhibit the characteristic of corrosivity), and could be discharged to the RLWS and tank systems without adversely affecting the 90-day accumulation limit.

As part of the waste survey and compliance review to be performed (Section 2.1), we will identify wastes that would be amenable to elementary neutralization, and identify processes that would satisfy the permit-by-rule conditions. We will inform Ecology of these wastes and processes after they have been identified.

2.5.2 Treatment by Generator

Much of the RMW and non-radioactive dangerous waste generated at RLWS Facilities is designated dangerous for more than just corrosivity. In order to treat these wastes in compliance with the regulations, a treatment by generator approval, pursuant to Ecology's TIM No. 86-3, will be required. It appears that the treatment processes conducted to allow wastes to be discharged to the RLWS and tank systems, and to enable the wastes to be transported to and received by the TSD facility, meet the criteria established in TIM No. 86-3.

Once we have completed the waste survey and compliance review (Section 2.1), we will identify those wastes and treatment processes that require treatment by generator approval. We will submit a request to Ecology, specifying the waste streams and treatment processes for which treatment by generator approval is sought.

2.6 Transport Vehicle Loading in Building 340B

Waste shipments to a permitted TSD facility are transferred to railroad tank cars in Building 340B. By properly scheduling discharges to the RLWS and tank systems at RLWS Facilities, and accumulating wastes in the Building 340 tanks, we can begin and complete waste transfer to the railroad tank cars, and initiate shipment to the TSD facility, in less than one day. It is our understanding that a time frame of 24 hours is frequently used by Ecology for determining whether wastes are accumulating or being stored at a location. For example, recyclers and TSD facilities are generally allowed to keep waste shipments for up to 24 hours without storage permits prior to recycling or treatment.

We expect to accomplish waste transfer and shipment in less than one day (under normal conditions), and we intend to begin shipment of the waste once a railroad tank car is full or the Building 340 tanks are empty. Because RMW will not be accumulated in railroad tank cars in Building 340B, the generator accumulation requirements would not apply to the railroad tank cars and Building 340B. Instead, we intend to follow good operating practices and existing procedural manuals to ensure safe handling of RMW during transfer and shipment. Copies of the written procedures for transfer activities at Building 340B can be provided to Ecology on request.

2.7 Tank Compliance Issues versus ALARA

The tanks in Buildings 324, 325, 340, and 340A will be subject to the tank standards of WAC 173-303-640. These standards include requirements for integrity assessments, secondary containment, leak detection, operating controls, inspections, and other actions. Several of these requirements will involve the potentially hazardous action of opening vaults and valve boxes. Such actions are likely to result in radiation exposures to workers. Thus, these actions must be carefully planned and justified to minimize radiation exposure in accordance with DOE's ALARA principle.

We expect that activities associated with integrity assessments and inspections will result in the highest potential radiation exposures. Exposure potential may also exist for other tank system compliance activities (e.g., retrofitting of equipment). To ensure that worker health and safety is protected in conducting these activities, we plan to submit to Ecology alternative compliance approaches for negotiation where unnecessary radiation doses can be avoided.

Several actions are needed to provide the information necessary for defining and explaining alternative tank system compliance approaches. In this regard, we will conduct the following activities and assessments:

- We will define which tanks, ancillary equipment, and secondary containment systems are needed for ongoing accumulation of RMW. We will remove remaining tank systems from service or dedicate them to non-dangerous radioactive waste or backup secondary containment uses only.

- We will complete the process of compiling data on tank system designs and service history. Using this information, we will identify which tank system components are most likely to have been exposed to conditions that could compromise their integrities. We will also identify locations on tanks and ancillary equipment where loss of integrity is most likely to have occurred, and/or to occur in the future.

- We will assess the ability to gain access to and evaluate those locations that are most likely to experience loss of integrity. This assessment will include accessibility for both remotely operated equipment and man-held equipment.

- We will assess dose rate levels expected as functions of distance from and shielding of the tank system components. We will also assess dose rate levels as functions of the amount of decontamination needed to allow access to tank system components, the amount of decontamination solutions required, and the amount of decontamination wastes that would be generated. Finally, we will assess the amounts of decontamination solutions that Building 204AR, the 242-A Evaporator, and the DSTs can accommodate.

- Using the information and results obtained through the efforts described above, we will develop criteria and parameters for safely conducting additional integrity assessment work, as well as any other tank regulatory compliance actions, as may be necessary.

- We will use these criteria and parameters to help develop alternative compliance approaches where strict compliance cannot be achieved safely (i.e., within the constraints of the ALARA principle).

An example of an alternative compliance approach that could be proposed for negotiation would address the requirement for daily visual inspection. In place of the daily inspection frequency, visual inspections of tanks enclosed in vaults could be conducted on a decreased frequency that would provide better worker protection under ALARA. The alternative inspection frequency could be determined on the basis of assessments of deterioration rates of the tank system equipment, and on daily verification that leak detection and tank level measuring equipment are functioning properly.

In conclusion, we intend to comply fully with any tank requirements that can be conducted safely and within ALARA guidelines. However, we do expect difficulty in safely complying with certain requirements without employing alternative compliance approaches.

3.0 DISCUSSION OF ALTERNATIVES CONSIDERED

This section presents a discussion of compliance alternatives that were evaluated but were not included in the selected compliance approach presented in Section 2.0. The rationale for not selecting these compliance alternatives is also included in the following discussions.

3.1 Introduction

The selected compliance alternatives presented in Section 2.0 include a variety of mechanisms for achieving compliance. The selected alternatives are intended to provide the compliance options that are most feasible for specific components of the RLWS Facilities.

Two critical factors influenced the rejection of considered alternatives. First was the feasibility of implementing the alternative in the near future. We recognize the need to be able to comply with Chapter 173-303 WAC as soon as possible, so some alternatives were rejected because they involve a long-term change in facility design or operations. However, some of these alternatives may be feasible in the long-term and, where this is so, we have indicated this possibility. Second, alternatives were rejected when it appeared unlikely that they would receive Ecology approval. In our opinion, it is more productive to propose compliance approaches that would be acceptable to Ecology.

3.2 Alternatives and Rejection Rationale

3.2.1 Interim and Final Status Permits

<u>Alternative Considered</u>

Treatment and storage of RMW has been and will probably continue to be necessary at RLWS Facilities. RMW has been accumulated in excess of 90 days in the Building 340. This is due to difficulties in scheduling railroad tank cars for transport of liquid RMW to Tank Farms. Wastes discharged to the RLWS has also traditionally been treated to protect the RLWS from obstructions and corrosion and to meet radiation safety standards.

We considered the need to obtain interim or final status permits for treatment and storage of RMW in the RLWS Facilities. Once a permit was received this option could allow for extended storage of RMW in tanks or containers. It could also allow various waste streams to be treated in tanks or containers, as necessary.

Rejection Rationale

We feel that storage of RMW in excess of 90 days will not be necessary, thus there will be no need to obtain a storage permit for the RLWS Facilities. Once satellite accumulation and proper scheduling of discharges to the RLWS have been instituted in accordance with the preferred alternative presented in Section 2.0, we anticipate having more than adequate time to comply with the 90-day accumulation limit. During times between RMW discharges, the primary use of tanks in Building 340 will be for storage of non-dangerous radioactive waste. RMW will periodically be scheduled for discharge from satellite accumulation areas to the Building 340 tanks to start the 90-day clock. Because we will know when these RMW streams will arrive at Building 340 we will be able to also schedule a railroad tank car far enough in advance to alleviate the need for RMW storage.

RMW treatment that may occur in the RLWS Facilities is restricted to very minor, low risk activities related to ensuring waste compatibility with containers and tanks and to allow the wastes to meet Tank Farm specifications (e.g. precipitation, neutralization, etc.). Such treatment would be an excellent candidate for receiving treatment by generator approval. The wastes will not be accumulated over 90 days and the treatment processes meet Ecology's criteria as presented in TIM No. 86-3. Thus, an interim or final status treatment permit is not appropriate for the RLWS Facilities at this time.

3.2.2 Permit-by-Rule

Alternative Considered

Permit-by-rule for elementary neutralization is a selected option that may be used to treat wastes designated only due to the characteristic of corrosivity in the RLWS Facilities (see Section 2.0). RMW could also be treated in wastewater treatment units or the RLWS could be considered a totally enclosed treatment facility.

Rejection Rationale

Currently, the RLWS Facilities are not under a NPDES or pretreatment permit. Thus, discharges of dangerous waste under a wastewater treatment unit permit-by-rule is not an option. Even if the 300 Area is permitted to discharge to the City of Richland sewage system it is unlikely that any dangerous wastes will be treated in the pretreatment system because the majority of our dangerous wastes are RMW. However, this may be a future option for consideration for non-radioactive dangerous waste generated in the RLWS Facilities.

We evaluated whether any treatment occurring in piping and/or tanks in the RLWS Facilities would qualify for permit-by-rule as a totally enclosed treatment facility. We feel that some of the units that may treat waste could be argued to meet the definition of totally enclosed treatment. The precautions necessary to contain radiaoactive releases virtually preclude environmental releases of dangerous wastes and constituents. However, this option was rejected because of the difficulty in showing that a unit is "totally enclosed". For example, there are pressure relief vents associated with some of the units which, even though they discharge via HEPA filters, could be considered as not "totally enclosed". In addition, we understand that the totally enclosed treatment facility permit-by-rule has rarely been approved by Ecology.

3.2.3 No RMW Generated in RLWS Facilities

<u>Alternative Considered</u>

Reducing or eliminating the amount of RMW in RLWS Facilities is a very desirable option that was carefully evaluated. Not only would this result in beneficial waste reduction, as required by the regulations, but it would also reduce or eliminate the need for complying with Chapter 173-303 WAC in some or all of the RLWS Facilities. Our evaluation included elimination of RMW, delisting, and potential de minimis amounts of listed waste.

<u>Rejection Rationale</u>

Implementation of the selected compliance alternatives discussed in Section 2.0 (particularly the waste survey) should help reduce the amount of waste and the degree of regulation in the RLWS Facilities. However, it will not be possible to eliminate all RMW generation because of the current (e.g., SST/DST sample analysis) and future (e.g., R&D) missions in the 300 Area. Much of our work in the RLWS Facilities is in support of dangerous waste characterization and R&D for cleanup of the Hanford Site. Some wastes generated while conducting these activities will continue to be regulated as dangerous waste.

Future activities in the RLWS Facilities may involve listed wastes. The option of petitioning for delisting of listed waste was evaluated. However, due to the amount of time it takes for the delisting process it was decided that the delisting option would have little compliance value in the short-term. It will be reconsidered in the future, as appropriate.

Much of the RMW generated in RLWS Facilities may contain very small amounts of listed waste. While there currently is no de minimis exemption for listed wastes, EPA expects to propose regulations providing de minimis exemption levels for listed wastes. If EPA and Ecology amend regulations allowing a de minimis exemption for listed wastes, then this option will be reconsidered for wastes in the RLWS Facilities.

3.2.4 Use of 340A Tanks as Secondary Containment

Alternative Considered

We evaluated the option of designating the Building 340A tanks for use solely as secondary containment for Building 340B. This would allow additional secondary containment capacity in the event of an emergency.

Rejection Rationale

This option was rejected because it would require major physical changes to the facility piping and other ancillary equipment. Currently, there is no way of pumping spilled material from Building 340B directly to Building 340A tanks. Modification to allow this option would require a sizable investment in time and money. This option may be reconsidered in the future.

APPENDIX A

OVERVIEW OF WASTE GENERATION ACTIVITIES IN THE 300 AREA DANGEROUS WASTE TANK MANAGEMENT SYSTEM

1.0 INTRODUCTION

This Appendix briefly describes types of wastes generated in facilities that discharge to the RLWS and addresses the potential that the RLWS waste stream now, or in the near future, can be categorized as a listed waste.

2.0 OVERVIEW

Construction and operation of the 300 Area began in the mid-1940s. The function of the 300 Area at that time was to provide R&D and other support activities (such as fuel fabrication for reactors) for Hanford operations conducted in the 100 Area and the 200 Area. Today, the function of the 300 Area is focused primarily on R&D support. The number of 300 Area facilities has expanded to approximately 100 to provide R&D support to a broad array of nuclear programs at Hanford and elsewhere. As during the early years of the 300 Area, many of these facilities generate radioactive wastes (and now regulated wastes, and/or radioactive mixed wastes (RMW)) as a consequence of the research, development, and service activities they conduct. The generated wastes include solid, liquid, and gaseous wastes. Because plans at present are to seek waste treatment, storage, or disposal permits for only a limited number of 300 Area facilities, most regulated wastes must be removed to interim status or permitted facilities within 90 days following their generation.

Several of the 300 Area facilities generate a radioactive liquid waste stream that is discharged into the Radioactive Liquid Waste System (RLWS). These facilities, which were built in the mid-1950s, include Buildings 324, 325, 326, 327, and 329. Individual segments of the RLWS waste stream they generate are currently regulated as dangerous wastes because of their reported characteristics of corrosivity, heavy metal EP toxicity, and the exhibition of state-only criteria. Recently, Ecology informed Hanford that it must identify double shell and single shell tank waste as a F003 listed waste due to the possible presence of trace quantities of acetone. Samples of double shell and single shell tank waste are routinely analyzed in Building 325, and effluents from the analyses are discharged into the RLWS. By regulatory definition, the action of combining the F003 waste stream with other waste streams results in classifying the combined waste stream as a F003 waste. Hence, as long as the analysis continues, the combined RLWS waste stream can be considered listed.

Before RCRA and the Washington State Dangerous Waste Regulations were established, acetone and several other listed solvents such as carbon tetrachloride and hexone were used for a variety of chemical reprocessing and R&D activities in the 200 Area and the 300 Area, respectively. The 200 Area processes discharged their wastes to single shell tanks in the late 1940s to mid-1970s. Solvent-containing wastes generated by the 300 Area activities may have been washed down drains connected to the RLWS. Great efforts are now and will be taken in the future to avoid adding listed wastes to the RLWS above the incidental levels that result from analyzing and testing materials such as the F003 listed single and double shell tank samples. It is likely that listed chemicals will continue to be necessary for analyzing materials and/or developing technologies for treating and analyzing the variety of Hanford radioactive and mixed wastes. Because it is technically impossible to quantitatively separate (to the last molecule) listed materials from radioactive materials once they are combined, and because segregation of listed and other wastes cannot be guaranteed to be 100% effective, there is a high likelihood that listed RMW will be generated at least occasionally by facilities that currently discharge to the RLWS.

The five facilities that discharge to the RLWS also discharge three other types of liquid wastes. Facility systems designed to handle these wastes include the retention process sewer, the process sewer, and the sanitary sewer.

3.0 RETENTION PROCESS SEWER

The retention process sewer, or the RPS, was designed to handle liquid effluents with low probabilities of radioactive contamination. Several hundred drains are connected to the RPS among the five waste generating facilities identified. Many of these drains are associated with equipment used for handling and/or testing radioactive materials.

Because the designers of the RPS expected periodic radioactive contamination, they created a system to divert the RPS stream to the RLWS in the event of detection of radioactivity in the RPS. The RPS diversion system, once diverted, remains so until there is no further indication of radioactivity. Reportedly, occasional diversions occur. Most are found to be due to factors such as the presence of temporary sources of radioactivity located too close to the diversion monitors, electronic instabilities resulting from setting the alarm point too close to the monitors' sensitivity limit, the presence of naturally occurring radiation, such as radon, or the passage of transient specks of radioactivity, perhaps from contamination dislodged from previous discharges. Although disposal of radioactive liquids into the RPS is discouraged by facility management, PNL's Waste Management and Environmental Compliance Manual (MA-8) permits radioactive liquid waste disposal at levels of up to 10% of the design concentration guidelines (a very low level) and at higher levels only with the permission of the Manager of Laboratory Safety. Disposal of regulated wastes is forbidden, however.

Recently, facility management has begun a process of sealing or disconnecting RPS drains in areas where a potential exists for radioactivity and dangerous waste to enter the drain. However, it is likely that there are more than 100 remaining points of entry to the RPS (and to the RLWS in the event of a diversion). To date, a comprehensive, systematic survey to positively identify every point of entry to the RPS has not been conducted, although several facility managers report that they have recently completed informal surveys. Samples of effluent in the RPS have been periodically taken and analyzed for radioactivity, but, few analyses have been conducted for chemicals used by the facilities whose discharge could potentially cause the waste to be regulated. The RPS stream, after passing the diversion system, is combined with the process sewer stream and is then discharged to the process water trenches where it seeps into the soil. Plans have been made to treat this waste stream via a new treatment facility per Tri-Party Agreement Milestones M-17-05 and M-17-06. The treated waste will be discharged into the City of Richland's sewer system or alternate system.

4.0 PROCESS SEWER

The process sewer, another waste stream generated by the identified facilities, was designed to dispose of process effluents with little probability of radioactive contamination during routine operations. The process sewer handles effluents such as cooling water, condensate, and floor drainage from areas of the facilities not likely to be exposed to radioactive contamination. Prior to RCRA, liquid chemical wastes from R&D and maintenance activities were discarded into the process sewer. Soon after RCRA and the Washington State Dangerous Waste Regulations were judged to apply to DOE facilities, an effort was established to locate and block or remove points of entry to the process sewer where there was a credible risk of discharging regulated wastes. At the same time, an effort was made to post process sewer drains with signs, such as "No Chemicals Down This Sewer". As with the RPS, there has not been a comprehensive survey and listing of points of entry to the process sewer. However, the process sewer is reportedly not connected to the RLWS except via the diversion system to the RPS. For process sewer effluent to flow into the RLWS, two low-probability events must occur simultaneously; the process sewer line must become plugged downstream of the diversion valve and the diversion valve must be opened. Because of the low probability of this scenario and the low potential for contamination in the process sewer at the same time, there probably is no need to analyze process sewer points of entry as potential sources of contamination to the RLWS. However, a survey of wastes added to the process sewer may be advisable, nevertheless, to determine the regulatory status of this waste stream. As previously implied, the process sewer and RPS are connected downstream of the RLWS diverter stations. This combined waste stream, which is currently discharged to the soil column, will be treated in a new treatment facility and discharged into Richland's sewer system or alternate system.

5.0 SANITARY SEWER

The fourth liquid waste stream, the sanitary sewer stream, is comprised of wastes from kitchens, janitorial sinks, showers, lavatories, and sinks in non-chemistry laboratories. The one exception is in Building 329 where approximately 20 drains from three laboratories are connected to the sanitary sewer. Activities conducted in the Building 329 laboratories include development of instrumentation and organic analyses. To date, there has been no systematic identification and listing of points of entry to the sanitary sewer in any of the five generating facilities. Reportedly, the sanitary sewer is not connected to the RLWS except through an extremely unlikely routing via the three Building 329 laboratories' waste systems and diversion valves.

6.0 LISTED WASTE SOURCES

The five facilities that contribute waste to the RLWS also generate other types of radioactive and radioactive mixed wastes. These wastes are treated and packaged for storage and/or disposal as solid wastes. Storage locations include PNL's 305-B Storage Facility and WHC's 616 Facility. Some of these wastes are liquid wastes that are not disposed to the RLWS because of reasons of chemical incompatibility, high radionuclide levels, or because of the presence of listed wastes. A variety of these liquid wastes, as well as solid wastes with listed components, are produced within units equipped with points of entry to the RLWS. Efforts are made to prevent the spillage of incompatible and listed wastes and to segregate these wastes from wastes approved for discharge into the RLWS. Examples of chemicals that are used, but prevented from disposal to the RLWS, include concentrated acids, hydrofluoric acid, 1,1,1,-trichloroethane, acetone, and methylene chloride. These chemicals are used for various purposes such as metallographic evaluations and organic analyses.

Evidence of the potential for listed-waste contamination of the RLWS was shown in 1989 when the process sewer in Building 329 backed up into the facility. Analyses of the backed-up effluent showed very low, but measurable levels of several solvents. The source of these solvents was never positively identified. However, it should be noted that the sample analyzed was collected from the floor where there would be a high potential for cross-contamination.

One potential source of cross-contamination in Building 325 is the cell off-gas condensate that is automatically discharged to the RLWS. If listed chemical vapors are in the cell off gas, small amounts will condense with the water and enter the RLWS.

This appendix has identified several potential mechanisms for discharging small amounts of listed and other forbidden wastes to the RLWS, including: 1) contamination of RLWS wastes with listed chemicals by inadvertent spills or contact of RLWS wastes with listed materials from other activities conducted in the same hood, cell, or glovebox; 2) use of samples (such as single-shell and double-shell tank waste samples) already contaminated with listed waste; and 3) use of listed chemicals as part of new technologies being developed for analyzing radioactive materials or treating Hanford wastes. A fourth potential mechanism is the dissolution of surface contamination on new equipment installed in the RLWS or within cells that discharge to the RLWS. This seemingly unlikely mechanism has already been found to be the cause of contamination of Hanford well water samples by residual solvent in well pumps. Although the quantities of listed chemicals that may potentially be contributed by these four mechanisms are very small, the resulting contamination may be measurable because analytical methods for solvents are so sensitive.

It would also seem reasonable to believe that the RPS and process sewer systems also have the potential for incidental contamination by listed chemicals because of the hundreds of entry points to these systems and the nature of work conducted in the vicinity of these entry points. Condensate from the Building 329 air conditioning system drains into the process sewer, for instance. Because Building 329 uses volatile solvents in various analyses and activities, some amount is likely to condense in the air conditioner condensate. Also, because the RPS is periodically diverted to the RLWS, incidental listed chemical contamination in the RPS would render the entire RLWS effluent a listed waste (by regulatory definition) even if efforts were successful to prevent the addition of listed chemicals at all RLWS entry points inside the facilities.

APPENDIX B

DANGEROUS WASTE AND DANGEROUS WASTE VERIFICATION

1.0 INTRODUCTION

The purpose of this appendix is three fold:

- It presents information on the types of RMW or RMW activities in the 300 Area that may be excluded, in whole or in part, from the dangerous waste regulations;
- It provides a discussion on the general types of RMW generated within the 300 Area based on current knowledge of the waste streams and processes; and
- It discusses the need for a comprehensive waste identification and verification program for RMW generated in the 300 Area.

The focus of this appendix is toward RMW. It does not address non-radioactive dangerous wastes or radioactive non-dangerous wastes handled in the 300 Area.

2.0 SUMMARY OF APPLICABLE EXCLUSIONS

This section of the appendix presents a discussion of four regulatory exclusions that appear to apply to activities and/or waste streams, providing certain conditions are met. These four exclusions address activities associated with laboratory analysis of RMW samples in the 300 Area laboratories. Each exclusion is discussed below in separate subsections.

2.1 Regulatory Exclusion for Samples

The state regulations provide exclusions for various categories of dangerous wastes (WAC 173-303-071). WAC 173-303-071(3)(l) provides an exclusion for solid waste samples which are collected for the sole purpose of testing to determining the characteristics or composition of the waste. Based on our understanding of current activities in the 300 Area laboratories, it appears that this exclusion would apply to waste samples being analyzed. It would not apply to wastes generated during the analytical process, such as waste reagents, waste supernatants, or decontamination liquids.

Solid waste samples that qualify for this exclusion are only exempt from regulation if certain conditions are met. The sample exclusion only applies to solid waste samples under the following situations:

- When being transported to the laboratory prior to testing and when being transported back to the original point of origin after testing is completed;

- When the sample is: stored by the sample collector prior to transport to the laboratory; stored by the laboratory prior to testing; and stored by the laboratory after testing pending transport to the point of origin; and

- While stored temporarily in the laboratory after testing for a specific purpose. This storage exemption would apply to archived Single Shell Tank (SST)/Double Shell Tank (DST) samples. However, EPA has interpreted that the "specific purpose" must be legitimate, must be documented, and must be for a finite period of time.

Conditions that must be met to qualify for the sample exclusion are associated with sample shipment. Specifically, the regulations require that sample transport must be in compliance with US Department of Transportation (DOT), US Postal Service, or other applicable shipping requirements. If none of these shipping requirements apply, the sample must be packaged to prevent it from spilling, leaking, or vaporizing from the package and the following information must accompany the sample during transport:

- The sample collector's (i.e., originator's) name, address, and telephone number;

- The receiving laboratory's name, address, and telephone number; and

- The quantity of the sample, the date of shipment, and a description of the sample.

2.2 Treatability Study Sample Exclusion

WAC 173-303-071(3)(r) provides an exclusion for the generation and collection of samples for the purpose of conducting treatability studies. Treatability studies include studies to determine if a waste is amenable for treatment using a specific process and tests related to compatibilities of liners, containers, etc.

In order to qualify for this exclusion, the handling of the samples must meet the requirements for laboratory samples discussed in Section 2.1 of this appendix. One exception is that archiving of treatability samples is not allowed. Additional requirements to those discussed in Section 2.1 include:

- **Quantity Limits.** The regulations place quantity limits on the amount of sample that can be used in the studies unless the agency grants a waiver from the quantity limit on a case-by-case basis. The quantity limits are restricted to no more than 1,000 kg of dangerous waste; 1 kg of acutely hazardous waste; and 250 kg of soil, water, or contaminated debris containing acutely hazardous waste.

- Recordkeeping. Documentation as to whether the unused samples were returned to the generator.

The state regulations also have certain requirements for samples undergoing treatability studies in laboratories as described in WAC 173-303-071(3)(s). This section of the regulations exempts the testing facility from Chapter 173-303 WAC except for WAC 173-303-050 (Ecology cleanup authority), -145 (response to spills to the environment), and -960 (Ecology powers and authorities), provided the following conditions are met:

- Ecology must be notified of the testing facility's intentions at least 45 days prior to conducting the treatability studies;

- The testing facility must obtain an EPA/state identification number;

- No more than 250 kg of waste is subjected to study in any one day;

- The total quantity of dangerous waste at the laboratory at any one time cannot exceed 1,000 kg, 500 kg of which can be contaminated soil, water, or debris, and 1 kg of which can be acutely hazardous waste (excluding testing residues and used reagents);

- The study must be completed within 90 days after receipt of the samples at the testing facility or 1 year after the date the sample was shipped to the testing facility, whichever comes first;

- The study does not involve placing waste on the land or open burning of waste;

- Records must be kept for at least three years at the testing facility regarding sample shipment information, documentation of compliance with the treatability sample exclusion requirements, treatability contracts with the generator, and the dates that the study started and stopped;

- The testing facility must submit a report to Ecology by March 15 of each year that describes the number of studies and quantity of wastes expected during the current year;

- Unused samples must either be returned to the generator or handled as dangerous waste if so designated;

- The testing facility notifies Ecology when it no longer plans to conduct treatability studies at the facility; and

- Containers holding samples must be labeled and marked and must contain the date the sample was received, or, if the tests have been completed, the date the testing project ended.

Activities occurring at the testing facility that are not related to the treatability tests are not excluded from regulation.

2.3 Empty Container Exclusion

The Dangerous Waste Regulations do not regulate empty containers. In order to qualify for the empty container exclusion, the item must meet the definition of a "container" and the container must meet the definition of "empty", as defined in the regulations. This exclusion would apply to "empty" laboratory glassware, sample containers, and other vessels that are used in the 300 Area laboratories as long as they are "containers" by definition.

WAC 173-303-040(15) of the state regulations defines container as a portable device in which a material is stored, transported, treated, disposed of, or otherwise handled. The key word is portable. The device can be any shape or size as long as it is designed to be portable and is designed to hold a material. For example, a railroad tank car is designed to be portable and to hold a material. Thus, when the railroad tank car is in a portable condition it is a container by definition. If, however, the tank car is hard piped to a facility or process it is no longer portable and would be considered a tank. The definition of container would also apply to boxes, bags, bowls, "tote" tanks, and flasks.

The definition of "empty" is found in WAC 173-303-160 in the state regulations. There are essentially two definitions of "empty" with respect to containers:

- A container that held a DW or EHW is empty when all material has been removed using commonly employed methods depending on the type of container. For example, a drum that contained a liquid is commonly emptied by pumping or pouring. In addition, a container of 110 gallons or less must contain less than one inch of material or less than one percent of the total container capacity, whichever is less. Containers larger than 110 gallons must contain 0.3 percent or less of the total container capacity. For example, a 10,000-gallon railroad tank car could contain up to 30 gallons of material and still meet the definition of empty. Compressed gas cylinders are empty when the pressure in the container equals or nearly equals atmospheric pressure.

- Containers that held acutely hazardous waste as defined in WAC 173-303-040(2), or pesticide containers with the "danger" or "warning" label, must be triple rinsed with a suitable solvent in order to meet the definition of empty. Paper bags and other containers that would be damaged by liquid rinses can meet the triple rinsing requirement by vacuum cleaning, inverting the container and striking the bottom three times with a hammer, or by tearing the bag open and shaking, as appropriate. The rinsate should be reused in the process whenever possible. If this is not possible, rinsate must be properly designated and handled as a dangerous waste, if appropriate.

2.4 Waste Laboratory Rags and Wipes

The 300 Area laboratories generate rags, tissues, and the like that come into contact with RMW samples during the process of analysis. These rags are currently being handled as RMW. In some cases, the rags may not be designated as dangerous waste. If waste rags generated in the laboratories were properly designated and segregated, non-dangerous waste rags could be disposed of as "normal" radioactive waste.

The only rags that would automatically become dangerous waste are discarded rags that contain listed wastes. This would be true regardless of the concentration of the listed constituents in the rag.

Discarded rags that do not contain listed wastes are not automatically dangerous wastes. Such rags would be designated dangerous only when they fail the dangerous waste characteristics (ignitability, corrosivity, reactivity, or EP toxicity) or fail the "state only" criteria (i.e., toxic, persistent, or carcinogenic).

3.0 SUMMARY OF KNOWN DANGEROUS WASTES

This section of the appendix presents a general summary of the kinds of RMW produced, by major waste stream type, based on our understanding of current conditions in the 300 Area. It includes examples of the contributions to each general category of RMW generated in the 300 Area laboratories but it is not intended to be specific or comprehensive. Appendix A of this document provides an overview of waste generating activities in the 300 Area.

3.1 Solid RMW

This section addresses only solid RMW categories. For the purpose of discussion in this section, "solid RMW" means RMW that do not contain free liquids. Liquid RMW categories are discussed in Section 3.2.

A variety of solid RMW are generated in the 300 Area laboratories as a result of laboratory processes. Examples of these RMW items include rags, glassware, gloves, solidified organic reagents, grouted precipitates from neutralization of various acids and hydrogen peroxide, and malfunctioning hot cell equipment.

These solid RMW items are assumed to be dangerous waste because of analytical data or knowledge indicating dangerous constituents are present or because the items came into contact with a sample or waste laboratory reagents that are RMW. The latter is especially true regarding laboratory waste equipment and glassware. This current approach to designating laboratory glassware, waste equipment, etc., is probably overly conservative, causing more waste to be handled as RMW than is necessary. See Section 5.2 for our recommended approach to designating solid wastes that have had incidental contact with dangerous waste or dangerous waste constituents.

Solid RMW are containerized in the 300 Area prior to being shipped to Central Waste Complex (CWC) located in the 200 West Area. Container activity levels are restricted to 200 mrem/hr. To date, there has not been a problem meeting the 200 mrem/hr limit. However, in the future PNL anticipates generating solid RMW that cannot meet the container activity limit. These containers will be provided with additional shielding prior to being shipped to CWC.

3.2 Liquid RMW in the RLWS

The RLWS is a system of double contained pipes, tanks, and drains that collect various radioactive liquid waste streams from Buildings 324, 325, 326, 327, and 329 in the 300 Area. Wastewater collected in the RLWS enters the 340 Building where it is consolidated prior to being transferred to Tank Farms for storage and treatment.

General procedures have been developed by PNL dictating what types of waste can and cannot be discharged to the RLWS. Administrative controls have been instituted that are intended to restrict the discharge of certain RMW into the RLWS. Prohibited wastes include:

- Solids, solidifying substances, and suspended particulates that could precipitate in the RLWS or in Building 340;
- Separable organics and water insoluble solvents;
- Radionuclides above specific levels;
- Wastes that could damage or corrode the RLWS; and
- Listed dangerous wastes.

In addition to the general prohibitions presented above, certain limits have also been placed on discharges to RLWS, including:

- The pH must be between 5 and 8;

- Less than 200 gallons per day per discharge, except for batch transfers (i.e., greater than 50 gallons) must meet the batch transfer requirements; and
- Alpha, beta, and gamma emitters all have specific levels that cannot be exceeded.

The three major RMW categories currently handled in the RLWS are briefly discussed below.

3.2.1 Liquid Waste from SST/DST Analysis

Various liquid RMW are generated in 300 Area laboratories during handling and analysis associated with the SST and DST characterization projects. These waste streams are generated in Buildings 324 (sample preparation) and 325 (sample analysis). These liquid RMW streams are discharged into the RLWS for transfer to Building 340.

Waste streams in this category include sample washes and waste supernatants being discarded after a test has been conducted. The waste streams are assumed to be dangerous wastes because they contain dangerous constituents or have been in contact with known RMW (e.g., DST sludges). SST- and DST-related waste streams are assumed dangerous due to the characteristic of EP Toxicity (levels of heavy metals) and due to acute toxicity in accordance with the "state only" criteria. In addition, some SST/DST samples may contain listed dangerous waste constituents, which could cause associated wastes to be considered listed dangerous wastes.

3.2.2 Spent Laboratory Reagents

Various spent laboratory reagents are discharged into the RLWS. These spent reagents are generated in laboratories located in Buildings 324, 325, 326, 327, and 329. PNL has developed procedures intended to ensure that the RLWS receives only acceptable waste streams as discussed in Section 3.2 of this appendix.

In general, spent laboratory reagents discharged to RLWS are restricted to acids (e.g., nitric acid), bases (e.g., sodium hydroxide), and hydrogen peroxide. These spent reagents must be neutralized prior to discharge to the RLWS. These waste streams are assumed dangerous due to the characteristic of corrosivity and due to acute toxicity in accordance with the "state only" criteria.

3.3.1 Decontamination Solutions

Decontamination solutions represent the largest volume of liquid waste discharged to the RLWS. These decontamination solutions are generated within the laboratory hot cells during the decontamination of samplers, sample containers, and cleaning of laboratory equipment. Building 325 currently generates the majority of the decontamination solutions discharged to the RLWS.

Water is the primary decontamination solution used in the 300 Area. The decontamination solutions are assumed to be regulated because they have been in contact with SST/DST sample contaminated equipment. Under this assumption, the spent decontamination solutions are considered to be regulated due to the dangerous waste characteristics (EP Toxicity and corrosivity), the "state only" criteria for acute toxicity, and possibly due to listing.

3.3 Batch Transfers of Containerized RMW

Building 340 has reportedly received a variety of liquid waste streams that do not arrive via the RLWS. The capability to accept such wastes still exists. These waste streams arrive at Building 340 in containers. The container contents are transferred to a sump that discharges to Building 340 tanks. Some uncertainty exists about the nature of the wastes that have been discharged to the sump. The following discusses three general types of containerized batch transfers that have been reported to us. Some of these wastes may or may not have been RMW; it is possible that future batch transfers directly to Building 340 could be RMW.

3.3.1 Groundwater Received in Drums

Building 340 has reportedly received groundwater samples generated during groundwater monitoring activities associated with the 300 Area process trenches. These samples were the left over portions after the samples had been analyzed. They were received from Building 3720 after they were approved for acceptance in accordance with the disposal request procedures.

The 300 Area process trenches have not received dangerous waste since 1985. Historically, the trenches potentially received a variety of dangerous waste in small quantities. These wastes were generated in the various laboratories and from fuel fabrication activities in the 300 Area. The Part A Permit Application indicates the trenches received wastes that were regulated due to corrosivity, the "state only" criteria of acute toxicity, and F listed solvent wastes.

Through PNL's disposal request process a determination is made as to whether waste groundwater samples contain listed wastes. If they do, they are not discharged into the sump, rather they are packaged as solid RMW for storage at another Hanford facility. Thus, waste groundwater samples accepted in the Building 340 system may be regulated only due to the characteristics and/or the "state only" criteria.

3.3.2 Lysimeter Wastewater

WHC personnel reported that wastewater from lysimeter studies is periodically brought to Building 340 and dumped into the sump. The lysimeter studies are conducted at FFTF and the Grout Facility. These waste streams have been subjected to the designation procedures by WHC and determined not to be dangerous wastes.

3.3.3 Containerized Decontamination Solutions

The majority of the decontamination solutions generated in the 300 Area laboratories are discharged directly to the RLWS. On occasion, however, pieces of equipment are decontaminated in areas that do not have direct access to the RLWS collection system. When this occurs, the spent decontamination solutions are placed in containers and delivered to Building 340 after approval is received consistent with the disposal request process.

The containerized decontamination solutions are primarily waste with household-type soaps or detergents. These spent solutions are assumed to be dangerous because they have been in contact with equipment that was used during analysis of SST/DST samples, or was otherwise contaminated with RMW. Under this assumption, the spent decontamination solutions are considered to be regulated due to the dangerous waste characteristics and/or the "state only" criteria for acute toxicity.

4.0 CONSIDERATIONS FOR FUTURE DANGEROUS WASTES

This section of the appendix briefly discusses the need for early planning regarding future waste generation and handling. It also identifies important points that should be addressed in order to achieve and maintain compliance with dangerous waste requirements.

In addition to the ongoing laboratory activities, the 300 Area has historically been the primary research and development (R&D) area for the Hanford Site. These sample analysis and R&D activities will continue on into the future. At this time it is not possible to determine what specific types of waste generating activities will result from future analysis and R&D campaigns in the 300 Area.

Planning should address all waste streams that may result from future activities. This should include potential dangerous wastes as well as non-dangerous wastes. Adequate planning will allow maximum use of available facilities and not reduce the level of compliance with applicable dangerous waste requirements. Considerations that should be addressed and potential benefits of adequate planning are discussed below.

4.1 Dangerous Waste Designation

Early in the project planning process it is important to identify and designate potential waste streams in accordance with the Dangerous Waste Regulations, to the extent possible. In most cases, some information will be available regarding a waste stream's characteristics and constituents. Additional information can be generated on the waste's characteristics and constituents based on knowledge of the current and/or planned process. Knowledge regarding the wastes can also be gained from similar processes that have occurred on the Hanford Site or at other DOE facilities in the past. The planning process should include sampling and testing of waste streams at the start of the activity if available information will not be adequate for waste designation purposes.

4.2 Selection of Planned Activity Location

If careful thought is given to the types of waste streams that are expected from a given new activity, it will aid in selecting the appropriate location for the activity to occur. For example, if RMW, non-radioactive dangerous waste, and radioactive non-dangerous waste are anticipated, it may be possible to select a location for the activity that will allow these waste streams to be segregated at the point of generation. This would result in reduction in the amount of waste that needs to be handled in accordance with the Dangerous Waste Regulations. If it is determined that a waste handling process will be needed and none of the available locations can accommodate this need, the planning process should weigh alternatives. This may include upgrading of the facility prior to starting the new activity.

4.3 Evaluate Potential Change in Regulatory Status

A change in regulatory status can result in significant impacts to a facility. The potential for a change in regulatory status needs to be carefully evaluated during the planning process. For example, questions that should be asked include:

Could any of the regulatory exclusions or exemptions apply to the planned activity, such as the sample exclusion or treatability study sample exclusion found in WAC 173-303-071? If so, can the planned activity be managed in such a way to qualify for the exclusion or will modifications to the facility or process need to be made?

- If dangerous waste treatment is envisioned, will a final status permit be required prior to starting operation or could the process qualify for interim status, permit-by-rule, treatment by generator, or a R&D permit? What type of modifications will be needed to the facility or planned process in order to qualify for and maintain compliance with applicable permit requirements?

- Will a storage permit be required or will the facility be able to ensure that wastes are transported to a permitted TSD unit within 90 days?

- How will waste streams resulting from the planned activity affect other facilities at the Hanford Site, such as Building 340 and Tank Farms?

5.0 COMPREHENSIVE WASTE SURVEY

During our review of existing information provided by WHC and PNL, it came to our attention that the 300 Area would benefit significantly from a comprehensive and detailed waste survey. This waste survey should include all containerized wastes and, more importantly, all wastes that are discharged to the RLWS, RPS, process sewer, and sanitary waste systems.

A comprehensive waste survey has significant potential advantages. These potential advantages include but are not limited to:

- Segregation of dangerous from non-dangerous wastes, allowing for waste minimization and a reduction in the amount of waste that must be in conformance with the Dangerous Waste Regulations;

- Allowing 300 Area personnel to more easily demonstrate to Ecology inspectors that the facility knows enough about the waste properties to ensure proper handling of the waste;

- Demonstrating to Ecology inspectors that the 300 Area waste streams have all been identified and properly designated in accordance with the designation requirements; and

- Anticipating future waste streams so that facility design and operating procedures can be developed, in advance, for proper handling of dangerous wastes and conformance with the regulatory requirements.

The following sections of this appendix address items that should be included in the comprehensive waste survey for the 300 Area.

5.1 Waste Stream Identification and Verification

Accurate waste stream identification and verification is a critical part of a comprehensive waste survey. They provide the basis for ensuring that 300 Area waste streams are properly handled.

The 300 Area contains many diverse operations due to the laboratory and R&D activities that make up the primary missions for the Area. Because of the variety of activities that have occurred and continue to occur in the 300 Area, changes in piping and waste stream types periodically occur in the RLWS Facilities. As a result of these changes, we recommend that all waste streams be identified and verified as part of the comprehensive waste survey.

This part of the waste survey should include:

- Identification of currently unknown waste streams, if they exist;
- Verification of known waste streams (i.e., do the waste streams contain what they are thought to contain and do they discharge to the appropriate location?);
- Updating of collection system diagrams (e.g., piping, sumps, sinks) to reflect actual conditions; and
- Development of a system to ensure that future changes in piping or waste streams are brought to the attention of appropriate individuals and that changes are made in the collection system diagrams to reflect these changes.

Under current conditions, none of the RLWS Facilities are required to have a TSD permit. Thus, there is no requirement to develop and use a Waste Analysis Plan (WAP). A WAP is not intended to be a plan for properly designating a waste, although it can incorporate waste designation procedures. The purpose of a WAP is to ensure the facility knows enough about the wastes it receives to properly manage the waste. This is especially critical for facilities that receive wastes from a variety of different generators.

The situation in the 300 Area is similar to many TSD facilities located on the Hanford Site and in the private sector. For example, Building 340 receives a variety of waste streams from many different "generators" (i.e., laboratories). Waste treatment occurs in the laboratories and in Building 340. Thus, the 300 Area has many of the same potential waste analysis problems that the WAP is designed to address.

After the comprehensive waste survey is completed, a document similar to a WAP should be developed for the 300 Area. This WAP could include the modified dangerous waste designation procedures discussed in Section 5.2 of this appendix. The type of information that should be generated on a waste stream is dependent on the type of waste and the proposed management practice envisioned for the waste. Issues that should be addressed in the WAP include:

- Procedures for ensuring that the generator supplied waste designation and characterization information is complete and of sufficient detail to allow proper management of the waste;

- Periodic verification of information supplied by the generator to ensure it is accurate. This may include actual sampling, testing, and/or auditing of each generator's waste analysis and verification procedures; and

- Procedures for evaluating what type of designation and characterization information is needed on each waste stream to ensure it can be properly managed (e.g., ensure the waste is going to the proper place, ensure the waste will not result in disruptions to the system, ensure that accidents such as leaks do not occur, ensure the safety of persons handling the waste, ensure the waste does not result in a change of regulatory status).

The need for an ongoing verification program for the 300 Area cannot be over emphasized. Given that the 300 Area is made up of laboratory and R&D activities that will change over time, a method needs to be put in place that will reassess and verify the designation and characteristics of each waste stream. In addition, the entire RCRA process is founded on "cradle to grave" responsibility and liability. Thus, there is a need for "generators" and "receivers" of waste to be assured that their waste is being handled appropriately at all times and that information on the waste is accurate and complete. Because of the "cradle to grave" responsibility for dangerous waste, both PNL and WHC should develop and implement an ongoing verification program. PNL should verify that WHC is properly managing wastes generated in the 300 Area laboratories and WHC should verify that information supplied by PNL is accurate and complete.

The ongoing verification program should include a system to ensure that future changes in piping or waste streams are brought to the attention of appropriate individuals and that corresponding corrections are made in waste handling diagrams and process flow charts to reflect these changes. This program should also include a method for periodically verifying that waste streams are what they are reported to be and procedures for responding to irregularities. This may include:

- Periodically auditing PNL's waste designation and characterizations process;

- Periodically auditing WHC's operations in Building 340 and other WHC facilities located on the Hanford Site that manage 300 Area waste streams; and

- Scheduled waste sampling of waste streams generated in the 300 Area (e.g., RLWS, RPS, containerized wastes).

5.2 Proper Waste Stream Designation

Current waste designation procedures required in the 300 Area are often based on very conservative assumptions. While this conservative approach is intended to ensure that all RMW are handled in accordance with applicable regulations, it also probably causes some non-dangerous radioactive wastes to be handled as RMW.

The Dangerous Waste Regulations require designation of all solid wastes. In general, the regulations allow two approaches to designation. The first approach, often referred to as "book designation" or "list designation", is mandatory (see WAC 173-303-070[3][a]). Using available information the generator must check the waste against the referenced sections of the regulations in the order presented. The second approach, often referred to as "criteria designation" is optional in most cases (see WAC 173-303-070[3][b]). Using available information and/or actual test information the generator can check the waste against the referenced sections of the regulations in the order presented. If the generator elects or is required by the agency to designate a waste using the criteria designation method, this method takes precedence over the book designation method.

One example of "over designation" of wastes resulting from the use of conservative assumptions is probably the designation of solid (i.e., non-liquid) laboratory equipment. The 300 Area laboratories generate various solid wastes such as glassware, spatulas, and malfunctioning equipment. Currently, these solid items are being handled as RMW if they came into contact with samples or reagents that are considered dangerous wastes. In our experience, these items are not automatically considered dangerous waste even if they came into contact with listed wastes. For example, contract laboratories we are familiar with do not handle glassware or other items as dangerous waste just because they may have been in contact with listed wastes. We recommend that PNL and WHC personnel develop a defensible procedure (i.e., supported by and consistent with regulatory requirements and common practice) for designating these non-liquid items and seek Ecology's concurrence with the procedure.

In general, waste designation procedures in the 300 Area should be revised to ensure that wastes are not "over designated." The current waste disposal request process is a good step in the right direction toward proper waste designation. However, it should be amended to provide more comprehensive and accurate information regarding each waste stream.. In many cases this will probably require some type of laboratory analysis, especially when little is known about waste stream constituents or when the waste stream is "on the line" between being regulated and non-regulated. Eliminating overly conservative assumptions during the designation process will reduce the amount of waste that needs to be handled as dangerous waste and is consistent with the waste minimization requirements in the regulations.

5.3 Special Considerations Regarding Listed Constituents

During waste characterization activities conducted in the laboratories, listed constituents are occasionally identified at low concentrations in the wastes being tested. When listed wastes are mixed with any other solid waste, the entire mixture becomes listed, regardless of the concentration of listed constituents in the mixture. Because of this, there are some special considerations that should be addressed in the 300 Area laboratories.

Two general types of circumstances are anticipated regarding identification of listed constituents in samples being tested in the 300 Area laboratories:

- The original generator has supplied information to the laboratory indicating that listed wastes are contained in the sample and the laboratory identifies some of those listed constituents during testing; and

- The original generator has not supplied information to the laboratory indicating that listed wastes are contained in the sample but the laboratory identifies some listed constituents in the waste during analysis.

In the first case, it is clear that the sample is a listed waste. Any liquid wastes (e.g., analytical reagents, filtrate supernatant) and some solid residues (e.g., precipitates, filtrate solids) generated during testing that came into contact with the waste would also be considered listed, regardless of the concentration of listed constituents in the waste (see Section 5.1 regarding some solid waste streams). This would be true even if listed constituents could not be detected in the laboratory waste.

In the second case described above, the resolution is not as clear as in the first case. A waste is not necessarily a listed waste simply because it contains listed constituents. The constituents must have come from a listed source (WAC 173-303-082) or be a discarded chemical product (WAC 173-303-081) in order for them to be listed. For example, acetone that is used as a reactant in a process does not become a listed waste when it is discarded because it is not a discarded chemical product and it is not a spent solvent (i.e. it was used as a reactant and not for its solvent properties). However, if the acetone was used as a solvent (e.g., as a constituent in paint thinner) the waste would be considered listed (F003).

Procedures should be implemented in the 300 Area to address detection of listed constituents in waste samples where the original generator has not identified the waste as listed. To the extent possible these procedures should include:

- Isolating and holding waste streams associated with analysis of the waste sample until such time as the question of whether the sample contains listed waste can be resolved;

- Informing the original generator that the sample contains listed constituents in an effort to determine the source of these constituents;

- If, after consultation with the original generator, it is determined that the constituents did come from a listed waste, materials that came into contact with the waste during analysis should be considered listed when such materials are discarded as wastes;

- If the source of the listed constituents cannot be identified, it would be appropriate to evaluate available information and determine what is the likely source of the listed constituents. Negotiation with Ecology may be necessary in some cases to determine the preferred waste handling option; and

- If it is determined that the listed constituents did not come from a listed waste, the waste can be handled as a non-dangerous radioactive waste assuming it is not designated for any other reason.

Waste streams that have come into contact with listed wastes in the laboratory often contain very low levels of listed constituents. In some cases, even though a waste stream came into contact with a listed waste sample (e.g., decontamination water used to rinse laboratory equipment) it may not contain listed constituents at detectable levels. However, according to EPA and state interpretations of the regulations, these waste streams would still be considered listed because of their contact with the listed waste.

One potential option does exist for removing a listed waste from the RMW category. The waste could be delisted by submitting a delisting petition in accordance with WAC 173-303-910. This is often a long process requiring a lot of work. However, it can be a viable option, especially if listed constituents are not detectable, the waste is generated fairly continuously, large volumes are generated, and one can be reasonably sure that the waste stream will not vary significantly over time.

5.4 Final Considerations

One final point to bring out concerns potential impacts on the laboratories and Tank Farms if it is determined that a waste is actually listed when original information indicated it was not listed. The generator of the waste is responsible for properly designating the waste. This designation must, at a minimum, be based on existing knowledge of the waste. If it is later discovered through analysis that the waste is listed, this would be considered new information and the waste would need to be handled in accordance with this new information from that point on.

If the waste was already being handled as a RMW, the impacts would be minimal in most cases. Part A permit applications at Tank Farms would need to be amended, and other administrative documents (e.g., Waste Analysis Plan, Recordkeeping, etc.) would need to be amended to include this new information. This would even apply to liquid radioactive wastes that were previously thought to be non-dangerous as long as the wastes were being discharged to the RLWS. Wastes discharged to the RLWS are all handled in the same general manner regardless of whether they are RMW or not.

A significant problem could arise if it were determined that a waste previously thought to be non-dangerous was discovered to be dangerous and this waste had historically been sent to a facility that is not a permitted dangerous waste facility. Examples would include: non-radioactive waste historically discharged to the RPS system being found to be dangerous; and solid radioactive waste (e.g., solidified sample residue) that was disposed of at Low Level Burial Grounds being designated dangerous on the basis of new information.

Based on our experience, in cases such as these Ecology has required that facilities comply with all dangerous waste TSD requirements due to the designation of dangerous wastes handled in their historical activities. Treatment and disposal operations that were previously not subject to the TSD facility requirements have been required to apply for permits and begin complying with the dangerous waste management standards. This would apply regardless of the reason for designation (e.g., EP toxicity, corrosivity, listing). Thus, it is obvious that a comprehensive waste survey is necessary to prevent currently unregulated management activities from being identified as dangerous waste TSD operations in the future.

APPENDIX C

OVERVIEW OF RLWS WASTE MANAGEMENT PROCESSES

1.0 INTRODUCTION

The Radioactive Liquid Waste System (RLWS) provides a means of collecting and accumulating (primarily in Buildings 340 and 340A) liquid radioactive mixed waste effluents generated by Buildings 324, 325, 326, 327, and 329 (see Appendix A). These five generator facilities are managed by PNL. The RLWS is also capable of accepting and accumulating liquid radioactive waste and RMW from rail cars, tank trucks, drums, and carboys. There is an ongoing effort to identify all points of entry to the RLWS. In addition to tanks in Buildings 340 and 340A, RLWS waste may be accumulated in tanks in two of the generating facilities (Buildings 324 and 325), or in containers in all five facilities.

The period of accumulation (defined as the time of generation to the time of delivery to a permitted facility or a facility operating under interim status) may not exceed 90-days if the waste is regulated under RCRA. Typically, the wastes are transferred by pipeline from the generating facilities to the central accumulation site (Buildings 340 and 340A). These two facilities and Building 340B, which serves as the load-out facility for Buildings 340/340A, are managed by Westinghouse Hanford Company (WHC). WHC is also responsible for the piping that connects the generating facilities to Building 340. Before the 90 day accumulation period has elapsed, the effluents collected in Buildings 340/340A are pumped to tank cars and shipped to 204-AR in the 200E Area. 204-AR is an interim status treatment and storage facility. Two of the PNL facilities, Buildings 324 and 325, also have load-out capability into bowling ball casks and tank trucks. Building 325 can load-out into tank cars as well.

2.0 WASTE SPECIFICATION/DESIGNATION

Before a waste may be discharged to the RLWS, several requirements must be met to: 1) ensure that the waste is in compliance with regulations; 2) ensure that worker safety is maintained; and 3) ensure that the waste will not damage pipes, tanks, casks, and other equipment in RLWS and subsequent waste storage and treatment processes. Listings of the requirements for RLWS wastes that must be met by the generator are provided in PNL Procedure R1-6 and in the WHC document, WHC-CM-5-2 340 Facility Waste Management.

Workers who generate potential RLWS waste must gain approval for their waste stream before the waste can be discharged to the RLWS. Sampling is not normally required if only small quantities (less than approximately 50 gallons) are generated, neutralized to a pH value of 5 to 8, and disposed to RLWS drains. PNL's Waste Management and Environmental Compliance (WM&EC) Section (Laboratory Safety Department) provides both training and assistance to generators in assessing the acceptability of their wastes for RLWS disposal. At a minimum, generators are responsible for providing complete data on chemical composition and radionuclide inventory of the waste. That information is currently provided to WM&EC on the "RLWS DISPOSAL APPROVAL REQUEST" form. WM&EC makes additional assessments of the waste based on chemical properties, process knowledge, further testing, etc., in order to establish the appropriate regulatory designation of the waste.

3.0 DISCHARGE TO RLWS

If the waste meets the RLWS disposal requirements, an approval number is assigned to the waste. This approval number authorizes the generator to dispose of single or multiple batches or continuous flows, sometimes with limitations on frequency and volume.

WM&EC maintains frequent communication with Building 340 management to ensure that waste discharges to Building 340 meet WHC requirements. Occasionally WM&EC may provide orders to waste generators to change the frequency and volume of discharges to facilitate downstream operations. The waste generators must monitor their accumulation times and keep WM&EC posted on accumulation status.

Disposal of waste to the RLWS is conducted according to approved operating procedures and Radiation Work Permits posted at each point of entry to the RLWS. These procedures typically reference WM&EC Procedure No. R1-6 and PNL's Waste Management and Environmental Compliance Manual (PNL-MA-8). Each disposal to a drain is logged into a logbook unique to the drain. Information logged includes:

- Date of disposal;
- Initials of person disposing waste;
- Approval number;
- Waste generator (including organization code);
- Volume disposed; and
- Principal radionuclides in disposed waste.

The discharge of waste in the RLWS may be initiated after gaining WHC approval. If the pH is outside the acceptable range (5 to 8), the transfer must be followed by a line flush.

4.0 RLWS FACILITIES

The following sections describe the facilities and pipeline that comprise the RLWS. These facilities contain a wide variety of R&D functions which generate a diversity of frequently changing waste streams. The RLWS or other effluent handling system must have a high degree of flexibility to accommodate these waste streams.

4.1 Building 324

Building 324 houses a number of large laboratories and hot cells for developing waste treatment processes. Examples of waste processes developed in Building 324 over the years include waste vitrification, *in situ* vitrification, Hanford waste grouting, spray calcination, and pelletizing. Building 324 continues to play an important role in developing and refining the Hanford Waste Vitrification Plant (HWVP) process, the Hanford grout process, and *in situ* vitrification. These are three of the processes that will be required for cleaning up Hanford and meeting specific Tri-Party Agreement Milestones.

In the past, RLWS waste has been generated in Building 324 within hot cells used for demonstrating various waste treatment technologies for highly radioactive wastes. The RLWS transfer system is not being used at present as the cells are undergoing cleanout of vitrification process equipment from past demonstrations. The equipment is being packaged and disposed of at Hanford as solid radioactive waste.

To date, nine waste tanks have been identified in Building 324, although not all of the tanks are currently connected to the RLWS. These tanks are contained within three concrete vaults covered with massive concrete blocks that provide radiation shielding for worker protection. The vaults are believed to be lined with stainless steel plate. The tanks are constructed of stainless steel and range in capacity from approximately 400 gallons to approximately 5,000 gallons. Three of the tanks are capable of transferring wastes directly to Building 340: TK 101, TK 102, and TK 177. Other tanks and drains are connected to these tanks.

Transfers of waste are made to Building 340 using steam jets (80 lb. steam). Most tanks are fitted with bubbler tubes for measuring or observing liquid level, specific gravity, and tank pressure (vacuum). Instrument readings are logged daily. Thermocouples are also used for measuring temperature. The tanks are also equipped with high liquid level alarms and high temperature alarms. Use of steam jets and top entering instrumentation precludes the need for penetrations into the tank walls, thereby avoiding leaky fittings below the liquid level. The tanks are vented through a common vessel vent system that discharges air and vapors to the atmosphere via HEPA filters.

Currently the tanks hold low-level, radioactive, acidic solution. This solution is being recycled as decontamination fluid during efforts to prepare the cells for future missions. Liquids in certain tanks can be recirculated through a sampling station where samples can be obtained. Previous sample analyses have focused on radionuclide content. A recent sample analysis indicated a dose rate of 500 mrem/hr at the surface of a 10 ml sample bottle.

Sumps in the Building 324 vaults are equipped with liquid sensing alarms and pumps (or jets) capable of transferring the waste to other tanks in the system. There are no postings on the tanks or in the vicinity of the tanks. In the history of the building, only one incident of vault flooding could be recalled.

There are a variety of points at which waste may drain to or otherwise enter the tanks in Building 324. Facility management reportedly has identified the primary entry points and has plugged or locked and tagged those points that are not needed for current operations. Some of these entry points include pipelines connected to product tanks that are being emptied of residual product material.

4.2 Building 325

Building 325 houses a number of analytical cells and mid-size process development cells, as well as many laboratories equipped with gloveboxes, hoods, sinks, etc. Since it was built, the facility has been used to provide process chemistry support of various nuclear operations on the Hanford Site. In one major project, the building was used to reprocess a small amount of spent nuclear fuel to provide representative high-level waste to Building 324 for a demonstration of the vitrification process. Two important current functions of the facility are developing and demonstrating the Catalyzed Electrochemical Plutonium Oxide Dissolution (CEPOD) process and analyzing samples from Hanford single and double shell tanks. The CEPOD process recovers plutonium from dilute waste solutions, coincidently rendering the waste more suitable for disposal. The CEPOD process is a major contributor of waste to the RLWS.

The effort to analyze single and double shell wastes in Building 325 is a key component of Hanford's program to develop safe methods for the retrieval, processing, and disposal of those wastes and, thereby, meet Tri-Party Agreement milestones. After sampling, the single and double shell tank sample cores are transported to Building 325 in a cask and unloaded into Building 325 hot cells. The samples, which are contained within sample tubes, must be extruded before analyses can be conducted. After extrusion, the sample tubes are washed and temporarily stored for return to WHC for reuse. A new, non-reusable sampler will be used in the near future. The current sampler washing process generates up to 10 gallons of solid waste (after absorption or solidification) per sample core. This highly radioactive wash solution was, in the past, disposed of after absorption or solidification to caissons. Disposal in caissons may no longer be an acceptable practice.

As previously stated in Appendix A, the tank waste samples have been identified as a listed waste. Therefore, the wash solutions and other subsequent wastes may be subject to the treatment and disposal requirements for listed wastes. After extrusion, the tank waste samples are prepared for various physical, chemical, and radiochemical analyses. Various organic analyses are conducted, including TOC and total carbon, but no analyses for specific listed chemicals are conducted.

Three separate waste streams result from this analytical process. The first waste stream is comprised of residual solid sample material, including samples that have been vitrified to assess their compatibility with the Hanford vitrification process. These samples are currently being stored in Building 325 hot cells. The second waste stream is miscellaneous trash, including glassware, kleenex, rags, cardboard, etc. This material is packaged into 5-gallon buckets or 55-gallon drums for disposal as low-level waste. This waste stream also includes evaporated solutions generated during the process for homogenizing the waste samples. These solutions are evaporated to dryness in beakers which are subsequently added to the trash containers.

The third waste stream is comprised of liquid wastes from the physical and chemical analyses of the samples. Certain of these wastes are accumulated in containers and neutralized. The neutralization causes precipitation of metals, which are subsequently filtered, air dried, and handled as solid waste. The filtrate is discharged to the RLWS. Small volumes of liquids from equipment rinses are also included in this waste stream.

PNL is currently modifying a permitted treatment facility within Building 325 for neutralizing, filtering, and solidifying small volumes of liquid wastes not suitable for discharge to the RLWS. Secondary liquid wastes from this facility will be discharged to the RLWS if they conform to requirements.

Points of entry to the Building 325 RLWS have been surveyed by PNL personnel. They include various sinks and drains in hoods and cells. A number of other potential points of entry are being eliminated as equipment (including tanks) from the fuel reprocessing activity is dismantled and discarded. At the completion of this work, seven tanks will reportedly remain as part of the Building 325 RLWS. These range in size from 150 gallons to 17,500 gallons. Two of the tanks (WT-1 and the Room 32 tank) are directly connected to Building 340. One tank, the WT-4 tank (which is not currently considered by PNL as part of the RLWS) can be used for transferring solutions to Building 324. The vacuum system for conducting such transfers has been disconnected, however.

The Building 325 tanks are contained within stainless-steel lined vaults and are equipped with jet pumps and instrumentation similar to that described for Building 324 tanks. One spill inside a vault has been reported in the history of the plant. This spill was attributed to an improperly installed level detector in a newly installed tank which resulted in overfilling the tank. Because the Building 325 vaults are not under a roof as they are in Building 324, approximately 8,000 gallons of rainwater drained between cover block joints and collected in one inadequately sealed vault. The accumulation of rainwater in the vault is an indication of the degree of leak-tightness of the vault base.

4.3 Buildings 326, 327, and 329

Buildings 326, 327, and 329 house a number of cells and hoods used for analytical and instrument development purposes. Activities conducted in these facilities include specialized organic and radiochemical analyses, development of analytical methods, and detailed analysis of metals exposed to radiation. Organic analysis and radiochemical analyses of single and double shell tank waste samples will also be conducted in Building 329. These facilities are differentiated from Buildings 324 and 325 in that no tanks are contained in these facilities. If waste solutions must be accumulated (e.g., for analysis to determine RLWS acceptability), such accumulation is conducted in containers. Once approval to discharge to the RLWS is gained, the waste is dumped into drains that flow by gravity directly to Building 340.

4.4 RLWS Piping

The RLWS piping connects Buildings 324, 325, 326, 327, and 329 to Building 340. RLWS piping also connects Buildings 340A and B to Building 340. All of the RLWS piping is reportedly stainless steel pipe encased in reinforced epoxy pipe. RLWS piping to Building 309 also exists but is out of service. The flow of waste through the RLWS piping is controlled by WHC personnel who are responsible for opening and closing valves located at various points between the generating facilities and Building 340. The valves are located in covered concrete boxes called valve boxes.

The epoxy pipe that encases the stainless steel pipe ends at the valve box and is sealed around the stainless steel pipe at that location. Each pipe segment between two valve boxes is equipped with a liquid sensor in the annulus and an alarm. The valve box serves as secondary containment for the valve. Each box is also equipped with liquid sensors that alarm when activated. Large batch transfers are normally monitored in Building 340. Valve boxes are inspected on an established frequency.

In general, the RLWS piping is sloped downward to Building 340 to prevent liquid retention in the lines which could lead to plugging and/or corrosion. One instance of corrosion occurred that may be attributed, in part, to a low point in the RLWS line between Building 329 and the first downstream valve box. The corrosion eroded through the line, resulting in a leak that was detected in the pipe annulus. That 150-foot section of line was subsequently taken out of service and replaced with a plastic-in-plastic encased pipe. Also the section of stainless pipe from the Building 329 sink drain to the new plastic pipe was also badly corroded and replaced with a glass pipe.

4.5 Building 340 Complex

The Building 340 Complex includes Buildings 340, 340A, and 340B. The RLWS piping from the generating facilities discharges into Building 340. Building 340A provides extra accumulation capacity for wastes discharged to Building 340. Building 340B provides load-in/load-out capability for Building 340.

Building 340 contains two, 15,000-gallon stainless steel waste accumulation tanks for receipt of small, continuous flows and 50-gallon or greater batch transfers from the generating facilities. These tanks (Tank 1 and Tank 2) may also receive diverted flows from the RPS system. A small decontamination room associated with Building 340 is another source of waste that can be added to the tanks via a floor sump and pump. This room is infrequently used for decontamination purposes, but is has been recently used for unloading drummed Hanford liquid wastes, including rainwater accumulated from lysimeters operated by PNL.

The Building 340 tanks are contained within an unlined concrete vault. It is covered with concrete cover blocks which, as in the case of the Building 325 vaults, are believed to have allowed rainwater to pass and collect in the vault. This water is detected by an alarmed liquid sensor and can be pumped from a sump in the floor of the vault to one of the Building 340 tanks. Each of the tanks is equipped with top-entering agitators, pumps, and liquid level sensors. Thus, there is no possibility of leaks at fittings below the liquid level.

Waste in the tank is pumped to a sampling station where the pH is measured. Adjustments are made by adding NaOH as required to adjust the pH to >7 (typically 7 to 8) for shipments in 20,000-gallon tank rail cars. Samples are also taken at the sample station and submitted for analysis to verify that various chemicals and radionuclides are within allowable limits. The required analyses include several chemicals that must be known to make proper adjustment for feeding the waste to the 200 Area evaporator and storing the waste in double shell tanks. Because the tanks currently hold relatively low activity waste, the estimated dose rate near the tanks is 100 mrem/hr. Much higher doses rates have been observed in the past. Dose rates depend on the nature of the waste-generating activities.

If more space is needed for accumulated Building 340 waste, the waste in the two Building 340 tanks may be pumped to six 8,000-gallon tanks connected by a common header at the base of each of the six tanks. These tanks are located in Building 340A, which is an above-grade facility adjacent to Building 340. The pipe between the facilities is encased and the annulus between pipes drains to the Building 340 vault. The floor of Building 340A drains by gravity through an encased pipe to Tank 2 in Building 340.

During hydrostatic testing of these six tanks soon after they were installed, the tanks were reportedly allowed to drain without venting to atmosphere. This resulted in the creation of sufficient negative pressure inside the tanks to partially collapse their roofs. The tanks' integrities were subsequently verified as acceptable by WHC engineers, however. These tanks contain no instrumentation or other equipment except for a bubbler liquid level sensor in one of the tanks. Remotely operated valves must be opened to drain the contents of the six tanks into either Tank 1 or Tank 2 in Building 340.

Unloading and loading operations are conducted in Building 340B, which is also adjacent to Building 340. Bldg 340B is an abovegrade facility with a concrete basin which drains (or is pumped) through encased pipe to either of the Building 340 tanks. Tank cars are filled with waste such that limits on volume, chemical and radionuclide content, dose rate, and removable radioactive contamination are not exceeded.

WHC has found the limit on fissile material (15 grams per tank car) and other radiation limits to be periodically constraining because the residual radionuclide content of the empty tank car is too high. This has caused higher-than-desired dose rates to personnel as the rail car cannot be filled to capacity, which necessitates additional loading, transportation, and unloading operations. After the tank car is filled and verified acceptable for shipment, the tank car is moved by rail to the 200E Area for unloading at 204-AR, an interim status storage facility.

Operation of the RLWS system in the Building 340 Complex is conducted according to written procedures. All qualified operators of the transfer system have received documented training in its operation. The training addresses contingencies and emergencies.

APPENDIX D

DISCUSSION OF REGULATORY COMPLIANCE ALTERNATIVES

1.0 INTRODUCTION

This appendix discusses the regulatory compliance alternatives available for the various dangerous wastes and dangerous waste management processes associated with facilities discharging radioactive mixed waste (RMW) to the 300 Area Radioactive Liquid Waste System (RLWS). The purpose of this appendix is to describe the various regulatory compliance alternatives that could apply to the RLWS Facilities under Chapter 173-303 WAC, Dangerous Waste Regulations, and to identify selected alternatives for the major components of the RLWS Facilities based on applicability and preference.

Section 2.0 provides an overview of the types of regulatory compliance alternatives that were considered for the RLWS Facilities, and provides general descriptions of the regulatory requirements for each compliance alternative. Section 3.0 identifies the compliance alternatives that could reasonably be applicable to the major components of the RLWS Facilities. Section 4.0 ranks the potential compliance alternatives identified in Section 3.0, and discusses briefly the rationales for the selected rankings.

2.0 OVERVIEW OF COMPLIANCE ALTERNATIVES

This section provides an overview of the various regulatory compliance alternatives that were considered for the RLWS Facilities. Except for those alternatives discussed in Section 2.6, all of the alternatives outlined in this section assume that RMW is generated and managed in the RLWS Facilities, requiring compliance with some aspect of the dangerous waste management standards. Section 2.6 describes alternatives related to showing that RMW is not dangerous, thus relieving the management processes from the regulatory requirements.

2.1 Generator Accumulation

Generators are allowed to accumulate their own wastes in containers or tanks for up to 90 days without having to obtain a treatment, storage, or disposal (TSD) facility storage permit (interim or final status), provided they meet certain conditions (see Subsection 2.1.2). If accumulation exceeds 90 days, or if the accumulation conditions cannot be met, then the tanks or containers would be subject to the TSD facility storage requirements (see Section 2.3).

2.1.1 Generator Accumulation Alternatives

Generator Accumulation in Containers

RMW generated within the RLWS Facilities, including in the laboratories, can be accumulated in containers. Accumulation of RMW in containers is generally limited to those wastes with very low levels of radioactivity and/or minimal potential for worker exposure, although certain high activity wastes are collected in containers in hot cells. Prime candidate waste streams for accumulation in containers include:

- Solid RMW, such as precipitated sludges and contaminated items (e.g., rags, absorbents);
- Small containers of liquid RMW, such as vials and test tubes;
- Larger volumes of low dose RMW, packed in overpack containers to minimize exposure; and
- Small volumes of high dose RMW, accumulated in protected areas (e.g., hot cells).

Generator Accumulation in Tanks

RMW generated within the RLWS Facilities can be accumulated in tanks. Accumulation of RMW in tanks generally includes those liquid wastes that have higher radiation doses and thus need more restrictive containment, or which are generated in sufficient volumes to require the increased capacity provided by a tank. Measures are taken to prevent or minimize solids accumulation in tanks; generally, solids are not allowed to accumulate in tanks due to the potential to exceed acceptable activity levels.

Generator Accumulation in Railroad Tank Cars

Typically, dangerous waste that is in the process of transport is only subject to the applicable transportation regulations. If a railroad tank car is filled with dangerous waste and removed expeditiously from the generator's site, then it would be subject to the pertinent US Department of Transportation and related requirements. As long as transport of the dangerous waste in the railroad tank car begins soon after the load is transferred and the waste is not kept on-site for a long time (e.g., more than 24 hours), then the tank car usually is not considered to be an accumulation or storage device. It is a transport vehicle (see definition in 40 CFR 260.10) and would not be subject to the generator accumulation requirements.

Alternatively, RMW can be accumulated on-site for an extended period of time in railroad tank cars. In this case, the tank cars would qualify as containers under the regulations, and would be subject to the same requirements as containers used to accumulate the generator's wastes. The tank cars allow for accumulation of the same wastes that can be accumulated in either containers or tanks, with the exception of solid, nonflowing wastes (e.g., dry materials, equipment, items).

Generator Satellite Accumulation

RMW can be accumulated in containers at satellite accumulation areas. A satellite accumulation area is generally at or near the point of generation, and is used to accumulate wastes generated at that point for the purpose of aggregating a volume of waste for removal to a central accumulation or storage area. Although there is no physical limit to the size of a satellite accumulation area, or specific description of the layout of such an area, there are limits on the volume of RMW that can be accumulated (generally, 55 gallons or less). Additional discussion of satellite areas is provided in Subsection 3.1.2.

Generally, all of the same requirements apply to satellite accumulation areas as apply to any other generator accumulation activity. The principal exception is that the 90-day time limit does not begin until a certain quantity limit is exceeded (see Subsection 3.1.2). Thus RMW, particularly in the laboratories, could be accumulated at or near the point of generation in satellite areas beyond 90 days after the date of first generation, provided certain conditions are met.

2.1.2 *Regulatory Requirements for Generator Accumulation*

Generators that accumulate their own waste on-site have certain requirements that must be met under Chapter 173-303 WAC, Dangerous Waste Regulations. In general, these requirements are divided into two broad categories:

- General requirements found in Sections -060 through -230; and

- Unit-specific requirements relative to containers and tanks, incorporated by reference in Section -200. Section -200 references the final TSD standards for containers (-630) and tanks (-640). However, not all of the final TSD standards apply to generator accumulation areas.

General Requirements

For the most part, the general requirements for generators address administrative actions that must be taken by the generator. The general requirements include:

- Notification. A generator must notify Ecology of dangerous waste activities and obtain an EPA/state identification number prior to conducting such activities;

- **Waste Designation.** Generators of dangerous waste are required to properly designate their waste;

- **Prohibitions.** Generators of dangerous waste are subject to the land disposal restrictions, cannot treat, store, or dispose of dangerous waste without a permit unless Ecology authorizes treatment by generator status, and a generator cannot dilute a waste for the purpose of avoiding regulation;

- **Manifests and Shipping.** Generators that ship dangerous waste to off-site facilities (i.e., off the Hanford Site) must do so using a Uniform Hazardous Waste Manifest and must properly package, label, and mark containers in addition to ensuring the transport vehicle is properly placarded in accordance with DOT requirements;

- **Reporting.** A generator must submit certain reports to Ecology including annual reports (Form 4), exception reports, and any other report the agency determines is necessary;

- **Recordkeeping.** Generators must keep copies of all reports required by the agency in addition to copies of all required manifests and data or information related to designation of the waste;

- **Personnel Training.** Personnel associated with the generation and handling of dangerous waste must receive training on the regulatory requirements, hazards associated with the waste, and proper waste handling procedures in accordance with a written Training Plan;

- **Emergencies and Contingency Planning.** Facilities that accumulate dangerous waste must prepare and plan for emergencies in accordance with a written Contingency Plan;

- **Inspections.** Generators must inspect their accumulation areas, log the results of these inspections, and remedy problems noted during inspections in accordance with a written inspection schedule; and

- **Labeling.** Accumulation containers and tanks must be: labeled as hazardous or dangerous waste; identify the major risks associated with the waste; and clearly marked with date of accumulation on the container or tank.

Unit-Specific Requirements for Containers

Generators that accumulate waste in containers must comply with -630(2), (3), (4), (5), (6), (8), and (9). In general, these requirements include:

- **Condition and Identification.** Containers must be in good condition and must be labeled to identify the major risks associated with the waste;

- **Compatibility.** Accumulation containers must be compatible with the waste they contain or must be lined with a material that is compatible with the waste;

- **Management of Containers.** Accumulation containers must be closed at all times except when adding or removing waste and they cannot be handled in a manner that would cause them to leak or rupture;

- **Inspections.** In addition to the general inspection requirements discussed above, accumulation containers and accumulation areas must be inspected at least weekly looking for leaks or deterioration of containers and containment systems;

- **Ignitable and Reactive Wastes.** Accumulation containers that hold ignitable or reactive wastes: must be stored in a manner equivalent to the Uniform Fire Code (UFC); must be inspected annually by an individual that is familiar with the UFC requirements; and must not be subjected to conditions that would cause them to ignite or react; and

- **Incompatible Wastes.** Incompatible wastes or materials cannot be placed in the same container unless precautions are taken to ensure that they do not react and containers that hold wastes that are incompatible with other containerized wastes or materials must be segregated.

Secondary Containment for Container Accumulation Areas

Existing container accumulation areas do not need to comply with the secondary containment requirements. However, existing container accumulation areas, and satellite accumulation areas, are required to comply with the secondary containment requirements found in -630(7) if Ecology requires it on a case-by-case basis due to a history of spills or due to the nature of the wastes. In addition, container accumulation areas, but not satellite accumulation areas, that were constructed or installed after September 30, 1986, must have secondary containment in accordance with -630(7).

Paragraph -630(7)(c) of the regulations provides an exemption from the secondary containment requirement for container areas that:

- Do not contain free liquids;

- Do not contain wastes that are ignitable or reactive; and

- Do not contain wastes that are listed as non-specific sources with the dangerous waste numbers F020, F021, F022, F023, F026, or F027 (i.e., "dioxin wastes").

provided that:

- The container accumulation area is designed to remove accumulated rainfall from around the containers; or

- The containers are elevated to prevent rainfall from accumulating around the base of the containers (e.g., on pallets).

Secondary containment systems, when required, must meet the following standards:

- Secondary containment systems must be capable of collecting and containing spills and leaks and the base of the system must be impervious to the wastes that are being accumulated and must be free of cracks;

- The containment area must be sloped to facilitate removal of accumulated liquids or the containers must be elevated to prevent them from coming into contact with accumulated liquid;

- The containment area must have a positive drainage control system, such as a locked valve, and the containment area must be emptied frequently enough to prevent an overflow of the containment area;

- Unless the containers do not contain free liquids and do not contain the "F" listed "dioxin wastes" (e.g., F020, F021, etc.), secondary containment areas must have sufficient capacity to contain 10 percent of the volume of all containers located in the area, or to contain the volume of the largest container, whichever is greater;

- Uncovered secondary containment areas must be capable of containing the volume from a 25-year storm of 24-hour duration;

- Run-on into the secondary containment system must be prevented unless Ecology waives this requirement; and

- Accumulation containers holding EHW must be stored under cover.

<u>Unit-Specific Requirements for Tanks</u>

Generators that accumulate wastes in tanks must comply with the unit-specific requirements found in -640. This includes the unit-specific closure requirements in -640(8) except for -640(8)(c) which deals with tank systems that are required to have secondary containment but do not fully comply with the secondary containment requirements in -640(4)(b) through (f). The unit-specific tank requirements are discussed in detail in Appendix F of this document.

Special Wastes

The state also allows reduced regulation for "special wastes" with prior approval from Ecology. Special wastes are defined as those wastes that are solid (i.e., non-liquid, non-aqueous, and non-gaseous) and that are not regulated by the EPA (i.e., "state only" wastes). However, a "state only" waste that is designated EHW does not qualify as a special waste.

Special wastes can be transported under an approved alternative manifest system. They can also be accumulated in tanks or containers for up to 180 days without obtaining a permit. All other generator accumulation requirements, as discussed above, apply to generators of special waste.

2.2 Generator Treatment

The March 24, 1986, Federal Register contains an EPA interpretation in the preamble that allows generators to treat their own waste in accumulation tanks or containers without obtaining a TSD permit provided that the generator complies with: the 90-day accumulation period; Part 265 Subpart I (for containers); or Part 265 Subpart J, except the waste analysis and trial test requirements (for tanks). Ecology took a more restrictive approach to this interpretation requiring generators to receive approval from the agency prior to being allowed to treat their own waste in tanks or containers without obtaining a permit.

Generators can treat their own wastes in tanks or containers provided that they receive written approval for treatment by generator (TBG) from Ecology and comply with the generator accumulation requirements (see Subsection 2.1.2). Generators that treat waste and do not receive TBG approval must comply with the TSD facility treatment requirements (see Section 2.4).

2.2.1 Generator Treatment Alternatives

Treatment by Generator Approval

RMW generated within the RLWS Facilities can treat their own waste on-site in tanks or containers without a TSD permit provided that TBG status is obtained from Ecology. Generators that receive TBG status from the state must also comply with the generator accumulation requirements for tanks and containers, as appropriate (see Subsection 2.1.2).

There are no set guideline for how to go about receiving TBG status from Ecology. However, in our experience, the authorization is usually initiated by a written TBG request to the agency. The request should include a description of the treatment process and a discussion of how the operator of the process will ensure compliance with the generator accumulation requirements. In addition, T.I.M. No. 86-3, which addresses the state's attitude toward TBG, presents a list of four criteria that Ecology uses to determine whether TBG status will be granted. These four criteria should be addressed in the TBG request. The four criteria include:

- The inherent risk of the treatment process (lower risk treatment processes will be preferentially allowed);
- The toxicity of the waste (lower toxicity wastes will be preferentially allowed);
- The risk of a release of the waste to the environment and the relative risk of such a release to human health and the environment; and
- The relative benefit of the treatment process to the environment (processes that result in a substantial benefit to the environment will be preferentially allowed).

Generator Treatment in Containers

RMW generated in the RLWS Facilities can be treated on-site in containers without obtaining a TSD permit provided TBG status is obtained and the treatment process is in compliance with the container accumulation requirements for generators (see Subsection 2.1.2). This could apply to any containerized waste stream, including solids, semi-solids, liquids, or contained gaseous materials. The treatment process could include any and all physical, chemical, or biological process as long as it made the waste: less dangerous or non-dangerous; safer for transport; amenable for energy recovery, material recovery, or storage; or reduced in volume.

Generators that add absorbents to waste or waste to absorbents in a container are not required to obtain TBG status and do not need a TSD permit provided:

- The addition of absorbents to the container occur at the time the wastes are first placed into the container;
- The generator complies with the container requirements as described in -200(1)(b); and
- The generator complies with the special requirements for ignitable, reactive, or incompatible wastes presented in -395(1)(a) and (b).

Generator Treatment in Tanks

RMW generated in the RLWS Facilities can be treated on-site in tanks without obtaining a TSD permit provided TBG status is obtained and the treatment process is in compliance with the tank accumulation requirements for generators (see Subsection 2.2.2). This could apply to any of the liquid RMW waste streams that are or will be treated in tanks the RLWS Facilities. The treatment process could include any and all physical, chemical, or biological process as long as it made the waste: less dangerous or non-dangerous; safer for transport; amenable for energy recovery, material recovery, or storage; or reduced in volume.

Generator Treatment in Railroad Tank Cars

As indicated earlier, railroad tank cars would typically be considered only as transport vehicles. However, RMW generated in the RLWS Facilities could be treated on-site in railroad tank cars, without obtaining a TSD permit, provided TBG status is obtained and the treatment process is in compliance with the container accumulation requirements for generators (see Subsection 2.1.2). Compliance with the generator accumulation requirements would be required because, under most circumstances, railroad tank cars are portable and meet the definition of containers.

This alternative could apply to any of the liquid RMW waste streams that could be treated in railroad tank cars in the RLWS Facilities. The treatment process could include any and all physical, chemical, or biological process as long as it made the waste: less dangerous or non-dangerous; safer for transport; amenable for energy recovery, material recovery, or storage; or reduced in volume.

2.2.2 Regulatory Requirements for Generator Treatment

The requirements for generator treatment in tanks or containers would be the same requirements placed on generators that accumulate waste for less than 90 days (see Subsection 2.1.2). Ecology may place additional requirements on a generator treatment operation on a case-by-case basis if they determine that generator accumulation requirements are not stringent enough to adequately protect human health and the environment. Any additional requirements would be open to negotiation.

2.3 TSD Facility Storage

Dangerous waste management facilities are allowed to store waste on-site in containers or tanks for longer than 90 days provided the facility obtains a permit and is in compliance with the standards and conditions under that permit. For the purpose of this appendix, we will concentrate on interim status storage and not address final status storage. It should be noted that some of the unit-specific requirements differ between interim and final status. These differences will need to be addressed in the Part B permitting process prior to obtaining final status.

2.3.1 TSD Facility Storage Alternatives

TSD Facility Storage in Containers

RMW can be stored in containers for longer than 90 days at the RLWS Facilities provided the facility complies with the general TSD facility requirements and the interim status requirements for closure and containers (see Subsection 2.3.2). The facility would also need to submit Part A of the TSD permit application. Interim status storage facilities are not restricted to managing wastes generated at the unit or site. Thus, a permitted interim status storage facility could store waste generated at the RLWS Facilities and/or from any facility located off the Hanford Site.

TSD Facility Storage in Tanks

RMW can be stored for longer than 90 days in tanks at the RLWS Facilities provided the facility complies with the general TSD facility requirements and the interim status requirements for closure and tanks (see Subsection 2.3.2). The facility would also need to submit Part A of the TSD permit application. Interim status storage facilities are not restricted to managing wastes generated at the unit or site. Thus, a permitted interim status storage facility could store waste in tanks if it was generated at the RLWS Facilities and/or from any facility located off the Hanford Site.

TSD Facility Storage in Railroad Tank Cars

Although railroad tank cars are typically only used as short-term transport vehicles, RMW could be stored for longer than 90 days. In such a case, the railroad tank cars at the RLWS Facilities would have to comply with the general TSD facility requirements and the unit-specific requirements for closure and containers (see Subsection 2.3.2). Compliance with the unit-specific requirements for containers would be required because, under most circumstances, railroad tank cars are portable and meet the definition of containers. The facility would also need to submit Part A of the TSD permit application. Interim status storage facilities are not restricted to managing wastes generated at the unit or site. Thus, a permitted interim status storage facility could store waste in railroad tank cars if it was generated at the RLWS Facilities and/or from any facility located off the Hanford Site.

2.3.2 Regulatory Requirements for TSD Facility Storage

TSD storage facilities have certain requirements that must be met. In general, these requirements are divided into three broad categories:

- General TSD requirements found in Sections -280 through -420 of the state regulations;
- Unit-specific requirements found in Section -400 of the state regulations which reference the interim status requirements found in 40 CFR Part 265 Subparts F through R. In addition, Section -400 imposes other requirements on interim status facilities operating in Washington that are not included in the federal standards. Container storage facilities must comply with Subpart I and tank storage facilities must comply with Subpart J. All interim status storage facilities must comply with the closure requirements in Subpart G of Part 265; and
- Permit requirements for interim status facilities as found in Section -805 of the state regulations.

If a TSD facility also generates waste at the site, the owner/operator must comply with the generator requirements (see Subsection 2.1.2) in addition to the interim status requirements.

General TSD Facility Requirements

For the most part, the general requirements for TSD storage facilities address administrative actions that must be taken by the owner/operator. The general requirements include:

- **Notification.** TSD storage facility must notify Ecology of dangerous waste activities and obtain an EPA/State identification number prior to conducting such activities;
- **Notices.** TSD storage facilities must provide various notices including: a notice of intent must be provided to Ecology and the public prior to siting a new TSD facility and prior to expanding an existing TSD facility under interim status; the owner/operator must notify Ecology prior to receiving a waste shipment from a foreign source; and if shipments are received from off the Hanford Site, the owner/operator must notify the generator that proper permits have been obtained and that the facility will accept the generators waste;
- **Prohibitions.** TSD storage facilities are subject to the land disposal restrictions, must have a permit, and the owner/operator cannot dilute a waste for the purpose of avoiding regulation;
- **Performance Standards.** General performance standards that essentially prohibit pollution of the environment must be met by TSD storage facilities;

- **Waste Analysis.** TSD storage facilities must conduct a detailed waste analysis in accordance with a written Waste Analysis Plan to ensure that the waste identity is known and that the waste is being properly managed at the facility;

- **Security.** Security must be provided at TSD storage facilities to prohibit unauthorized entry of personnel and livestock into the facility (e.g., signs, barriers, etc.);

- **Inspections.** TSD facility owner/operator's must inspect their storage areas, log the results of these inspections, and remedy problems noted during inspections in accordance with a written inspection schedule;

- **Personnel Training.** Personnel associated with the TSD storage operations must receive training on the regulatory requirements, hazards associated with the waste, and proper waste handling procedures in accordance with a written Training Plan;

- **Emergencies and Contingency Planning.** Facilities that store dangerous waste must prepare and plan for emergencies in accordance with a written Contingency Plan;

- **Manifests.** TSD storage facilities that receive manifested shipments of waste from off-site (i.e. off the Hanford Site) must meet certain manifest requirements (this currently does not apply to the 300 Area);

- **Recordkeeping.** TSD storage facilities must keep an operating record that includes all data, records, and information related to the receipt and management of the waste at the facility;

- **Reporting.** Storage facilities must submit certain reports to Ecology including annual reports (Form 4), unmanifested waste reports (only for shipments from off the Hanford Site), and any other report the agency determines is necessary; and

- **Other Requirements.** The TSD owner/operator must meet the general requirements regarding: ignitible, reactive, or incompatible wastes; compliance with other local, state, or federal environmental requirements; asbestos, unless the asbestos is handled in accordance with 40 CFR Part 61 Subpart M; loading and unloading facility requirements (only for shipments to or from a facility located off the Hanford Site); waste pile and surface impoundment storage time limits; labeling of tanks and containers; and siting standards.

Unit-Specific Requirements for TSD Container Storage

The unit-specific requirements for TSD facilities that manage containers include:

- **Condition and Identification.** Containers must be in good condition and must be labeled to identify the major risks associated with the waste;

- **Compatibility.** Storage containers must be compatible with the waste they contain or must be lined with a material that is compatible with the waste;

- **Management of Containers.** Storage containers must be closed at all times except when adding or removing waste and they cannot be handled in a manner that would cause them to leak or rupture;

- **Inspections.** In addition to the general inspection requirements discussed above, storage containers and storage areas must be inspected at least weekly looking for leaks or deterioration of containers and containment systems;

- **Ignitable and Reactive Wastes.** Storage containers that hold ignitable or reactive wastes must be stored at least 50 feet from the property boundary (i.e., the Hanford Site boundary);

- **Incompatible Wastes.** Incompatible wastes or materials cannot be placed in the same container unless precautions are taken to ensure that they do not react and containers that hold wastes that are incompatible with other containerized wastes or materials must be segregated.

Unit-Specific Requirements for TSD Tank Storage

TSD facilities that store waste in tanks must comply with the unit-specific requirements found in Section -400 of the state regulations and Subpart J of Part 265 in the federal regulations. These requirements are discussed in detail in Appendix F to this document.

TSD Facility Closure Requirements

The closure requirements in 40 CFR Part 265 Subpart G present general requirements for all TSD facilities. There are additional closure requirements that apply only to container management units. In general, the closure requirements include:

- **Performance Standards.** Closure of a TSD facility must be done in such a manner as to: Minimize further maintenance; and control, minimize, or eliminate the post-closure escape of dangerous wastes and constituents to the extent necessary to adequately protect human health and the environment;

- **Closure Plan.** All TSD facilities must have a written Closure Plan that describes how and when final closure and partial closure, if appropriate, will be accomplished at the facility;

- **Closure Plan Amendment.** The closure requirements describe when a Closure Plan can/must be amended;

- **Notification.** The owner/operator must submit the Closure Plan to Ecology for approval at least 180 days prior to the date that final closure, or partial closure, is expected to start;

- **Closure Schedule.** TSD facilities must be closed within 180 days of the closure start date unless the agency allows additional time for closure;

- **Closure Certification.** Within 60 days of the completion of final closure, the owner/operator must submit a certification to the agency stating that closure has been completed in accordance with the approved Closure Plan (if the agency concurs, interim status is withdrawn for that facility); and

- **Potential Post-Closure.** Any tank or container TSD facility that does not remove or decontaminate all equipment and surrounding soils at closure must close the facility as a landfill and comply with the landfill requirements, including Post-Closure care.

<u>TSD Facility Interim Status Permit Requirements</u>

Interim status permit requirements are found in Section -805 of the state regulations. These requirements apply to all interim status facilities regardless of the type of unit or type of operation. In general, the interim status permit requirements include:

- **Interim Status Qualification.** Interim status is allowed for facilities that were in operation when the RCRA regulations went into affect (November 1980) or facilities that were in operation at the time a change in the regulations caused a waste or operation to become newly regulated (November 1987 for RMW);

- **Maintaining Interim Status.** In order to maintain interim status, the owner/operator must: submit a notification and Part A permit application to Ecology; comply with the interim status requirements; update the Part A as necessary to reflect new conditions; and submit Part B of the permit application within six months after the agency request;

- **Termination of Interim Status.** Interim status can be terminated if: the agency determines that the facility is in violation of the interim status requirements or no longer qualifies for interim status; the owner/operator fails to submit a Part B permit application when requested to do so; the facility is found to violate the performance standards; a final status permit is issued; or when interim status closure is certified and approved by the agency;

- **Interim Status Prohibitions.** Interim status facilities are not allowed to: manage a waste that is not listed on the Part A permit application; operate processes that are not on the Part A; or exceed the design capacities specified on the Part A; and

- **Limits on Reconstruction.** Interim status facilities can expand operations and/or processes as long as the capital investment (excluding property costs) of the changes do not exceed 50 percent of the capital cost of constructing a new facility with similar operations and capacities.

2.4 TSD Facility Treatment

RMW in the RLWS Facilities can be treated in containers, tanks, and railroad tank cars as long as the following requirements are met:

- General TSD requirements found in Sections -280 through -420 of the state regulations;

- Unit-specific requirements found in Section -400 of the state regulations which reference the interims status requirements found in 40 CFR Part 265 Subparts F through R. All interim status facilities must comply with the closure requirements in Subpart G of Part 265. In addition, container treatment facilities must comply with Subpart I and tank treatment facilities must comply with Subpart J; and

- Permit requirements for interim status facilities as found in Section -805 of the state regulations.

The requirements for treatment in containers, tanks, and railroad tank cars are essentially the same as the requirements for storage in these types of units. See Section 2.3 for a discussion of the requirements that would be imposed on treatment in containers, tanks, and railroad tank cars.

2.5 Permit-by-Rule Treatment

Three types of treatment systems can be covered by a permit-by-rule under WAC 173-303-802(5). These are:

- Totally enclosed treatment facilities;

- Elementary neutralization units; and

- Wastewater treatment units.

Under the provisions of WAC 173-303-802(5), tank systems, and in some cases containers, that qualify for a permit-by-rule are exempt from the majority of the TSD facility requirements, unless on a case-by-case basis Ecology requires a full facility permit and imposes additional requirements on the facility.

2.5.1 Permit-by-Rule Treatment Alternatives

Totally Enclosed Treatment Facility

RMW can be treated in a totally enclosed treatment facility at RLWS Facilities provided the permit-by-rule requirements are met (see Subsection 2.5.2). A totally enclosed treatment facility is a facility for treating dangerous waste which is directly connected to a production process and which prevents the release of dangerous waste or dangerous waste constituents into the environment during treatment. Thus, if a tank system or container meets the definition or a totally enclosed treatment facility, then it is only required to comply with the permit-by-rule requirements.

The totally enclosed treatment language has been very narrowly applied by Ecology to mean that dangerous wastes must be totally contained within the treatment process. For example, if wastes or waste constituents could be released to the environment via pressure relief valves or leakage, then the system is not totally enclosed. If a tank is open topped, or if pipes transfer dangerous wastes to any part of the treatment process that is open, then the system is not totally enclosed. If a vacuum is drawn on a tank or cell, and dangerous wastes or waste constituents could be discharged to the atmosphere via a filtration system, then the system is not totally enclosed.

Elementary Neutralization Unit

RMW can be treated in an elementary neutralization unit at RLWS Facilities provided the permit-by-rule requirements are met (see Subsection 2.5.2). An elementary neutralization unit is a device which:

- Is used for neutralizing wastes which are dangerous wastes only because they exhibit the corrosivity characteristics defined in WAC 173-303-090 or are listed in WAC 173-303-081, or in 173-303-082 only for this reason; and

- Meets the definition of tank, tank system, container, transport vehicle, or vessel.

If a tank system or container is used solely for the purpose of neutralizing acidic or basic wastes, and those wastes are dangerous wastes only because of their high or low pH, then the unit is an elementary neutralization unit and is only required to comply with the permit-by-rule requirements.

Wastewater Treatment Unit

RMW can be treated in a wastewater treatment unit tank at RLWS Facilities provided the permit-by-rule requirements are met (see Subsection 2.5.2). Containers do no meet the definition of a wastewater treatment unit and do not qualify for permit-by-rule under this exemption.

A wastewater treatment unit is a device which :

- Is part of a wastewater treatment facility which is subject to regulation under either:
  - Section 402 (NPDES) or Section 307(b) (pretreatment program) of the Federal Clean Water Act; or
  - Chapter 90.48 RCW, State Water Pollution Control Act, provided that any dangerous waste treated at the facility is designated only by Chapter 173-303 WAC and is not regulated as hazardous waste under 40 CFR Part 261; and
- Handles dangerous waste as defined in WAC 173-303-070 through 173-303-103 in either of the following manners:
  - Receives and treats or stores an influent dangerous wastewater; or
  - Generates and accumulates or treats or stores a dangerous wastewater treatment sludge; and
- Meets the definition of tank or tank system in WAC 173-303-040.

To be a wastewater treatment unit, a tank system must meet two criteria:

- The tank system must receive and treat or store a dangerous wastewater, or generate and accumulate, treat, or store a dangerous wastewater treatment sludge. This is fairly broad, and covers nearly everything (other than land disposal or incineration) that would normally be done in the process of handling and treating wastewaters or wastewater sludges; and
- The tank system must be <u>subject to</u> either the federal (and equivalent state) National Pollutant Discharge and Elimination System (NPDES) or Pretreatment programs. The key language here is "subject to"; a state or federal permit does not actually have to be issued for the facility or tank system to qualify for this exemption.

2.5.2 Regulatory Requirements for Permit-by-Rule Treatment

The requirements for permit-by-rule units are found in Section -802 of the state regulations. Section -802(5) applies to totally enclosed treatment facilities, elementary neutralization units, and wastewater treatment unit. All three types of units have identical permit-by-rule requirements. In general, these requirements include:

- **Notification.** Permit-by-rule facilities must notify Ecology of dangerous waste activities and obtain an EPA/state identification number prior to conducting such activities;
- **Performance Standards.** General performance standards that essentially prohibit pollution of the environment must be met by permit-by-rule facilities;
- **Security.** Security, must be provided at permit-by-rule facilities to prohibit unauthorized entry of personnel and livestock into the facility (e.g., signs, barriers, etc.);
- **Emergencies and Contingency Planning.** Permit-by-rule facilities must prepare and plan for emergencies in accordance with a written Contingency Plan;
- **Manifests.** Permit-by-rule facilities that receive manifested shipments of waste from off-site (i.e., off the Hanford Site) must meet certain manifest requirements (this does not currently apply to the 300 Area);
- **Recordkeeping.** Permit-by-rule facilities must keep copies of summary reports regarding incidents that resulted in implementation of the Contingency Plan; and
- **Reporting.** Permit-by-rule facilities must submit certain reports to Ecology including annual reports (Form 4), unmanifested waste reports (only for shipments from off the Hanford Site), and any other report the agency determines is necessary.

2.6 Elimination of RMW

This section discusses four options that could allow a reduction in the degree of regulation in the 300 Area. These options address changes in the current processes and activities so that wastes would no longer be regulated under the state Dangerous Waste Regulations.

No Discharge/Receipt of RMW

The 300 Area processes that currently generate RMW could be changed so that RMW is no longer generated, discharged, or received by the RLWS Facilities. This could apply to all processes and activities that currently operate in the 300 Area or it could apply to one or more activity or process. Any RMW process that no longer handles dangerous waste would not be regulated under the Dangerous Waste Regulations. However, prior to being removed from regulation the process would need to be decontaminated in accordance with applicable accumulation tank or container decontamination requirements.

Render RMW Non-Dangerous

RMW could be treated to render them non-dangerous. The treatment process(es) would need to be conducted in accordance with a TBG approval, or a permit such as a TSD permit or, if applicable, a permit-by-rule (see Sections 2.2, 2.4, and 2.5). After proper treatment, the non-dangerous waste stream(s) would not be regulated nor would the process(es) associated with the handling of the non-dangerous waste streams.

Delisting of Listed RMW

The state Dangerous Waste Regulations allow procedures for delisting regulated wastes (WAC 173-303-910 and -072). These procedures entail a formal petition process which, if successful, can allow an otherwise regulated dangerous waste to be non-regulated. The petition process could be used to exempt certain RMW waste streams from regulation, provided the prescribed criteria are met and documented.

De Minimis Concentrations of Listed RMW

Under current state and federal regulations, any listed waste that is mixed with a solid waste causes the entire mixture to become a listed waste, regardless of the amount of listed waste involved. The EPA is contemplating a change to the regulations that would exclude waste streams that contain de minimis (i.e., small) amounts of listed dangerous wastes. At this time, the definition of de minimis has not been determined. Until the regulations are changed, this will not be an option for RMW generated in the 300 Area. However, it may be an option for RMW in the future if certain waste streams contain de minimis levels of listed waste.

2.7 Physical and Operational Changes

It is possible in many cases to achieve compliance by redesigning and reconstructing buildings and components, installing new equipment, and revamping existing activities and practices. These physical and operational changes can range from minor fixes to very extraordinary measures that can be costly, time consuming, and impeding to missions and schedules.

Physical and operational changes are another means of achieving regulatory compliance, and should be considered when evaluating compliance alternatives. However, major changes are only warranted where:

- Regulatory compliance is impossible without such changes. For example, it may be necessary to replace a tank that fails its integrity assessment;

- The ability to achieve regulatory compliance is greatly simplified by such changes. For example, installation of video cameras in tank vaults could satisfy the requirement for daily physical inspection; or

- The benefits of such changes far outweigh the costs. For example, replumbing a building's RMW sewer to bypass a tank could result in eliminating the need for the tank to comply with the regulations.

The regulatory compliance alternatives considered by this appendix generally do not rely on extensive physical or operational changes. Instead, the alternatives that have been developed assume, for the most part, that the RLWS Facilities status quo should be disrupted as little as possible. Nevertheless, where physical or operational changes could be made and clearly satisfy the criteria described above, the compliance alternative is presented.

3.0 APPLICABILITY OF COMPLIANCE ALTERNATIVES TO MAJOR RLWS FACILITIES COMPONENTS

This section describes the various compliance alternatives that may be applicable to the major components of the RLWS Facilities. The major RLWS Facilities components are discussed in Appendix A, and the following discussions are organized according to the major components.

3.1 Buildings 324 and 325

3.1.1 Generator Accumulation in Containers

Liquid RMW generated in hot cells and laboratories could be accumulated in containers temporarily. The date accumulation begins would be the date the liquid RMW is generated. Within 90 days after generation, the liquid RMW would have to be transferred to a TSD facility with interim or final status for storage or treatment, or else transferred to a permit-by-rule treatment facility. In Buildings 324 and 325, most liquid RMW would be discharged to the RLWS via hot cell drains, lab sinks, and the tanks.

Solid RMW generated in hot cells and laboratories could be accumulated in containers temporarily. The date accumulation begins would be the date the solid RMW is generated. Within 90 days after generation, the solid RMW would have to be transferred to a TSD facility with interim or final status for storage, treatment, or disposal. In Buildings 324 and 325, all solid RMW is transferred from these buildings in containers.

During accumulation, the containers would have to be kept closed, except to add or remove RMW. The containers would have to be made of, or lined with, a material that was compatible with the RMW. Any container accumulation areas installed after September 30, 1986, or expressly required to by Ecology, would have to have a secondary containment system. The container areas would have to be inspected at least weekly. A Personnel Training Plan, Contingency Plan, Inspection Schedule, and Inspection Log would have to be prepared and maintained for the RMW container accumulation activities. Other general requirements (e.g., for ignitables, reactives, and incompatibles) would also apply.

3.1.2 Generator Satellite Accumulation

Liquid RMW generated in hot cells and laboratories could be accumulated in containers at satellite accumulation areas. At a satellite accumulation area, the date accumulation begins for RMW at that satellite area would be the date the amount of liquid RMW being accumulated exceeds either:

- One quart for acutely hazardous waste ("P" listed discarded chemical products, toxic category X and A discarded chemical products, and the "F" listed dioxin wastes); or

- 55 gallons for all other RMW.

Within 90 days after the date accumulation begins, the liquid RMW would have to be transferred to a TSD facility with interim or final status for storage or treatment, or else transferred to a permit-by-rule treatment facility. In Buildings 324 and 325, most liquid RMW would be discharged to the RLWS via hot cell drains, lab sinks, and the tanks.

Solid RMW could also be accumulated in satellite areas under generally the same conditions as outlined above for liquid RMW. Generally, solid RMW will not be acutely hazardous waste, so the 55-gallon limit would probably apply to most solid RMW satellite areas. In Buildings 324 and 325, most solid RMW is transferred from these buildings in containers.

During accumulation in a satellite area, all of the generator accumulation requirements (with the exception of the 90 day time limit) apply. Thus, the containers would have to be kept closed, except to add or remove RMW. The containers would have to be made of, or lined with, a material that was compatible with the RMW. Any container accumulation areas expressly required to by Ecology would have to have a secondary containment system. The container areas would have to be inspected at least weekly. A

Personnel Training Plan, Contingency Plan, Inspection Schedule, and Inspection Log would have to be prepared and maintained for the RMW container satellite areas and accumulation activities. Other general requirements (e.g., for ignitables, reactives, and incompatibles) would also apply.

Finally, it is important to note that once a RMW is removed from a satellite area to a central accumulation area (e.g., the tanks), regardless of the volume of RMW generated, the 90-day time limit for that RMW begins counting. Thus, even if 55 gallons of RMW have not accumulated at a satellite area, and if that RMW is removed from the satellite area and transferred to a central accumulation area, it is at the time of transfer that the 90-day clock starts ticking for that RMW.

3.1.3 Generator Accumulation in Tanks

Liquid RMW generated in the hot cells and laboratories could be accumulated in tanks. The date accumulation begins would be the date the liquid RMW is generated, or the date the liquid RMW enters the tanks if transferred from a satellite accumulation area. Within 90 days after generation (or transfer from a satellite area), the liquid RMW would have to be transferred from the tanks to a TSD facility with interim or final status for storage or treatment, or else transferred to a permit-by-rule treatment facility. In Buildings 324 and 325, liquid RMW in the tanks would be discharged to the RLWS.

Solids are generally not accumulated in tanks, so generator accumulation of solid RMW in tanks is not a feasible alternative at this time. Satellite accumulation is not allowed in tanks under the regulations, thus exemption from the 90-day generator accumulation time limit is not a feasible alternative for RMW accumulation in tanks.

During accumulation, the tank systems would be subject to the same tank standards as apply to final status TSD facility tank systems, with the exception of the requirement for a closure plan and a permit. A detailed discussion of the unit-specific tank system requirements is provided in Appendix F. In addition, a Personnel Training Plan, Contingency Plan, Inspection Schedule, and Inspection Log would have to be prepared and maintained for the RMW tank systems and accumulation activities.

3.1.4 TSD Facility Storage in Containers

Liquid RMW generated in hot cells and laboratories could be stored in containers in accordance with the TSD facility requirements. There would be no time limit restricting how long the liquid RMW could be stored. Eventually, the liquid RMW would be transferred to another TSD facility with interim or final status for storage or treatment, or else transferred to a permit-by-rule treatment facility. In Buildings 324 and 325, most liquid RMW would be discharged to the RLWS via hot cell drains, lab sinks, and the tanks.

Solid RMW generated in hot cells and laboratories could be stored in containers in accordance with the TSD facility requirements. There would be no time limit restricting how long the solid RMW could be stored. Eventually, the solid RMW would be transferred to another TSD facility with interim or final status for storage, treatment, or disposal. In Buildings 324 and 325, most solid RMW is transferred from these buildings in containers.

During storage, the containers would have to be kept closed, except to add or remove RMW. The containers would have to be made of, or lined with, a material that was compatible with the RMW. Any container storage areas installed after September 30, 1986, or expressly required to by Ecology, would have to have a secondary containment system. The container areas would have to be inspected at least weekly. A Waste Analysis Plan, Personnel Training Plan, Contingency Plan, Inspection Schedule, Inspection Log, and Closure Plan would have to be prepared and maintained for the RMW container storage activities. Other general requirements (e.g., for ignitables, reactives, and incompatibles) would also apply.

In addition, the container storage operations would be subject to interim status and final status permit conditions. Thus, a Part A permit application would need to be submitted to include the container storage under TSD facility interim status. Eventually, a Part B permit application would have to be submitted for a final status permit. It should be noted, however, that a TSD container storage facility could qualify for generator accumulation (including satellite accumulation) status at some future time by satisfying certain requirements (e.g., procedural closure, demonstration of ability to comply with 90-day accumulation time limit). These requirements are generally set on a case-by-case basis by the regulatory agency.

3.1.5 TSD Facility Storage in Tanks

Liquid RMW generated in hot cells and laboratories could be stored in tanks in accordance with the TSD facility requirements. There would be no time limit restricting how long the liquid RMW could be stored. Eventually, the liquid RMW would be transferred to another TSD facility with interim or final status for storage or treatment, or else transferred to a permit-by-rule treatment facility. In Buildings 324 and 325, most liquid RMW would be discharged to the RLWS.

Solids are generally not stored in tanks, so TSD facility storage of solid RMW in tanks is not a feasible alternative at this time.

During storage, the tank systems would be subject to the interim or final status tank standards. A detailed discussion of the unit-specific tank system requirements is provided in Appendix F. In addition, a Waste Analysis Plan, Personnel Training Plan, Contingency

Plan, Inspection Schedule, Inspection Log, and Closure Plan would have to be prepared and maintained for the RMW tank systems and storage activities.

In addition, the tank storage operations would be subject to interim status and final status permit conditions. Thus, a Part A permit application would have to be submitted to include the tank storage under TSD facility interim status. Eventually, a Part B permit application would need to be submitted for a final status permit. It should be noted, however, that a TSD tank storage facility could qualify for generator accumulation status at some future time by satisfying certain requirements (e.g., procedural closure, demonstration of ability to comply with 90-day accumulation time limit). These requirements are generally set on a case-by-case basis by the regulatory agency.

3.1.6 TSD Facility Treatment

Treatment of RMW in containers or tanks could be performed in Buildings 324 and 325. Such treatment would have to be in accordance with the TSD facility requirements for containers and tanks and relevant treatment standards. Treatment could result in the RMW being rendered non-dangerous, or could be performed to make the RMW less dangerous, amenable for storage, or amenable for transport.

During treatment, containers would have to be kept closed, except to add or remove RMW or to perform treatment. The containers would have to be made of, or lined with, a material that was compatible with the RMW. Any container treatment areas installed after September 30, 1986, or expressly required to by Ecology, would have to have a secondary containment system. The container areas would have to be inspected at least weekly. Tank systems would be subject to the interim or final status tank standards. A detailed discussion of the unit-specific tank system requirements is provided in Appendix F. A Waste Analysis Plan, Personnel Training Plan, Contingency Plan, Inspection Schedule, Inspection Log, and Closure Plan would have to be prepared and maintained for the RMW containers and/or tank systems, and the treatment activities.

In addition, treatment operations would be subject to interim status and final status permit conditions. Thus, a Part A permit application would have to be submitted to include the treatment under TSD facility interim status. Eventually, a Part B permit application would have to be submitted, and a final status permit received.

3.1.7 Treatment by Generator

Treatment of RMW in containers or tanks could be performed in Buildings 324 and 325 under a treatment by generator approval from Ecology. A treatment by generator approval would allow treatment to occur in accordance with the generator container or tank accumulation requirements, without the need to obtain an interim or final status permit. Ecology approves treatment by generator on a case-by-case basis, and can impose conditions in addition to the generator accumulation requirements.

Under treatment by generator, containers would have to be kept closed, except to add or remove RMW or to perform treatment. The containers would have to be made of, or lined with, a material that was compatible with the RMW. Any container treatment areas installed after September 30, 1986, or expressly required to by Ecology, would have to have a secondary containment system. The container areas would have to be inspected at least weekly. Under treatment by generator, tank systems would be subject to the final status tank standards. A detailed discussion of the unit-specific tank system requirements is provided in Appendix F. A Personnel Training Plan, Contingency Plan, Inspection Schedule, and Inspection Log would have to be prepared and maintained for the RMW containers and/or tank systems, and the treatment activities.

3.1.8 Permit-by-Rule Treatment

Treatment of RMW in Buildings 324 and 325 could be performed under a permit-by-rule. RMW designated solely due to corrosivity could be neutralized in containers or tanks under an elementary neutralization unit permit-by-rule. Any RMW could be treated under a totally enclosed treatment facility permit-by-rule, however to be totally enclosed generally implies that the treatment occurs in a tank system or pipe. Any RMW could be treated under a wastewater treatment unit permit-by-rule, however to qualify for this the treatment unit must be a tank that is subject to a NPDES or POTW pretreatment permit under the Federal Clean Water Act.

Thus, treatment of RMW in containers could only qualify for a permit-by-rule if the RMW was solely corrosive, and treatment was solely a neutralization process. Treatment of RMW in tanks could only qualify for a permit-by-rule if it was elementary neutralization, or was a totally enclosed treatment system. Ecology has been very restrictive in the past on what constitutes totally enclosed, and has been reluctant to use this permit-by-rule allowance.

A wastewater treatment unit permit-by-rule is not currently an option because the tanks in Buildings 324 and 325 are not subject to NPDES or POTW pretreatment permits. This option could become available in the future if the RLWS Facilities is eventually tied into the Richland POTW, as called for in Milestone M-17-09 of the Tri-Party Agreement. However, there currently are no plans to tie the RLWS into the anticipated treatment plant.

Under a permit-by-rule, containers and tanks are not subject to the container and tank standards. A Contingency Plan must be developed and maintained for the containers and/or tanks, and the treatment activities.

3.1.9 No Generation or Handling of RMW

Operations and activities in Buildings 324 and 325 could be conducted in such a way as to ensure that RMW is not generated or handled. This could be accomplished through a number, or combination, of efforts, including:

- No receipt of RMW for analyses;
- Elimination of analyte solutions and reagents that result in RMW when disposed of; and/or
- Restriction of other waste generating operations to eliminate potential RMW generating materials.

Although this option technically exists, it would likely be so restrictive on the mission of the Building 324 and 325 laboratories, and on waste analysis efforts at the Hanford Site (e.g., for SST/DST) that this option is impractical.

Another alternative would be to render RMW non-dangerous at Buildings 324 and 325. For liquids, this treatment either could occur in the tanks in the buildings, or could be performed in containers prior to discharge to the tanks. For solids, treatment would most likely occur in containers. As a result of treatment, the RMW would no longer be dangerous. Thus, any subsequent handling of the waste stream after treatment would be exempt from the regulatory requirements. The actual treatment of the RMW would be subject to regulation, either as generator treatment (see Section 2.2) or as TSD facility treatment (see Section 2.4). This alternative would be of primary benefit for RMW that is ignitable, reactive, corrosive, or EP Toxic.

This alternative would not be useful for listed RMW, unless the resulting treated waste could be delisted (see Subsection 2.6.3). Delisting is typically an onerous process, and is generally only successful for wastes with very low (i.e., part per billion) concentrations of listed constituents. Delisting may be most possible for some of the dilute wastes generated in Buildings 324 and 325, particularly for rinsewaters and other incidental contact wastes generated during analyses of listed RMW samples (e.g., single shell tank cores).

3.2 RLWS

3.2.1 Generator Tank System Ancillary Equipment

The RLWS (pipes, sumps, secondary containment, alarms, and associated equipment) could be considered part of the Building 324/325 and/or Building 340 tank systems. If the tanks in Buildings 324, 325, and 340 are considered to be generator accumulation tanks, then the RLWS could be ancillary equipment of the generator tank system.

Under this alternative, the RLWS would be subject to the same tank standards as apply to final status TSD facility tank systems, with the exception of the requirement for a closure plan. A detailed discussion of the unit-specific tank system requirements is provided in Appendix F. In addition, a Personnel Training Plan, Contingency Plan, Inspection Schedule, and Inspection Log would have to be prepared and maintained for the RMW tank systems and accumulation activities.

3.2.2 TSD Facility Tank System Ancillary Equipment

The RLWS could be considered part of the Building 324/325 and Building 340 tank systems. If any of the tanks in Buildings 324, 325, or 340 are considered to be TSD facility storage or treatment tanks, then the RLWS could be ancillary equipment of the TSD facility tank system.

Under this alternative, the RLWS would be subject to the interim or final status tank standards. A detailed discussion of the unit-specific tank system requirements is provided in Appendix F. A Waste Analysis Plan, Personnel Training Plan, Contingency Plan, Inspection Schedule, Inspection Log, and Closure Plan would have to be prepared and maintained for the RLWS.

In addition, the RLWS would be subject to interim status and final status permit conditions. Thus, a Part A permit application would have to be submitted to include the RLWS under TSD facility interim status. Eventually, a Part B permit application would have to be submitted, and a final status permit received.

3.2.3 Permit-by-Rule

If treatment of the RMW in the tanks at either Buildings 324/325 or Building 340 is determined to qualify for a permit-by-rule, the RLWS could be considered to be part of the permit-by-rule facility. Since a permit-by-rule facility is generally exempt from the majority of the unit-specific requirements (e.g., standards for tank systems), the RLWS could also be exempt from the requirements under this alternative.

Alternatively, it may be possible to qualify the RLWS itself as a permit-by-rule treatment system, even though Buildings 324/325 and Building 340 activities don't qualify for permit-by-rule. This would depend on being able to show that treatment (e.g., elementary neutralization) occurs within the RLWS, and that the RLWS can satisfy the conditions applicable to permit-by-rule facilities. Under this alternative, the RLWS could be exempt from most of the unit-specific requirements.

Under a permit-by-rule, containers and tanks are not subject to the container and tank standards, and the same would be true for the RLWS. There are no standards specific to pipes. A Contingency Plan must be developed and maintained for the RLWS and the treatment activities.

3.2.4 No RMW Present

If it can be demonstrated that RMW is not handled in the RLWS, then the RLWS would not be subject to the dangerous waste standards. Such a demonstration would depend on showing either:

- Wastes discharged to the RLWS are not RMW when generated. This would require showing that analyses, administrative controls, or other measures are in place to prevent the discharge of RMW to the RLWS; or

- RMW has been effectively treated prior to discharge to the RLWS to render it non-dangerous. This would require showing that the treatment practices result in a waste stream that would no longer be designated dangerous.

Either of these demonstrations will be complicated by the presence of listed RMW in any of the waste streams discharging to the RLWS. It would be necessary to delist any listed RMW as part of an effort to show that the RLWS is not handling RMW. Delisting is discussed in Subsection 2.6.3.

In addition, because it is possible that the RLWS did handle RMW in the past, it would also be necessary to show that RMW is no longer present in the RLWS, through delisting of the remaining contents and/or closure of the RLWS. If the RLWS could not be clean closed (i.e., shown that no RMW residues remain), then this alternative would not be feasible.

3.3 Building 340

3.3.1 Generator Accumulation in Tanks

Liquid RMW is initially received at Building 340 in tanks. Accumulation of this liquid RMW could be considered generator accumulation in tanks. The date accumulation begins would be the date the liquid RMW is generated, or the date the liquid RMW is transferred from a satellite accumulation area. Thus, RMW may be anywhere from a few days to several weeks old by the time it arrives at Building 340.

Within 90 days after generation (or transfer from a satellite area), the liquid RMW would have to be transferred from the Building 340 tanks to a TSD facility with interim or final status for storage or treatment, or else transferred to a permit-by-rule treatment facility. Liquid RMW is currently transported to the 204-AR facility via railroad tank cars.

During accumulation, the Building 340 tank system would be subject to the same tank standards as apply to final status TSD facility tank systems, with the exception of the requirement for a closure plan. A detailed discussion of the unit-specific tank system requirements is provided in Appendix F. In addition, a Personnel Training Plan, Contingency Plan, Inspection Schedule, and Inspection Log would have to be prepared and maintained for the Building 340 tank system and accumulation activities.

3.3.2 TSD Facility Storage in Tanks

Liquid RMW received at Building 340 could be stored in tanks in accordance with the TSD facility requirements. There would be no time limit restricting how long the liquid RMW could be stored. Eventually, the liquid RMW would be transferred to another TSD facility with interim or final status for storage or treatment, or else transferred to a permit-by-rule treatment facility.

During storage, the tank system would be subject to the interim or final status tank standards. A detailed discussion of the unit-specific tank system requirements is provided in Appendix F. In addition, a Waste Analysis Plan, Personnel Training Plan, Contingency Plan, Inspection Schedule, Inspection Log, and Closure Plan would have to be prepared and maintained for the Building 340 tank system and storage activities.

In addition, the tank storage operations would be subject to interim status and final status permit conditions. Thus, a Part A permit application would have to be submitted to include the tank storage under TSD facility interim status. Eventually, a Part B permit application would have to be submitted, and a final status permit received.

3.3.3 Treatment by Generator

Treatment of RMW in tanks could be performed in Building 340 under a treatment by generator approval from Ecology. A treatment by generator approval would allow treatment to occur in accordance with the generator tank accumulation requirements, without the need to obtain an interim or final status permit. However, treatment would have to occur within 90 days after the RMW was generated to still be subject only to generator accumulation standards. Ecology approves treatment by generator on a case-by-case basis, and can impose conditions in addition to the generator accumulation requirements.

Under treatment by generator, the Building 340 tank system would be subject to the final status tank standards. A detailed discussion of the unit-specific tank system requirements is provided in Appendix F. A Personnel Training Plan, Contingency Plan, Inspection

Schedule, and Inspection Log would have to be prepared and maintained for the Building 340 tank system and the treatment activities.

3.3.4 TSD Facility Treatment

Absent treatment by generator approval from Ecology, or if treatment could not occur within 90 days after the date the RMW was generated, treatment in the Building 340 tank system could be performed in accordance with the TSD facility requirements for tanks and the relevant treatment standards.

The Building 340 tank system would be subject to the interim or final status tank standards. A detailed discussion of the unit-specific tank system requirements is provided in Appendix F. A Waste Analysis Plan, Personnel Training Plan, Contingency Plan, Inspection Schedule, Inspection Log, and Closure Plan would have to be prepared and maintained for the Building 340 tank system and the treatment activities.

In addition, treatment operations would be subject to interim status and final status permit conditions. Thus, a Part A permit application would have to be submitted to include the Building 340 tank treatment under TSD facility interim status. Eventually, a Part B permit application would have to be submitted, and a final status permit received.

3.3.5 Permit-by-Rule Treatment

Treatment of RMW in Building 340 could be performed under a permit-by-rule. RMW designated solely due to corrosivity could be neutralized in the tank system under an elementary neutralization unit permit-by-rule. Any RMW could be treated at Building 340 under a totally enclosed treatment facility permit-by-rule.

Any RMW could be treated at Building 340 under a wastewater treatment unit permit-by-rule; however to qualify for this the Building 340 tank system must be subject to a NPDES or POTW pretreatment permit under the Federal Clean Water Act. A wastewater treatment unit permit-by-rule is not currently an option because the tank system in Building 340 is not subject to NPDES or POTW pretreatment permits. This option could become available in the future if the RLWS Facilities is eventually tied into the Richland POTW, as called for in Milestone M-17-09 of the Tri-Party Agreement. However, there are no plans at this time to tie the RLWS or the Building 340 tank system into the planned treatment plant.

Thus, at this time, treatment of RMW in the Building 340 tank system could only qualify for a permit-by-rule if it was elementary neutralization, or was a totally enclosed treatment system. Elementary neutralization would only be a feasible alternative if RMW transferred to Building 340 was not listed, was not ignitable, reactive, or EP Toxic, and did not exhibit any of the state-only criteria (acute toxicity, persistence, or carcinogencity). It is unlikely that these limitations could be satisfied for many of the RMW transferred to Building 340.

With respect to totally enclosed treatment, Ecology has been very restrictive in the past on what constitutes totally enclosed, and has been reluctant to use this permit-by-rule allowance. However, given the extent to which the Building 340 tank system has been designed and operated to contain radioactive releases, a strong argument could be made that the system is totally enclosed.

Under a permit-by-rule, the Building 340 tank system would not be subject to the tank standards. A Contingency Plan must be developed and maintained for the Building 340 tank system and the treatment activities.

3.3.6 No Receipt of RMW

If it can be demonstrated that RMW is not handled in the Building 340 tank system, then the tank system would not be subject to the dangerous waste standards. Such a demonstration would depend on showing either:

- Wastes sent to the Building 340 tank system are not RMW. This would require showing that analyses, administrative controls, or other measures are in place to prevent RMW from being discharged to or arriving at the Building 340 tank system; or

- RMW is non-dangerous once it enters the Building 340 tank system. This would require showing that all RMW waste streams would be non-dangerous by the time they reach Building 340, or else would be non-dangerous upon entering the Building 340 tank system.

Either of these demonstrations will be complicated by the presence of listed RMW in any of the waste streams discharging to Building 340. It would be necessary to delist any listed RMW as part of an effort to show that the Building 340 tank system is not handling RMW. Delisting is discussed in Subsection 2.6.3.

In addition, because it is possible that the Building 340 tanks did handle RMW in the past, it would also be necessary to show that RMW is no longer present in the tanks, through delisting of the remaining contents and/or closure of the tanks. If the tanks could not be clean closed (i.e., shown that no RMW residues remain), then this alternative would not be feasible.

3.4 Building 340A

Liquid RMW has occasionally, in the past, been shunted from Building 340 to one or more of the 6 tanks in Building 340A. Generally, this practice only occurs due to unforeseen circumstances (e.g., lack of capacity at Building 340). Nevertheless, RMW has been held in the Building 340A tanks in the past, and could be transferred to the tanks in the future.

3.4.1 Generator Accumulation in Tanks

Accumulation of liquid RMW in the Building 340A tanks could be considered generator accumulation in tanks. The date accumulation begins would be the date the liquid RMW is generated, or the date the liquid RMW is transferred from a satellite accumulation area. Thus, RMW may be anywhere from a few days to several weeks old by the time it arrives at Building 340A.

Within 90 days after generation (or transfer from a satellite area), the liquid RMW would have to be transferred from the Building 340A tanks to a TSD facility with interim or final status for storage or treatment, or else transferred to a permit-by-rule treatment facility. Liquid RMW is currently transported to the 204-AR facility via railroad tank cars.

During accumulation, the Building 340A tank system would be subject to the same tank standards as apply to final status TSD facility tank systems, with the exception of the requirement for a closure plan. A detailed discussion of the unit-specific tank system requirements is provided in Appendix F. In addition, a Personnel Training Plan, Contingency Plan, Inspection Schedule, and Inspection Log would have to be prepared and maintained for the Building 340A tank system and accumulation activities.

3.4.2 TSD Facility Storage in Tanks

Liquid RMW received at Building 340A could be stored in tanks in accordance with the TSD facility requirements. There would be no time limit restricting how long the liquid RMW could be stored. Eventually, the liquid RMW would be transferred to another TSD facility with interim or final status for storage or treatment, or else transferred to a permit-by-rule treatment facility.

During storage, the tank system would be subject to the interim or final status tank standards. A detailed discussion of the unit-specific tank system requirements is provided in Appendix F. In addition, a Waste Analysis Plan, Personnel Training Plan, Contingency Plan, Inspection Schedule, Inspection Log, and Closure Plan would have to be prepared and maintained for the Building 340A tank system and storage activities.

In addition, the tank storage operations would be subject to interim status and final status permit conditions. Thus, a Part A permit application would have to be submitted to include the Building 340A tank storage under TSD facility interim status. Eventually, a Part B permit application would have to be submitted, and a final status permit received.

3.4.3 Use of Tanks for Secondary Containment Only

It may be possible to dedicate the 6 tanks in Building 340A solely for use as part of the secondary containment system for Building 340 and/or Building 340B. This would require that the Building 340A tanks no longer be used to contain excess volumes from Building 340, and that the Building 340A tanks be otherwise isolated from receiving RMW other than under accidental release/secondary containment circumstances.

If the Building 340A tanks could be dedicated solely to containment of releases at Building 340B, then they would be considered part of a container accumulation or storage area secondary containment system. Container secondary containment is not subject to the tank standards; instead, it would be subject to the containment and inspection requirements of the dangerous waste container regulations. Thus, the Building 340A tanks would not be required to undergo integrity assessments or to have secondary containment.

If the Building 340A tanks could be used to contain releases from the Building 340 tanks, then the Building 340A tanks would be considered part of the secondary containment for a tank system. Under this alternative, the Building 340A tanks would still be included in the integrity assessment for the Building 340 tank system, however the Building 340A tanks would be exempt from the secondary containment requirements. In addition, integrity assessment of the Building 340A tanks (as part of the overall Building 340 tank system assessment) could be greatly simplified by the fact that RMW would only be present during accidental releases.

3.4.4 No Receipt of RMW

If it can be demonstrated that RMW is not handled in the Building 340A tank system, then the tank system would not be subject to the dangerous waste standards. Such a demonstration would depend on showing either:

- Wastes sent to the Building 340A tank system are not RMW. This would require showing that analyses, administrative controls, or other measures are in place to prevent RMW from being discharged to or arriving at the Building 340A tank system; or

- RMW is non-dangerous once it enters the Building 340A tank system. This would require showing that all RMW waste streams would be non-dangerous by the time they reach Building 340A, or else would be non-dangerous upon entering the Building 340A tank system.

Either of these demonstrations will be complicated by the presence of listed RMW in any of the waste streams entering the Building 340A tank system. It would be necessary to delist any listed RMW as part of an effort to show that the Building 340A tank system is not handling RMW. Delisting is discussed in Subsection 2.6.3.

In addition, because it is possible that the Building 340A tanks did handle RMW in the past, it would also be necessary to show that RMW is no longer present in the tanks, through delisting of the remaining contents and/or closure of the tanks. If the tanks could not be clean closed (i.e., shown that no RMW residues remain), then this alternative would not be feasible.

3.5 Building 340B

RMW is periodically transferred from the Building 340 tank system to railroad tank cars in Building 340B. A secondary containment system is in place for the railroad tank cars in the floor of Building 340B. The railroad tank cars are portable devices that meet the definition of transport vehicle and also the definition of container. Transport vehicles that are loaded and begin transport expeditiously (e.g., within 24 hours) are typically not considered accumulation or storage. Even if transport cannot begin quickly, at most the tank cars would be containers. Thus, container regulations could apply to the railroad tank cars, but they would not be subject to tank standards.

3.5.1 Transport Vehicles

Loading of transport vehicles by a generator of a waste is generally not considered to constitute an accumulation or storage practice. Thus, it is likely that RMW transfer activities at Building 340B would not be subject to either generator accumulation or TSD storage facility requirements.

Although there is no explicit regulatory language, general guidance provided by Ecology is that if waste transfer operations can be completed and transport initiated expeditiously, then accumulation and storage requirements are not applied. Expeditious transfer and transport is generally cited as being within 24 hours after the waste arrives at the load/unload area.

Thus, if operations at Buildings 340 and 340B could be coordinated to accomplish RMW transfer and shipment within one day, then the generator accumulation and TSD storage facility requirements would not apply to the railroad tank cars and Building 340B.

3.5.2 Generator Accumulation in Containers

Liquid RMW transferred from the Building 340 tank system to Building 340B could be accumulated in railroad tank cars temporarily. This option would be necessary if transfer and removal of wastes could not be accomplished within 24 hours. This would constitute generator accumulation of RMW in containers, provided that certain conditions are met.

Within 90 days after generation, the liquid RMW would have to be transferred to a TSD facility with interim or final status for storage or treatment, or else transferred to a permit-by-rule treatment facility. The date accumulation begins would be the date the liquid RMW is generated (e.g., in Buildings 324/325), or the date the liquid RMW is transferred from a satellite accumulation area. Thus, RMW may be anywhere from a few days to several weeks old by the time it is placed in railroad tank cars at Building 340B.

During accumulation, the railroad tank cars would have to be kept closed, except to add or remove RMW. The railroad tank cars would have to be made of, or lined with, a material that was compatible with the RMW. The Building 340B containment would have to comply with the container secondary containment system regulations, and would have to be inspected at least weekly. A Personnel Training Plan, Contingency Plan, Inspection Schedule, and Inspection Log would have to be prepared and maintained for the RMW accumulation activities in Building 340B. Other general requirements (e.g., for ignitables, reactives, and incompatibles) would also apply.

3.5.3 TSD Facility Storage in Containers

Liquid RMW transferred from Building 340 to Building 340B could be stored in railroad tank cars in accordance with the TSD facility container requirements. There would be no time limit restricting how long the liquid RMW could be stored. Eventually, the liquid RMW would be transferred to another TSD facility with interim or final status for storage or treatment, or else transferred to a permit-by-rule treatment facility.

During storage, the railroad tank cars would have to be kept closed, except to add or remove RMW. The railroad tank cars would have to be made of, or lined with, a material that was compatible with the RMW. The Building 340B containment would have to comply with the secondary containment system regulations, and would have to be inspected at least weekly. A Waste Analysis Plan, Personnel Training Plan, Contingency Plan, Inspection Schedule, Inspection Log, and Closure Plan would have to be prepared and maintained for the RMW container storage activities. Other general requirements (e.g., for ignitables, reactives, and incompatibles) would also apply.

In addition, the railroad tank car storage operations would be subject to interim status and final status permit conditions. Thus, a Part A permit application would have to be submitted to include container storage in Building 340B under TSD facility interim status. Eventually, a Part B permit application would have to be submitted, and a final status permit received.

3.5.4 Treatment by Generator

It may be possible on occasion to treat RMW during or after its placement in railroad tank cars in Building 340B. This would constitute treatment by the generator in containers. Treatment of RMW in containers could be performed under a treatment by generator approval from Ecology. A treatment by generator approval would allow treatment to occur in accordance with the generator container accumulation requirements, without the need to obtain an interim or final status permit. Ecology approves treatment by generator on a case-by-case basis, and can impose conditions in addition to the generator accumulation requirements.

Under treatment by generator, the railroad tank cars would have to be kept closed, except to add or remove RMW or to perform treatment. The railroad tank cars would have to be made of, or lined with, a material that was compatible with the RMW. The treatment area (Building 340B) would have to comply with the secondary containment system requirements, and would have to be inspected at least weekly. A Personnel Training Plan, Contingency Plan, Inspection Schedule, and Inspection Log would have to be prepared and maintained for the railroad tank cars and the treatment activities.

3.5.5 TSD Facility Treatment

Absent treatment by generator approval from Ecology, or if treatment could not occur within 90 days after the date the RMW was generated, treatment in the Building 340B railroad tank cars could be performed in accordance with the TSD facility requirements for containers and the relevant treatment standards.

During treatment, the railroad tank cars would have to be kept closed, except to add or remove RMW or to perform treatment. The railroad tank cars would have to be made of, or lined with, a material that was compatible with the RMW. The treatment area (Building 340B) would have to comply with the secondary containment system regulations, and would have to be inspected at least weekly. A Waste Analysis Plan, Personnel Training Plan, Contingency Plan, Inspection Schedule, Inspection Log, and Closure Plan would have to be prepared and maintained for the railroad tank cars and the treatment activities.

In addition, treatment operations would be subject to interim status and final status permit conditions. Thus, a Part A permit application would have to be submitted to include the treatment under TSD facility interim status. Eventually, a Part B permit application would have to be submitted, and a final status permit received.

3.5.6 Permit-by-Rule Treatment

Treatment of RMW in railroad tank cars at Building 340B could be performed under a permit-by-rule. RMW designated solely due to corrosivity could be neutralized under an elementary neutralization unit permit-by rule. A waste water treatment unit permit-by-rule would not be an available option for Building 340B because the railroad tank cars would not be tanks (by definition), and the treatment in Building 340B would not be subject to a NPDES or POTW pretreatment permit under the federal Clean Water Act.

Any RMW could be treated under a totally enclosed treatment facility permit-by-rule, however to be totally enclosed generally implies that the treatment occurs in a tank system or pipe that is directly connected to the process that generated the waste. Ecology has been very restrictive in the past on what constitutes totally enclosed, and has been reluctant to use this permit-by-rule allowance.

Thus, treatment of RMW in the railroad tank cars probably could only qualify for a permit-by-rule if the RMW was solely corrosive, and treatment was solely a neutralization process. Under a permit-by-rule, the railroad tank cars would not be subject to the container and tank standards. A Contingency Plan must be developed and maintained for the railroad tank cars, Building 340B, and the treatment activities.

3.5.7 No Receipt of RMW

If it can be demonstrated that RMW is not handled in the Building 340B railroad tank cars, then the railroad tank cars would not be subject to the dangerous waste standards. Such a demonstration would depend on showing either:

- Wastes sent to the Building 340B railroad tank cars are not RMW. This would require showing that analyses, administrative controls, or other measures are in place to prevent RMW from being discharged to or arriving at the railroad tank cars; or

- RMW is non-dangerous once it enters the railroad tank cars. This would require showing that all RMW waste streams would be non-dangerous by the time they reach Building 340B and/or the railroad tank cars, or else would be non-dangerous upon entering Building 340B and/or the railroad tank cars.

Either of these demonstrations will be complicated by the presence of listed RMW in any of the waste streams being introduced to the railroad tank cars. It would be necessary to delist any listed RMW as part of an effort to show that the Building 340B system is not handling RMW. Delisting is discussed in Subsection 2.6.3.

In addition, because it is possible that the Building 340B system and the railroad tank cars did handle RMW in the past, it would also be necessary to show that RMW is no longer present in Building 340B and the railroad tank cars. This could be accomplished through delisting of the RMW that is sent to the railroad tank cars, delisting of any RMW residues remaining in the Building 340B system and the railroad tank cars, or through clean closure of the Building 340B system and railroad tank cars. If the Building 340B system and the railroad tank cars could not be clean closed (i.e., shown that no RMW residues remain), then this alternative would not be feasible.

3.6 Buildings 326, 327, and 329

Activities in Buildings 326, 327, and 329 are generally similar to activities in Buildings 324 and 325. The major difference is that Buildings 326, 327, and 329 do not have tanks for accumulating wastes prior to discharge to the RLWS.

3.6.1 Generator Accumulation in Containers

Liquid RMW could be accumulated in containers temporarily. The date accumulation begins would be the date the liquid RMW is generated. Within 90 days after generation, the liquid RMW would have to be transferred to a TSD facility with interim or final status for storage or treatment, or else transferred to a permit-by-rule treatment facility. While most liquid RMW from Buildings 326, 327, and 329 are disposed of via the RLWS, it may be possible for some liquid RMW with very low radiation doses to be transferred offsite in containers.

Solid RMW could be accumulated in containers temporarily. The date accumulation begins would be the date the solid RMW is generated. Within 90 days after generation, the solid RMW would have to be transferred to a TSD facility with interim or final status for storage, treatment, or disposal.

During accumulation, containers would have to be kept closed, except to add or remove RMW. The containers would have to be made of, or lined with, a material that was compatible with the RMW. Any container accumulation areas installed after September 30, 1986, or expressly required to by Ecology, would have to have a secondary containment system. The container areas would have to be inspected at least weekly.

A Personnel Training Plan, Contingency Plan, Inspection Schedule, and Inspection Log would have to be prepared and maintained for the RMW container accumulation activities. Other general requirements (e.g., for ignitables, reactives, and incompatibles) would also apply.

3.6.2 Generator Satellite Accumulation

Liquid RMW could be accumulated in containers at satellite accumulation areas. At a satellite accumulation area, the date accumulation begins for RMW at that satellite area would be the date the amount of liquid RMW being accumulated exceeds either:

- 1 quart for acutely hazardous waste ("P" listed discarded chemical products, toxic category X and A discarded chemical products, and the "F" listed dioxin wastes); or
- 55 gallons for all other RMW.

Within 90 days after the date accumulation begins, the liquid RMW would have to be transferred to a TSD facility with interim or final status for storage or treatment, or else transferred to a permit-by-rule treatment facility.

Solid RMW could also be accumulated in satellite areas under generally the same conditions as outlined above for liquid RMW. Generally, solid RMW will not be acutely hazardous waste, so the 55-gallon limit would probably apply to most solid RMW satellite areas.

During accumulation in a satellite area, all of the generator accumulation requirements (with the exception of the 90-day time limit) apply. Thus, the containers would have to be kept closed, except to add or remove RMW. The containers would have to be made of, or lined with, a material that was compatible with the RMW. Any container accumulation areas expressly required to by Ecology would have to have a secondary containment system. The container areas would have to be inspected at least weekly.

A Personnel Training Plan, Contingency Plan, Inspection Schedule, and Inspection Log would have to be prepared and maintained for the RMW container satellite areas and accumulation activities. Other general requirements (e.g., for ignitables, reactives, and incompatibles) would also apply.

Finally, it is important to note that once a RMW is removed from a satellite area to a central accumulation area (e.g., a loading dock, discharged to the RLWS), regardless of the volume of RMW generated, the 90-day time limit for that RMW begins counting. Thus, even if 55 gallons of RMW have not accumulated at a satellite area, if that RMW is removed from the satellite area and discharged to the RLWS, it is at the time of discharge that the 90-day clock starts ticking for that RMW.

3.6.3 TSD Facility Storage in Containers

Liquid RMW generated in Buildings 326, 327, and/or 329 could be stored in containers in accordance with the TSD facility requirements. There would be no time limit restricting how long the liquid RMW could be stored. Eventually, the liquid RMW would be transferred to another TSD facility with interim or final status for storage or treatment, or else transferred to a permit-by-rule treatment facility.

Solid RMW could also be stored in containers in accordance with the TSD facility requirements. There would be no time limit restricting how long the solid RMW could be stored. Eventually, the solid RMW would be transferred to another TSD facility with interim or final status for storage, treatment, or disposal.

During storage, the containers would have to be kept closed, except to add or remove RMW. The containers would have to be made of, or lined with, a material that was compatible with the RMW. Any container storage areas installed after September 30, 1986, or expressly required to by Ecology, would have to have a secondary containment system. The container areas would have to be inspected at least weekly.

A Waste Analysis Plan, Personnel Training Plan, Contingency Plan, Inspection Schedule, Inspection Log, and Closure Plan would have to be prepared and maintained for the RMW container storage activities. Other general requirements (e.g., for ignitables, reactives, and incompatibles) would also apply.

In addition, the container storage operations would be subject to interim status and final status permit conditions. Thus, a Part A permit application would have to be submitted to include the container storage under TSD facility interim status. Eventually, a Part B permit application would have to be submitted, and a final status permit received.

It should be noted, however, that a TSD container storage facility could qualify for generator accumulation (including satellite accumulation) status at some future time by satisfying certain requirements (e.g., procedural closure, demonstration of ability to comply with 90-day accumulation time limit). These requirements are generally set on a case-by-case basis by the regulatory agency.

3.6.4 Treatment by Generator

Treatment of RMW in containers could be performed in Buildings 326, 327, and/or 329 under a treatment by generator approval from Ecology. A treatment by generator approval would allow treatment to occur in accordance with the generator container accumulation requirements, without the need to obtain an interim or final status permit. Ecology approves treatment by generator on a case-by-case basis, and can impose conditions in addition to the generator accumulation requirements.

Under treatment by generator, containers would have to be kept closed, except to add or remove RMW or to perform treatment. The containers would have to be made of, or lined with, a material that was compatible with the RMW. Any container treatment areas installed after September 30, 1986, or expressly required to by Ecology, would have to have a secondary containment system. The container areas would have to be inspected at least weekly.

A Personnel Training Plan, Contingency Plan, Inspection Schedule, and Inspection Log would have to be prepared and maintained for the RMW containers and/or tank systems, and the treatment activities. Other general requirements (e.g., for ignitables, reactives, and incompatibles) would also apply.

3.6.5 TSD Facility Treatment

Absent treatment by generator approval from Ecology, or if treatment could not occur within 90 days after the date the RMW was generated, treatment in Buildings 326, 327, and/or 329 could be performed in accordance with the TSD facility requirements for containers and the relevant treatment standards.

During treatment, containers would have to be kept closed, except to add or remove RMW or to perform treatment. The containers would have to be made of, or lined with, a material that was compatible with the RMW. Any container treatment areas installed after September 30, 1986, or expressly required to by Ecology, would have to have a secondary containment system. The container areas would have to be inspected at least weekly.

A Waste Analysis Plan, Personnel Training Plan, Contingency Plan, Inspection Schedule, Inspection Log, and Closure Plan would have to be prepared and maintained for the container treatment area(s) and the treatment activities. Other general requirements (e.g., for ignitables, reactives, and incompatibles) would also apply.

In addition, treatment operations would be subject to interim status and final status permit conditions. Thus, a Part A permit application would have to be submitted to include the treatment under TSD facility interim status. Eventually, a Part B permit application would have to be submitted, and a final status permit received.

3.6.6 Permit-by-Rule Treatment

Treatment of RMW in Buildings 326, 327, and/or 329 could be performed under a permit-by-rule. Corrosive only RMW could be neutralized in containers, or in the building pipe system under an elementary neutralization permit-by rule. However, this alternative would only apply to RMW designated solely due to corrosivity (i.e., the RMW could not be listed, ignitable, reactive, EP Toxic, or state criteria designated).

Any RMW could be treated under a totally enclosed treatment facility permit-by-rule, however to be totally enclosed generally implies that the treatment occurs in a tank system or pipe that is directly connected to the process that generated the waste. Ecology has been very restrictive in the past on what constitutes totally enclosed, and has been reluctant to use this permit-by-rule allowance.

A waste water treatment unit permit-by-rule would not be an available option for Buildings 326, 327, and 329 at this time because any treatment conducted would not occur in tanks, and the treatment would not currently be subject to a NPDES or POTW pretreatment permit under the federal Clean Water Act. This option could become available in the future if tanks are added to Buildings 326, 327, and/or 329, and if the RLWS Facilities is eventually tied into the Richland POTW, as called for in Milestone M-17-09 of the Tri-Party Agreement. However, there are currently no plans to connect the RLWS to the planned treatment plant.

Under a permit-by-rule, containers and tanks are not subject to the container and tank standards. A Contingency Plan must be developed and maintained for the containers and/or tanks, and the treatment activities.

3.6.7 No Generation or Handling of RMW

Operations and activities in Buildings 326, 327, and 329 could be conducted in such a way as to ensure that RMW is not generated or handled. This could be accomplished through a number, or combination, of efforts, including:

- No receipt of RMW for analyses;
- Elimination of analyte solutions and reagents that result in RMW when disposed of; and/or
- Restriction of other waste generating operations to eliminate potential RMW generating materials.

Although this option technically exists, it would likely be so restrictive that this option is impractical.

Another alternative would be to render RMW non-dangerous at Buildings 326, 327, and/or 329. For liquids, this treatment either could occur in containers or in building piping prior to discharge to the RLWS. For solids, treatment would most likely occur in containers. As a result of treatment, the RMW would no longer be dangerous. Thus, any subsequent handling of the waste stream after treatment would be exempt from the regulatory requirements. The actual treatment of the RMW would be subject to regulation, either as treatment by generator (see Section 2.2), TSD facility treatment (see Section 2.4), or permit-by-rule treatment (see Section 2.5). This alternative would be of primary benefit for RMW that is ignitable, reactive, corrosive, or EP Toxic.

This alternative would not be useful for listed RMW, unless the resulting treated waste could be delisted (see Subsection 2.6.3). Delisting is typically an onerous process, and is generally only successful for wastes with very low (i.e., part per billion) concentrations of listed constituents. Delisting may be most possible for some of the dilute wastes generated in Buildings 326, 327, and/or 329, particularly for rinsewaters and other incidental contact wastes generated during analyses of listed RMW samples.

4.0 RANKINGS AND RATIONALES FOR POTENTIAL COMPLIANCE ALTERNATIVES

This section discusses the potential compliance alternatives in order of preference, based on relative rankings of the alternatives. The ranking of the alternatives was determined on the basis of qualitative factors such as reasonableness, practicality, likely acceptability to the regulatory agencies, ability to satisfy ALARA goals, reduction or simplification of regulatory requirements, potential for future regulatory or waste related changes, and effects and relationships of certain alternatives to others.

The compliance alternatives discussed below assume, for the most part, that RLWS Facilities equipment and operations will not be changed significantly to achieve regulatory compliance. As discussed in Section 2.7, it is certainly possible to achieve compliance through major physical and operational changes. However, the compliance alternatives discussed below attempt to minimize potential disruption of the missions and schedules of the RLWS Facilities while promoting regulatory compliance.

4.1 Recommended Compliance Approach

This section describes the recommended compliance approach for the various RLWS Facilities components.

4.1.1 Buildings 324 and 325

<u>Waste Survey</u>

A comprehensive waste survey (as discussed in Appendix B) should be undertaken in Buildings 324 and 325. The goal of this survey would be to identify all current and potential RMW. Waste streams that are currently being handled as RMW but which are not actually dangerous wastes under Chapter 173-303 WAC should also be identified. These non-dangerous radioactive wastes may represent a significant volume of the wastes that are currently handled as RMW. Their handling as RMW complicates the compliance effort, and probably reduces the opportunity to use less restrictive regulatory options (e.g., satellite accumulation, treatment by generator).

Satellite Accumulation

To the maximum extent possible, RMW should be collected in containers and kept in satellite accumulation areas at and near the points of generation in Buildings 324 and 325. This will likely require better segregation of RMW and non-dangerous radioactive waste, which in turn depends on the waste survey described above. The goal of this effort is, if possible, to accumulate all RMW in containers in satellite accumulation areas. This may require the use of dedicated hot cells or use of special containers for high activity RMW. Non-dangerous radioactive waste need not be kept in the satellite areas, and would be discharged to the tanks in Buildings 324 and 325 as they are generated.

The primary benefit of satellite accumulation will be to allow larger volumes of RMW to be accumulated for longer periods of time. This will result in less concern about the 90-day accumulation time limit, and allow Buildings 324 and 325 to aggregate more waste prior to transfer to Building 340. Thus, it may be possible to significantly limit transfers of RMW to Building 340. The consequence will be that fewer railroad tank car shipments from Building 340 will be needed, and that the shipments that are made will make better use of the tank car capacity.

Tank Accumulation

The primary purpose of the tanks in Buildings 324 and 325 should be for the accumulation of non-dangerous radioactive waste. Periodic discharges of RMW to the tanks from satellite accumulation areas throughout Buildings 324 and 325 would occur. These discharges, as well as the subsequent transfer to the RLWS and Building 340, should be scheduled or planned to occur at approximately the same times (e.g., within the same week). Thus, the tanks will be accumulating non-dangerous radioactive wastes most of the time. During a one week or so period, the Building 324 and 325 satellite accumulation areas would be purged of all RMW. This RMW would be drained to the Building 324 and 325 tanks, routed into the RLWS, and then followed by a flush and rinse of the plumbing and tank systems. When the initial satellite area purge occurs, the 90-day generator accumulation time limit for this batch of RMW would begin.

There are two primary benefits of using the tanks only periodically to accumulate RMW. First, the current problems associated with ensuring that RMW in the tanks is not more than 90 days old would be brought under control. By knowing when RMW is scheduled to be in the Building 324 and 325 tanks (and that RMW is not in the tanks the rest of the time), it is easier to satisfy the 90-day time constraint. Second, this approach simplifies the 90-day counting cycle for Building 340. Operators at Building 340 would know when RMW was scheduled to arrive, how old it was when it got there, and how much time remained to arrange for loading and shipment in a railroad tank car.

Treatment

Some treatment of RMW in Buildings 324 and 325 will likely be necessary. Most of this treatment either will be excluded as a result of the treatability exclusion in the regulations, or will be regulated under a separate R&D permit. Some treatment; however, will be performed to ensure compatibility of the RMW with the RLWS, laboratory plumbing, and/or tanks. It should be possible to coordinate treatment with the scheduled purges of the satellite accumulation areas.

The following approaches should be taken to address the issue of treatment in Buildings 324 and 325:

- For RMW that is designated solely because it is corrosive (i.e., it is not listed, EP Toxic, or state criteria), an elementary neutralization permit-by-rule should be established for the adjustment of pH.

- For RMW that is designated for reasons other than corrosivity, a treatment by generator approval should be obtained from Ecology. This would only be allowed for treatment in containers or tanks.

- Treatment efforts should be coordinated. RMW requiring treatment prior to discharge to the Building 324/325 tanks should be treated at about the same time the satellite area purges occur. One exception to this would be if, after treatment, a RMW could be shown to no longer be dangerous (e.g., neutralization of corrosive-only RMW), then treatment need not track with the satellite area purges.

- All treated RMW should be reevaluated after treatment to determine if it is still RMW, or if it is non-dangerous radioactive waste. Non-dangerous radioactive waste should be discharged to the Building 324/325 tanks after treatment; RMW should be kept in satellite accumulation areas until these areas are purged.

There are four principal benefits of the treatment approach outlined above. First, it could allow for the use of some RMW to treat other RMW (e.g., acid/base neutralization). Second, it could result in some RMW no longer being designated dangerous waste, thus providing regulatory relief for such wastes. Third, it would allow treatment to occur without the burden of obtaining a TSD treatment facility permit. Finally, it would allow a more comprehensive, organized treatment effort to be conducted, thus reducing the potential that RMW could inadvertently enter the Building 324/325 tanks (causing 90-day clock problems) due to inadequate treatment. A secondary benefit of this would be that building personnel could focus on the treatment effort during a narrow timeframe, allowing better planning and performance of treatment.

Requirements

Until such time as all RMW can be collected in containers at satellite accumulation areas in Buildings 324 and 325, the current system for handling RMW will have to be maintained. That is, the 90-day clock will begin as soon as RMW enters the Building 324/325 tanks, and frequent transfers to the RLWS and Building 340 will have to occur. If transfers to the railroad tank cars cannot be ensured within 90 days after RMW generation, then a TSD facility storage permit (interim and, eventually, final status) will be required. Treatment in Buildings 324 and 325 is not currently covered by a permit-by-rule or treatment by generator approval; until such time as this is resolved, such treatment is technically subject to the TSD treatment facility requirements.

The satellite accumulation areas and the tanks in Buildings 324 and 325 would be subject to the generator accumulation requirements. Generator accumulation (including satellite and tank accumulation) requirements are discussed in detail in Subsection 2.1.2 of this appendix. Detailed discussions of tank standards are also provided in Appendices F, G, and H. Elementary neutralization permit-by-rule requirements are discussed in detail in Subsection 2.5.2 of this appendix. Treatment by generator requirements are discussed in detail in Subsection 2.2.2 of this appendix.

4.1.2 RLWS

The RLWS should be considered ancillary equipment of a generator accumulation tank system. Although the RLWS will be subject to the generator accumulation requirements (as discussed in Subsection 2.1.2 of this appendix) and the applicable tank standards (as discussed in detail in Appendices F, G, and H), it will not be considered a TSD facility activity subject to interim and final status permitting. This approach is contingent upon the tanks in Buildings 324, 325, and 340 remaining generator accumulation (rather than TSD storage and treatment facility) operations.

4.1.3 Building 340

Tank Accumulation

The primary purpose of the tanks in Building 340 should be for the accumulation of non-dangerous radioactive waste. This would include diversions from the RPS; batch transfers of excess quantities of non-dangerous radioactive waste from Buildings 324 and 325 (e.g., because of tank capacity limitations at those buildings); continuous discharges of non-dangerous radioactive waste from Buildings 326, 327, and 329; and non-dangerous decontamination waste solutions from decontamination activities conducted at Building 340.

Periodically, the Building 340 tanks would receive batches of RMW from Buildings 324, 325, 326, 327, and 329, via the RLWS, when satellite accumulation areas are purged. Depending on how the discharges to the RLWS are coordinated, RMW arriving at Building 340 should easily have at least 60 days of accumulation time still available. This should be adequate for the required analysis, transfer to railroad tank cars, and shipment to 200 Area evaporators.

RMW may occasionally be disposed of into the sump at Building 340 (e.g., RMW decontamination solutions, RMW groundwater, or lysimeter water). To the maximum extent possible, discharges of RMW to the Building 340 sump should be coordinated to coincide with the scheduled transfers of waste to the railroad tank cars. The reason for this approach is that batches of RMW arriving in containers at the Building 340 sump may have various ages ranging from a few days to several months old. Since these RMW may occasionally be near the 90-day accumulation time limit, their residence time in the Building 340 tanks should be minimized in order to avoid exceeding the 90-day limit. Thus, their receipt at Building 340 should be scheduled to coincide with the dates of railroad tank car shipments.

Treatment

Some treatment of RMW in Building 340 will likely be necessary. Most of the treatment will be performed to ensure compatibility of the RMW with the railroad tank cars and to meet evaporator and DST limits. The following approaches should be taken to address the issue of treatment in Building 340:

- A treatment by generator approval should be obtained from Ecology.
- All treated RMW should be reevaluated after treatment to determine if it is still RMW, or if it is non-dangerous radioactive waste.
- In the event that treatment has rendered the RMW in the Building 340 tanks non-dangerous, then subsequent handling of the waste would not be subject to the regulations. In particular, the 90-day accumulation limit would no longer apply, and the non-dangerous radioactive waste could be retained in the Building 340 tanks as long as practical or desirable.

It will be necessary to obtain a treatment by generator approval in order to avoid having to obtain a TSD treatment facility interim and final status permit. Thus, this approval is a critical element of the Building 340 compliance approach.

Requirements

Until changes in existing practices can be made (e.g., establishment of satellite accumulation in Buildings 324, 325, 326, 327, and 329), the current waste handling situation will remain in place. If transfers to the railroad tank cars cannot be ensured within 90 days after RMW generation, then a TSD facility storage permit (interim and, eventually, final status) will be required. Treatment in Building 340 is not currently covered by a permit-by-rule or treatment by generator approval; until such time as this is resolved, such treatment is technically subject to the TSD treatment facility requirements.

The tanks in Building 340 would be subject to the generator accumulation requirements. Generator accumulation requirements are discussed in detail in Subsection 2.1.2 of this appendix. Detailed discussions of tank standards are also provided in Appendices F, G, and H. Treatment by generator requirements are discussed in detail in Subsection 2.2.2 of this appendix.

4.1.4 Building 340A

The tanks in Building 340A have, in the past, been used to accumulate RMW, and the current operations are such that accumulation could occur in the future. Absent certain piping and operational changes (see Subsection 4.2.4), the Building 340A tanks would be generator accumulation tanks whenever RMW is present.

The tanks in Building 340A would be subject to the generator accumulation requirements. Generator accumulation requirements are discussed in detail in Subsection 2.1.2 of this appendix. Detailed discussions of tank standards are also provided in Appendices F, G, and H.

4.1.5 Building 340B

The operations involving transfer of RMW to railroad tank cars in Building 340B should be timed and coordinated to be accomplished in less than one day. If this is possible, then the generator accumulation and TSD storage facility requirements could be waived. Standard good practices could be followed (e.g., monitoring of transfer activities) and these would likely be satisfactory to the regulatory agencies. Documentation should be maintained to provide written evidence that transfer operations are completed within one day, and this documentation should be kept in a centralized location, available for agency review.

4.1.6 Buildings 326, 327, and 329

Waste Survey

A comprehensive waste survey (as discussed in Appendix B) should be undertaken in Buildings 326, 327, and 329. The goal of this survey would be to identify all current and potential RMW. Waste streams that are currently being handled as RMW but which are not actually dangerous wastes under Chapter 173-303 WAC should also be identified. These non-dangerous radioactive wastes may represent a significant volume of the wastes that are currently handled as RMW. Their handling as RMW complicates the compliance effort, and probably reduces the opportunity to use less restrictive regulatory options (e.g., satellite accumulation, treatment by generator).

Satellite Accumulation

To the maximum extent possible, RMW should be collected in containers and kept in satellite accumulation areas at and near the points of generation in Buildings 326, 327, and 329. This will likely require better segregation of RMW and non-dangerous radioactive waste, which in turn depends on the waste survey described above. The goal of this effort is, if possible, to accumulate all RMW in satellite accumulation areas. This may require the use of dedicated hot cells or use of special containers for high activity RMW. Non-dangerous radioactive waste need not be kept in the satellite areas, and should be discharged to the RLWS.

The primary benefit of satellite accumulation in Buildings 326, 327, and 329 will be to eliminate or minimize ongoing discharges of RMW to the RLWS and Building 340. This will result in less concern about the 90-day accumulation time limit, allow Buildings 324 and 325 to aggregate more waste prior to transfer to Building 340, and prevent Building 340 from receiving RMW that begins the 90-day clock. The consequence will be that fewer railroad tank car shipments from Building 340 will be needed, and that the shipments that are made will make better use of the tank car capacity.

Treatment

Some treatment of RMW in Buildings 326, 327, and 329 will likely be necessary. Most of this treatment will be performed to ensure compatibility of the RMW with the RLWS, laboratory plumbing, and/or tanks. It should be possible to coordinate treatment with the scheduled purges of the satellite accumulation areas.

The following approaches should be taken to address the issue of treatment in Buildings 326, 327, and 329:

- For RMW that is designated solely because it is corrosive (i.e., it is not listed, EP Toxic, or state criteria), an elementary neutralization permit-by-rule should be established for the adjustment of pH.

- For RMW that is designated for reasons other than corrosivity, a treatment by generator approval should be obtained from Ecology.

- Treatment efforts should be coordinated. RMW requiring treatment prior to discharge to the RLWS should be treated at about the same time the satellite area purges occur. One exception to this would be if, after treatment, a RMW could be shown to no longer be dangerous (e.g., neutralization of corrosive-only RMW), then treatment need not track with the satellite area purges.

- All treated RMW should be reevaluated after treatment to determine if it is still RMW, or if it is non-dangerous radioactive waste. Non-dangerous radioactive waste should be discharged to the RLWS after treatment; RMW should be kept in satellite accumulation areas until these areas are purged.

There are four principal benefits of the treatment approach outlined above. First, it could allow for the use of some RMW to treat other RMW (e.g., acid/base neutralization). Second, it could result in some RMW no longer being designated dangerous waste, thus providing regulatory relief for such wastes. Third, it would allow treatment to occur without the burden of obtaining a TSD treatment facility permit. Finally, it would allow a more comprehensive, organized treatment effort to be conducted, thus reducing the potential that RMW could inadvertently enter the RLWS (causing 90-day clock problems) due to inadequate treatment. A secondary benefit of this would be that building personnel could focus on the treatment effort during a narrow timeframe, allowing better planning and performance of treatment.

<u>Requirements</u>

Until such time as all RMW can be collected in containers at satellite accumulation areas in Buildings 326, 327, and 329, the current system for handling RMW will have to be maintained. That is, the 90-day clock will begin as soon as RMW enters the RLWS and is transferred to Building 340. If transfers to the railroad tank cars cannot be ensured within 90 days after RMW generation, then a TSD facility storage permit (interim and, eventually, final status) will be required. Treatment in Buildings 326, 327, and 329 is not currently covered by a permit-by-rule or treatment by generator approval; until such time as this is resolved, such treatment is technically subject to the TSD treatment facility requirements.

The satellite accumulation areas and the tanks in Buildings 326, 327, and 329 would be subject to the generator accumulation requirements. Generator accumulation requirements are discussed in detail in Subsection 2.1.2 of this appendix. Elementary neutralization permit-by-rule requirements are discussed in detail in Subsection 2.5.2 of this appendix. Treatment by generator requirements are discussed in detail in Subsection 2.2.2 of this appendix.

4.2 Rankings of Compliance Alternatives

4.2.1 Buildings 324 and 325

Satellite accumulation, generator accumulation (containers and tanks), elementary neutralization permit-by-rule, and treatment by generator were identified as the preferred regulatory compliance approaches for Buildings 324 and 325. The other compliance alternatives, in order of ranked preference, are discussed below.

<u>TSD Facility Storage and Treatment</u>

This alternative is the next most preferrable because it is the most likely to be acceptable to the regulatory agencies after generator accumulation and treatment by generator.

<u>Permit-by-Rule Treatment</u>

Options exist to use the totally enclosed treatment permit-by-rule and the wastewater treatment permit-by-rule. The wastewater treatment permit-by-rule is not currently available as an option, but it may be usable in the future; thus, opportunities to use the wastewater treatment permit-by-rule should be kept in mind as changes occur in the 300 Area.

The totally enclosed treatment permit-by-rule is a possibility, but it would be subject to approval by Ecology. It would be very unlikely that approval would be granted for treatment in containers, even though such containers may be in a hood or hot cell. It is also very unlikely that Ecology would be willing to consider a totally enclosed treatment permit-by-rule even for treatment in the tank system. This opinion is based on three factors: the agency's general reluctance to provide this exception; the agency's reluctance to set precedents at the Hanford Site, particularly in the area of the tank requirements; and the possibility that chemical constituents could escape to the environment (e.g., through the HEPA air filter system).

<u>No Generation or Handling of RMW</u>

Although this alternative is the most desirable from a simplicity standpoint, it is also the least likely to be achievable based on current and planned operations at the 300 Area. While the benefits of this approach are obvious and significant, the efforts that would be needed to accomplish it in the near future are probably not possible.

Given the presence of listed wastes (past and future) in the RLWS Facilities, a delisting petition would have to be submitted to Ecology. Review and, if acceptable, approval could eventually require several months to years. Even after approval of a delisting petition, the potential for changes in operations and generation of new types of RMW would likely result in the need to update the petition approval on a frequent basis.

Eventually, EPA and Ecology should adopt de minimis concentrations for designating and delisting listed wastes. These standards will be self-implementing; that is, the generator of the waste will not have to petition the agencies and gain approval to determine that the wastes are not regulated. This should be an excellent alternative for some of the listed RMW, but it is unlikely that this option will be available for several years.

4.2.2 RLWS

Generator tank system ancillary equipment has been identified as the preferred regulatory compliance approaches for the RLWS. The other compliance alternatives, in order of ranked preference, are discussed below.

<u>TSD Facility Tank System Ancillary Equipment</u>

This alternative is the next most preferrable because it is the most likely to be acceptable to the regulatory agencies after generator accumulation and treatment by generator.

<u>Permit-by-Rule Treatment</u>

Options exist to use the totally enclosed treatment permit-by-rule. The totally enclosed treatment permit-by-rule is a possibility, but it would be subject to approval by Ecology. It would be difficult to obtain approval from Ecology because of three factors: the agency's general reluctance to provide this exception; the agency's reluctance to set precedents at the Hanford Site, particularly in the area of the tank requirements; and the fact that the RLWS would be part of tank systems that would not themselves qualify for permit-by-rule.

<u>No RMW Present</u>

Although this alternative is the most desirable from a simplicity standpoint, it is also the least likely to be achievable based on current and planned operations at the 300 Area. While the benefits of this approach are obvious and significant, the efforts that would be needed to accomplish it in the near future are probably not possible.

Given the presence of listed wastes (past and future) in the RLWS Facilities, a delisting petition would have to be submitted to Ecology. Review and, if acceptable, approval could eventually require several months to years. Even after approval of a delisting petition, the potential for changes in operations and generation of new types of RMW would likely result in the need to update the petition approval on a frequent basis.

Eventually, EPA and Ecology should adopt de minimis concentrations for designating and delisting listed wastes. These standards will be self-implementing; that is, the generator of the waste will not have to petition the agencies and gain approval to determine that the wastes are not regulated. This should be an excellent alternative for some of the listed RMW, but it is unlikely that this option will be available for several years.

4.2.3 Building 340

Generator accumulation in tanks and treatment by generator were identified as the preferred regulatory compliance approaches for Building 340. The other compliance alternatives, in order of ranked preference, are discussed below.

TSD Facility Storage and Treatment

This alternative is the next most preferrable because it is the most likely to be acceptable to the regulatory agencies after generator accumulation and treatment by generator.

Permit-by-Rule Treatment

Options exist to use the totally enclosed treatment permit-by-rule and the wastewater treatment permit-by-rule. The wastewater treatment permit-by-rule is not currently available as an option, but it may be usable in the future; thus, opportunities to use the wastewater treatment permit-by-rule should be kept in mind as changes occur in the 300 Area.

The totally enclosed treatment permit-by-rule is a possibility, but it would be subject to approval by Ecology. It is very unlikely that Ecology would be willing to consider a totally enclosed treatment permit-by-rule for treatment in the Building 340 tank system. This opinion is based on three factors: the agency's general reluctance to provide this exception; the agency's reluctance to set precedents at the Hanford Site, particularly in the area of the tank requirements; and the possibility that chemical constituents could escape to the environment (e.g., through the HEPA air filter system).

No Receipt of RMW

Although this alternative is the most desirable from a simplicity standpoint, it is also the least likely to be achievable based on current and planned operations at the 300 Area. While the benefits of this approach are obvious and significant, the efforts that would be needed to accomplish it in the near future are probably not possible.

Given the presence of listed wastes (past and future) in the RLWS Facilities, a delisting petition would have to be submitted to Ecology. Review and, if acceptable, approval could eventually require several months to years. Even after approval of a delisting petition, the potential for changes in operations and generation of new types of RMW would likely result in the need to update the petition approval on a frequent basis.

Eventually, EPA and Ecology should adopt de minimis concentrations for designating and delisting listed wastes. These standards will be self-implementing; that is, the generator of the waste will not have to petition the agencies and gain approval to determine that the wastes are not regulated. This should be an excellent alternative for some of the listed RMW, but it is unlikely that this option will be available for several years.

4.2.4 Building 340A

Generator accumulation in tanks was identified as the preferred regulatory compliance approach for Building 340A. The other compliance alternatives, in order of ranked preference, are discussed below.

TSD Facility Storage

This alternative is the next most preferrable because it is the most likely to be acceptable to the regulatory agencies after generator accumulation.

Use of Tanks for Secondary Containment Only

This alternative would provide significant relief from the tank standards for the tanks in Building 340A. However, its implementation would require a major investment in procedural and equipment changes for the 340 complex, and would probably need a long period of time to accomplish. Consequently, despite the benefits that could be obtained, this alternative was ranked lower. Although this alternative is probably not available in the near future, if a commitment to this alternative could be made, the regulatory agencies would probably consider this option very acceptable.

No Receipt of RMW

Although this alternative is the most desirable from a simplicity standpoint, it is also the least likely to be achievable based on current and planned operations at the 300 Area. While the benefits of this approach are obvious and significant, the efforts that would be needed to accomplish it in the near future are probably not possible.

Given the presence of listed wastes (past and future) in the RLWS Facilities, a delisting petition would have to be submitted to Ecology. Review and, if acceptable, approval could eventually require several months to years. Even after approval of a delisting petition, the potential for changes in operations and generation of new types of RMW would likely result in the need to update the petition approval on a frequent basis.

Eventually, EPA and Ecology should adopt de minimis concentrations for designating and delisting listed wastes. These standards will be self-implementing; that is, the generator of the waste will not have to petition the agencies and gain approval to determine that the wastes are not regulated. This should be an excellent alternative for some of the listed RMW, but it is unlikely that this option will be available for several years.

4.2.5 Building 340B

Transport vehicle status was identified as the preferred regulatory compliance approach for the railroad tank car loading activities at Building 340B. The other compliance alternatives, in order of ranked preference, are discussed below.

Generator Accumulation and TSD Facility Storage

These alternative are the next most preferrable because they are the most likely to be acceptable to the regulatory agencies after transport vehicle status.

Treatment by Generator, TSD Facility Treatment, and Permit-by-Rule Treatment

It is questionable whether current operations can or should be modified to allow for treatment in the railroad tank cars. Even if such treatment were feasible, it would likely result in the tank cars and Building 340B becoming subject to the generator accumulation, TSD storage facility, or permit-by rule requirements. This option should only be considered if the railroad tank car transfer operations must be considered accumulation or storage, and only if significant benefits could be accrued from treating RMW in the tank cars.

No Receipt of RMW

Although this alternative is the most desirable from a simplicity standpoint, it is also the least likely to be achievable based on current and planned operations at the 300 Area. While the benefits of this approach are obvious and significant, the efforts that would be needed to accomplish it in the near future are probably not possible.

Given the presence of listed wastes (past and future) in the RLWS Facilities, a delisting petition would have to be submitted to Ecology. Review and, if acceptable, approval could eventually require several months to years. Even after approval of a delisting petition, the potential for changes in operations and generation of new types of RMW would likely result in the need to update the petition approval on a frequent basis.

Eventually, EPA and Ecology should adopt de minimis concentrations for designating and delisting listed wastes. These standards will be self-implementing; that is, the generator of the waste will not have to petition the agencies and gain approval to determine that the wastes are not regulated. This should be an excellent alternative for some of the listed RMW, but it is unlikely that this option will be available for several years.

4.2.6 Buildings 326, 327, and 329

Satellite accumulation, elementary neutralization permit-by-rule, and treatment by generator were identified as the preferred regulatory compliance approaches for Buildings 326, 327, and 329. The other compliance alternatives, in order of ranked preference, are discussed below.

Generator Accumulation

This alternative would be the next most preferrable after satellite accumulation because it is likely to be the next most acceptable to the regulatory agencies.

TSD Facility Storage and TSD Facility Treatment

This alternative is the next most preferrable after generator accumulation and treatment by generator because it is the next most likely to be acceptable to the regulatory agencies.

Permit-by-Rule Treatment

Options exist to use the totally enclosed treatment permit-by-rule and the wastewater treatment permit-by-rule. The wastewater treatment permit-by-rule is not currently available as an option, but it may be usable in the future; thus, opportunities to use the wastewater treatment permit-by-rule should be kept in mind as changes occur in the 300 Area.

The totally enclosed treatment permit-by-rule is a possibility, but it would be subject to approval by Ecology. It would be very unlikely that approval would be granted for treatment in containers, even though such containers may be in a hood or hot cell. It is also very unlikely that Ecology would be willing to consider a totally enclosed treatment permit-by-rule because of four other factors: the agency's general reluctance to provide this exception; the agency's reluctance to set precedents at the Hanford Site; the fact that totally enclosed treatment is generally considered to be associated with a tank system (which Buildings 326, 327, and 329 do not currently have); and the possibility that chemical constituents could escape to the environment (e.g., through the HEPA air filter system).

No Generation or Handling of RMW

Although this alternative is the most desirable from a simplicity standpoint, it is also the least likely to be achievable based on current and planned operations at the 300 Area. While the benefits of this approach are obvious and significant, the efforts that would be needed to accomplish it in the near future are probably not possible.

Given the presence of listed wastes (past and future) in the RLWS Facilities, a delisting petition would have to be submitted to Ecology. Review and, if acceptable, approval could eventually require several months to years. Even after approval of a delisting petition, the potential for changes in operations and generation of new types of RMW would likely result in the need to update the petition approval on a frequent basis.

Eventually, EPA and Ecology should adopt de minimis concentrations for designating and delisting listed wastes. These standards will be self-implementing; that is, the generator of the waste will not have to petition the agencies and gain approval to determine that the wastes are not regulated. This should be an excellent alternative for some of the listed RMW, but it is unlikely that this option will be available for several years.

APPENDIX E

DISCUSSION OF TRANSPORTATION ISSUES

1.0 INTRODUCTION

This appendix discusses several issues related to the transport of liquid RMW from Building 340 to the 200 Area. Section 2.0 addresses the current status regarding applicability of US Department of Transportation (DOT) regulations to the subject RMW transport. Section 3.0 discusses potential effects of transport time on the 90 day generator accumulation time limit. Section 4.0 addresses potential issues related to the use of hexone railroad tank cars for transport of RMW.

2.0 APPLICABILITY OF DOT REGULATIONS

DOT regulations regarding the transport of hazardous materials, including wastes, only apply to the transport of such materials in commerce. By definition, the transport of materials and wastes by the federal government are not considered to be "in commerce." Thus, the DOT requirements referenced in the state Dangerous Waste Regulations do not apply to federal government shipment of wastes. This interpretation has been verified in conversations with federal DOT personnel. In addition, the dangerous waste transporter requirements do not apply to on-site (i.e., on the Hanford Site) transport of dangerous waste per section -240(4) of the state regulations.

Although not technically required, it would be prudent to comply with the intent of the DOT requirements when transporting waste on the Hanford Site. These regulations provide measures to ensure safe transport of hazardous materials. These measures are directed at public health and environmental safety. Safe transport of hazardous materials and wastes is a prime concern at the Hanford Site. Unsafe transport of hazardous material on the Hanford Site is strictly forbidden by DOE directives, orders, and procedures. For example, one of the safety procedures documents in use is the Safety Analysis Report for Packaging and Shipping (SARP) which addresses railroad tank car transport of RMW from the 300 Area to the 200 Area. In addition, any unsafe transport of dangerous waste on the Hanford Site would allow Ecology to invoke the imminent hazard authorities under section -280(2) and -960 of the state regulations.

3.0 TRANSPORT TIME EFFECTS ON 90-DAY ACCUMULATION

RMW accumulation activities at the RLWS Facilities are subject, under the Dangerous Waste Regulations, to a 90-day time limit. Transportation of RMW may add several days to the amount of time necessary for the RMW to be delivered to an interim or final status TSD unit. Thus, the question arises as to whether the time that a RMW shipment is in transit to the TSD unit should be counted against the 90-day accumulation time limit.

In the private sector, dangerous waste shipments from accumulation areas are sent to a permitted "off-site" TSD facility (i.e., a facility with a different ID number) within 90 days. The transporter then has essentially 45 days to deliver the waste to the receiving TSD facility (although a transporter can rarely justify a 45-day transportation period). Ten of those days can be at the transporter's facility in order to allow the transporter time to gather waste from other generators to make up a full truck load.

In the case of the Hanford Site, where waste is shipped from an accumulation unit to an on-site TSD unit, this issue becomes clouded. If the receiving TSD unit had a storage permit, the waste could be stored at that facility for an unlimited period of time as long as all applicable storage requirements were met. If the receiving TSD unit did not have a storage permit, it is reasonable to assume that, as long as the waste is removed from the generator accumulation area within 90 days, Ecology would allow "reasonable" transportation time to the receiving TSD unit. However, this is an issue that would need to be discussed with Ecology personnel on a case-by-case basis.

Whenever a railroad tank car shipment is initiated from the 300 Area, a Radioactive Shipment Record (RSR) is used for recordkeeping purposes. The RSR includes the date and time the shipment leaves the 300 Area. Once the shipment arrives at 204-AR it is immediately pulled into the 204-AR Building for off-loading. The date and time of arrival at 204-AR is recorded on the RSR. The date and time the shipment is off-loaded to Tank Farms is recorded in transfer records located at 204-AR. On rare occasions, the shipment will be staged for a day or two on a secure siding near 204-AR (TC-4 Siding). This only occurs when the wind is blowing over 15 miles per hour. At such times, the doors to 204-AR cannot be opened due to radiologic concerns. When this occurs, the RSR is completed at the time of delivery to TC-4 Siding. Facility records located at 204-AR contain information regarding when the shipment is taken inside the building and when the shipment is off-loaded.

A question was asked as to what documentation would be required in order to document to Ecology that a "reasonable" transportation time was used when shipping liquid RMW from the 300 Area to 204-AR. It appears that the RSR and transfer records located at 204-AR would both be needed. These records would provide the dates and times the shipment left the 300 Area, when the shipment arrived at 204-AR (or TC-4 Siding), and when the shipment was off-loaded to Tank Farms.

4.0 USE OF HEXONE RAILROAD TANK CARS

WHC has considered using railroad tank cars that previously held hexone (methyl isobutyl ketone) for the transport of RMW from the 300 Area to the 200 Area. The question has been asked: What is required under the Dangerous Waste Regulations regarding the hexone tank cars (e.g., cleaning, testing) to prepare them for transport of 300 Area RMW?

We envision two potential situations regarding use of the hexone tank cars for transport of RMW on the Hanford Site:

- The hexone tank cars could be used solely for transportation of dangerous waste. In this case, the tank cars would be filled with waste and transported immediately to a permitted TSD facility (e.g., 204-AR Vault) where they are connected to the facility for off-loading within 24 hours.

- The hexone tank cars could be loaded with waste in the 300 Area and staged at the 300 Area, or some other area at the Hanford Site, pending approval for off-loading at a permitted TSD facility.

In the first case, the tank cars would be used solely for transportation. In that railroad tank cars are containers by definition, all that would be required is the containers would need to be in good condition and "empty" (see Appendix B, Section 2.3). In addition, transportation of dangerous waste within the Hanford Site is exempt from the transporter requirements, as discussed in Section 2.0 of this appendix.

In the second case, the tank cars would be used for transportation and accumulation (if below the 90-day time limit) or storage (if over the 90-day time limit). The tank cars would need to be in good condition and "empty", as discussed in the previous paragraph. In addition, they would need to be in compliance with the generator accumulation, or TSD storage, requirements while they are being staged pending off-loading at a permitted TSD unit. Ecology has determined in the past that accumulation/storage requirements apply if the waste is staged at a receiving facility for more than 24 hours. Appendix D, Subsection 2.1.2 describes generator accumulation requirements. Appendix D, Subsection 2.3.2 describes TSD storage requirements.

APPENDIX F

REGULATORY REQUIREMENTS FOR TANK SYSTEMS

1.0 INTRODUCTION

A unit in which dangerous wastes are handled may be a tank system or part of a tank system. General guidance is provided in this appendix to assist in determining if a dangerous waste unit is a tank, ancillary equipment, or a tank system. In addition, specific regulatory guidance is presented in this appendix for the following aspects of dangerous waste tank systems:

- Assessment of Existing Tank Systems;
- Design and Construction Standards for New Tank Systems;
- Secondary Containment;
- General Operating Requirements;
- Inspections;
- Responses to Leaks or Spills;
- Closure (and Post-Closure) Requirements;
- Ignitible or Reactive Wastes; and
- Incompatible Waste.

2.0 OVERVIEW OF APPLICABLE REGULATIONS

Tanks which manage dangerous wastes are currently regulated under Washington's Dangerous Waste Regulations (WAC 173-303-200, -400, and -640) and EPA's federal regulations (40 CFR Parts 264 and 265, Subpart J). For generators accumulating waste less than 90 days, a dangerous waste tank system is subject to the requirements for generators accumulating dangerous wastes in tanks as presented in WAC 173-303-200(1) and 173-303-640. For interim status waste management facilities treating or storing waste in excess of 90 days in tanks or tank systems, the facility is subject to the requirements presented in WAC 173-303-400 and, by reference, 40 CFR Part 265 Subpart J. For waste management facilities with storage or treatment tanks or tank systems, operating under a final status permit, the requirements as found in WAC 173-303-640 are applicable.

3.0 DISCUSSION OF REGULATORY REQUIREMENTS

The following presents a discussion of the regulatory requirements for tanks and tank systems. Regulatory compliance dates presented in the following discussion represent those dates as found in the regulations. The dates presented may or may not correspond to the milestone dates in the Hanford Federal Facility Agreement and Consent Order (Tri-Party Agreement).

3.1 Existing Tank Systems

The regulations require that existing tank systems be assessed for structural and operational integrity as a condition of continued operation.

Integrity Assessments

The need for an integrity assessment is applicable to all existing tank systems, except tank systems under interim status with secondary containment. (Note: Even for those Hanford Site interim status tanks with secondary containment, integrity assessments are generally being required by Ecology).

The tank system must be evaluated to ensure that it will not collapse, rupture, or fail. The purpose of the assessment is to determine if an existing tank system without secondary containment is suitable for continued use under the new tank regulations. At a minimum the assessment must address the following:

- Design standards used in the original design of the tank system;
- Compatibility between the materials of construction and the wastes handled in the tank;
- Results of a leak test or an internal inspection of the tank. For underground, non-enterable tanks and for ancillary equipment, a leak test is required;
- Corrosion protection system, if one exists;
- Documented age of the tank system; and
- Ancillary equipment.

The integrity assessment may be accomplished through a leak test, internal examination, or other approved method. The assessment must include sufficient detail so that an agency reviewing the assessment can determine if the tank was sufficiently assessed, and if the tank is fit for continued service. For example, an inspection of a tank might include ultrasonic testing of the tank walls, checking for cracks in the roof, walls, floors, and fittings, checking for loose fittings, testing the corrosion protection system, etc. Each component of the assessment must be documented in detail.

The results of the integrity assessment must be written, kept on file at the facility, and reviewed and certified by an independent, qualified, registered professional engineer.

Schedule

For nonenterable underground tanks, the integrity assessment must be accomplished by January 12, 1988.

For all other tank systems, the integrity assessment must be accomplished by January 12, 1990.

For generators accumulating waste less than 90 days, and for final status tank systems, a schedule for conducting integrity assessments over the life of the tank must be developed.

3.2 New Tank System/Component Design and Installation

Before new tank system components can be put into service, the regulations require that their design, construction, and installation be evaluated to ensure proper operation and performance.

Design and Construction

The design of the tank system components (tanks and ancillary equipment) must be assessed to ensure that the system will not rupture, leak, or fail. New tank systems which are constructed under interim status must adhere to specific design and construction standards.

The primary design standard is that the tank system must be designed in accordance with one of the nationally recognized tank design standards. These standards have been developed by national professional groups such as the American Concrete Institute (ACI), the American Petroleum Institute (API), and the American Iron and Steel Institute (AISI). Other design requirements of new dangerous waste tank systems include:

- Detailed corrosion potential analyses and design by a corrosion expert;

- Consideration of external loads such as vehicular traffic;
- Adequate foundation support for the system; and
- Documentation of compatibility between the materials of construction and the waste in the tank system.

Installation

The regulations require that the owner/operator ensure that the tank system is properly installed without damage. The system must be inspected after placement, and before covering, for signs of potential distress. After inspection and prior to being placed in service, the tank system must be tested for tightness. Other installation requirements include:

- Proper backfill materials and techniques;
- Proper support of ancillary equipment; and
- Documentation that the system was constructed and installed as designed and in accordance with the tank regulations.

Assessment

The design assessment must be reviewed and certified by an independent, qualified, registered professional engineer.

Inspection

Prior to covering or using the tank system, the installation must be inspected by a person knowledgeable in the requirements.

Certification

Certification statements by the individuals certifying design and installation must be obtained and maintained at the facility.

3.3 Containment and Detection of Releases

In addition to ensuring the integrity of new and existing tank systems, all tanks and most ancillary equipment are required to have secondary containment. Existing tank systems must eventually be upgraded; new systems must include secondary containment as part of their design.

Installation

Secondary containment must be installed for all tank systems and components, unless specifically exempted. All tanks that manage dangerous wastes must have secondary containment, eventually. The specific date by which secondary containment must be provided is discussed under Schedule, below. Until secondary containment is provided, existing tanks must be leak tested or visually inspected each year in accordance with the integrity assessment requirements noted above.

Secondary Containment Systems

Secondary containment may include an external liner, vault, double walled tank, or other approved system. Typical secondary containment systems for tanks include the following:

- Vaults in which the tank sits;
- Double wall tanks with interstitial monitoring;
- Impermeable liners; and
- Concrete bases with berms.

Ancillary Equipment

Ancillary equipment must also be provided secondary containment. However, the following ancillary equipment are not required to have secondary containment if the equipment is visually inspected on a daily basis:

- Non-pressurized above-ground piping;
- Welded connections;
- Sealless or magnetic-coupling pumps; and
- Pressurized above-ground piping that has automatic shutoff devices.

Typical secondary containment systems for ancillary equipment include:

- Impermeable trenches;
- Jacketed pipes; and
- Double wall pipes.

Construction

The secondary containment system must be constructed with materials that are compatible with the wastes. The containment system must be able to support the weight of any wastes which may be contained as well as external loads. The containment system must also be sloped or otherwise designed or operated to drain and remove liquids resulting from a leak or spill.

Leak Detection

The secondary containment system must include a leak detection system which is capable of detecting the presence of a release within 24 hours. The leak detection system can consist of automatic sensing devices or simply a program of daily visual inspection. Automatic leak detection systems typically include:

- Thermal conductivity sensors;
- Electrical resistivity sensors; and
- Vapor detectors.

These sensors should be connected to an alarm system which, when initiated, alert the facility personnel that a release has occurred.

Integrity Examination

Until secondary containment is provided; an annual integrity examination must be performed by an independent, qualified, registered professional engineer. Once secondary containment has been provided, an alternate schedule (rather than annual) can be developed for periodically assessing the tank system's integrity.

Schedule

The specific date by which secondary containment must be provided depends on the age of the tank. Tank system components constructed after the effective date of the regulations ("new" tank systems or components) must have secondary containment when they begin operating. Existing tanks must have secondary containment within two years of the effective date of the regulations, or when the tank is 15 years old, whichever is later. Secondary containment must be provided by:

- January 12, 1991, or when the tank is 15 years old, whichever is later;
- January 12, 1991 for tanks of unknown age.

3.4 General Operating Requirements

Procedures and controls must be established to prevent failure of the tank system due to rupture, leakage, or corrosion.

Spills and Overflows

The tank system must be managed in a manner which prevents spills and overflows from the tank and containment. Dangerous waste tanks must have spill and overflow prevention devices. Proper practices during transfer of wastes to and from the tank are also required. The regulations allow some flexibility in the specific types of spill and overflow prevention devices used on specific tanks. Spill and overflow prevention devices typically include:

- Level sensors and gages;
- High and low level alarms;
- Automatic shutoff devices for feed lines;
- Bypass systems;
- Curbing, paving, and catchment facilities at loading and unloading areas; and
- Use of dry disconnect and ball valve systems.

Level sensors can range from simply noting the liquid level on a marked ruler in the tank to automatic electronic devices which provide a continuous record of the liquid level. Any type of level sensing system is acceptable if it effectively prevents overflowing of the tank. For example, if manual visual methods are used for level monitoring, the facility operating procedures should include how often the tank level is to be checked, who is responsible for checking it, and what actions should be undertaken if excessive levels are noted. The times when the level is checked should be directed toward those times when the tank is being filled or emptied.

High and low level alarms are considered part of the spill and overflow prevention system on dangerous waste tanks. The alarms are commonly integrated with the automatic level sensing devices and initiate when a predetermined high or low level is noted by the level sensor. Alternatively, the alarm systems can be separate from the level sensor and consist of a simple float switch.

Automatic cutoff systems should stop all feeds to the tank when the tank is full. Generally this is accomplished by integrating the cutoff system with the high level alarm and level sensing systems. For example, an integrated system consists of one where upon noting a high level condition in the tank, the high level alarm is sounded and pumps feeding the tank are automatically shut off. Another type of automatic cutoff system is one where all pumps are shut down in the event that a release is detected. This type of cutoff system is typically integrated with the release detection system in the secondary containment system. Automatic shut down of pumps in the event of a sudden loss of pressure in the piping, as would be expected if a major piping failure has occurred, is another type of automatic cutoff system.

Bypass systems are necessary when a tank or ancillary equipment becomes inoperable and must be bypassed to complete or safely shut down the process. A sufficient number of redundant tanks and ancillary equipment should be provided so that wastes can be routed around failed equipment safely. The bypass system can be integrated with the level sensing, high level alarm, and release detection systems so that the wastes are rerouted in the event of a high level condition or a release to the secondary containment system.

Delivery areas where wastes are transferred to tanks using nonpermanent connections (i.e., hoses from a delivery truck) should be paved and bermed to prevent the release of any spills to the environment. The areas should have a sump where any spills or overflows are collected and returned to the tank. Such sumps should have a release detection system and be constructed of waste compatible materials. Connections in the delivery system should be designed to minimize the amount of wastes spilled when disconnecting from the tank.

3.5 Inspections

Tank systems must be inspected periodically to identify potential failures of the tank system, signs of leakage, and other problems.

Inspection Schedule and Log

A written inspection schedule and procedure must be developed and followed for inspecting the tank system, foundations, equipment, alarms, and overflow controls. The results of inspections must be maintained in an inspection log or record.

Inspections and Frequencies

Daily inspections must be made of all above-ground portions of the system, data gathered from monitoring equipment, construction materials, and external portions of the system. Dangerous waste tank systems must be inspected on a regular basis. Specifically, the following items must be inspected at least once during each operating day:

- Overfill and spill control equipment;
- Above-ground portions of the tank and ancillary equipment;
- Leak detection and other monitoring data; and
- Areas around the tank and secondary containment system.

Corrosion protection systems must be checked within 6 months of their installation and annually thereafter. Sources of impressed current used in the corrosion protection system are required to be checked bimonthly.

Inspection of the spill and overflow prevention system should include:

- Level sensing devices;
- High and low level alarm systems;
- Automatic cutoff systems; and
- Bypass systems.

Each of these systems should be checked for proper operation daily. Although it is not required to actually test each system daily, some method of confirming daily that the systems are properly operating should be developed. Periodic (although not necessarily daily) testing of the alarm and cutoff systems should also be performed.

The above-ground portions of the tank system must be inspected daily for signs of corrosion or release (or potential release) of wastes. This inspection is directed toward checking the tank structure and ancillary equipment for distress such as leaks, cracks, buckles, bulges, discoloration, etc. Valves, pipes, fittings, hoses, pumps, and compressors should also be checked daily for:

- Leaks;
- Corrosion;
- Excessive vibration or swaying;
- Foundation cracks;
- Leaky seals;

- Safety equipment; and
- Sufficient lubricating oil.

Data gathered from monitoring equipment should be reviewed at least daily. The data should be checked for evidence of a release (or potential release) of waste to the environment or to the secondary containment system. The data should also be checked to verify that the system is operating properly. Monitoring data that should be included in the daily inspection includes:

- Leak detection sensor data;
- Level indicator data;
- Temperature and pressure data; and
- Flow rate data.

The area around the tank system must be checked daily for evidence of releases of dangerous wastes or erosion. Such evidence includes wet spots or dead vegetation around the tank system. Other items to check for include erosion around the base of the tank and the secondary containment system or erosion in a dike surrounding the tank.

Documentation

The inspection program that addresses the above requirements should be developed and documented as part of the facility operating procedures. Inspection checklists and logs should provide specific, detailed guidance to the inspector. For example, instead of simply stating "Check tank for distress", the daily inspection checklist for the inspection of the above-ground portions of the tank system should reflect the following level of detail:

> Check Tank B, the feed and outflow piping, pumps 101 and 102, and the secondary containment vault for:
>
> - Cracks;
> - Corrosion;
> - Discoloration; and
> - Excessive vibration or noise.

The detail and completeness of the inspection checklist should allow agency personnel to immediately note that the inspection program satisfies the inspection requirements for dangerous waste tanks.

The inspection checklists and logs from past inspections should be maintained in the facility operating record. The logs should note the date of the inspection, the inspector's name, and the results of the inspection. If any items requiring attention were disclosed as a result of the inspection, the log should note what actions were taken.

3.6 Response to Leaks or Spills

Response Actions

In response to a leak or spill, operations must cease and the spilled material contained, removed, and properly disposed of. The dangerous waste tank regulations require specific responses to leaks or spills. The responses in the tank regulations must be documented in the facility's Contingency Plan. The required responses to a leak or spill from a tank system include:

- Cessation of use, stopping flow into the tank;
- Removal of wastes from the tank (if the tank is leaking) and/or removal of the wastes from the secondary containment system;
- Containing visible releases to the environment;
- Repair of the tank system; and
- Reporting the incident and corrective measures.

The failed portion of the tank system should be isolated from the other portions of the system by use of the bypass system. Thus, if a leak occurs in a tank, the level of wastes in the tank should be lowered to a level below the leak site in the tank. The regulations note that such waste removal must be accomplished within 24 hours of detection of the release or at the earliest practicable time if it is not possible to do so within 24 hours. The removal of wastes also applies to waste released to, and contained in, the secondary containment system.

The response to a leak or spill must also include steps to immediately contain and clean up any visible releases to the environment. Containing the release may include construction of temporary berms or closing channels to catch basins. Cleanup of visible releases could include excavation and disposal of contaminated soil or decontamination of the secondary containment system.

Notification and Reporting

Notification must be made to the regulatory agency and an incident report submitted. If the quantity of wastes released is greater than 1 pound or if the release is not immediately cleaned up, the release must be reported to the regulatory agency within 24 hours. Within 30 days of a release to the environment, a report summarizing the following must be submitted to the regulatory agency:

- Migration route of the released wastes;
- Characteristics of the surrounding area including population, surface waters, drinking water supplies, soils, and hydrogeology;
- Results of monitoring; and
- Description of response actions.

Procedures at the Hanford Site call for these reports to be submitted to DOE-RL for review and clearance prior to submittal to the regulatory agency.

System Repair or Replacement

The system must be repaired prior to being put back into use. If the leak or spill was the result of the tank or ancillary equipment failing, the equipment must be repaired or replaced before returning to service. Major repairs and replacements must be certified as being accomplished in accordance with the dangerous waste tank design and construction requirements by an independent, qualified, registered professional engineer. If the release was from an underground, non-enterable tank, secondary containment must be provided to the tank prior to returning it to service.

If repair is not feasible, or if environmental contamination cannot be removed, the system must be closed. If wastes or waste constituents cannot be adequately removed, post-closure care may be necessary.

3.7 Closure and Post-Closure Care

In general, the requirements to ensure proper closure and, if necessary, post-closure care for tank systems apply to all TSD facilities and to generator accumulation. However, generators accumulating dangerous waste in tanks are not required to prepare a written closure plan or written contingent post-closure plan.

Closure

At closure, all wastes, residues, contaminated components, and contaminated soils must be removed. When a dangerous waste tank is permanently removed from service, it must be closed in accordance with specific tank closure requirements. Closure of a dangerous waste tank must include either complete removal of all contaminated equipment and materials or the tank must be closed as a landfill and be subject to post-closure care requirements.

Post-Closure Care

If removal of all waste, residues, etc., is not feasible, a contingent post-closure plan must be developed, and the tank system closed as a land disposal facility. Post-closure requirements include groundwater monitoring, inspection, and maintenance. In addition, certain notices must be placed in the plot maps and deed for the property to identify the presence of dangerous wastes and constituents, and to prevent disturbance of any covers and monitoring equipment.

3.8 Ignitable or Reactive Waste

Performance

Ignitable or reactive waste must not be placed in a tank system unless the waste is treated such that it no longer meets the definition of ignitable or reactive, or is handled in a manner that will not allow it to ignite or react. Dangerous waste tanks are not allowed to handle ignitible or reactive wastes unless the wastes are:

- Made non-ignitible or nonreactive prior to, or immediately after, entering the tank; or
- Handled in a manner that prevents the wastes from igniting or reacting; or
- The tank is used solely for emergencies.

The specific requirements under which these precautions must be accomplished, as well as the general requirements for facilities handling ignitible or reactive wastes, are presented in WAC 173-303-395, Other General Requirements.

Labels

The state dangerous waste regulations provide addenda to the federal dangerous waste tank labeling requirements. The state regulations note that dangerous waste tanks must be marked with a label that notes the contents of the tank and the risks associated with the wastes. The label must be legible from at least 50 feet.

Location

Tanks must be located in a manner equivalent to the NFPA buffer zone standards. Tanks which handle ignitible or reactive wastes must be located a minimum distance from public ways, streets, and adjoining property lines. The specific distance requirements are presented in the National Fire Protection Code and depend on the type of tank, the size of the tank, and the nature of the material handled in the tank.

3.9 Incompatible Waste

Performance

Incompatible wastes or materials must not be placed in the same tank system which could cause them to uncontrollably react or compromise the integrity of the tank. Dangerous waste must not be placed in a tank system which held an incompatible waste or material unless the tank system has been decontaminated.

4.0 GUIDANCE ON EVALUATING TANK SYSTEM COMPONENTS

The following provides guidance on evaluating a tank, tank system, and ancillary equipment associated with a waste management tank. It also provides guidance on recycling units.

Tank

A unit is generally considered to be a tank if it satisfies the following three conditions:

- It is designed to contain an accumulation of dangerous waste, however briefly. This implies that the unit, by design, is intended to accumulate or contain an accumulation of dangerous wastes. If the unit is not designed, or intended by design, to accumulate or contain an accumulation of dangerous wastes, then it is not a tank.

  For example, pipes are not generally considered to be tanks because they transport or distribute, rather than accumulate dangerous wastes. Similarly, an in-line unit that is essentially a "widespot" in the line is not usually considered to be a tank (although it may be ancillary equipment). Devices that receive dangerous wastes for the purpose of discharging it to the ground are not tanks because they are not designed to contain the waste; they are designed to release the waste to the ground. On the other hand, overflow accumulation units where dangerous wastes may temporarily reside, even for a few moments, are usually considered to be tanks.

- It is not portable. Containers are not tanks. A container is used to accumulate dangerous wastes, but it is different from tanks primarily because it is portable. If during, or as a critical element of, its operation the unit must be moved or movable, then it generally is not considered to be a tank. However, if the unit is not designed to move, or if its proper function depends on the unit remaining stationary, then the unit is generally considered to be a tank.

- It does not depend on earthen materials for structural support. Surface impoundments, lagoons, and landfills are not tanks. Tank walls are usually self-supporting, and are constructed of wood, metal, concrete, fiberglass, plastic, or combinations of these materials. When dirt, soil, rock, or earth are used as the materials providing structural support to the unit, then the unit is usually not a tank.

Ancillary Equipment

A unit is generally considered to be ancillary equipment if it satisfies the following two conditions:

- It is directly involved in the distribution, transfer, metering, or flow control of dangerous wastes to, from, or between tanks. If a unit is not involved in these activities, it is not ancillary equipment. For example, pipes, pumps, jets, valves, gauges, transfer boxes, drains, surge controllers, sampling ports, flanges, fittings, connectors, and similar devices are usually considered to be ancillary equipment when involved in handling dangerous wastes from, to, or between tanks. Examples of units that are not ancillary equipment include tanks, containers, recycling units, secondary containment systems, and heating or cooling coils.

- It is directly associated with a dangerous waste tank or tanks. If the unit is not associated with dangerous waste tanks, then it is not ancillary equipment. For example, pipes that deliver dangerous waste from a point of generation directly to containers, cribs, surface impoundments, or other non-tank devices is not ancillary equipment. Pumps or jets that transfer dangerous waste from a recycling unit to another recycling unit are not ancillary equipment. However, ancillary equipment would include a pipe or pump involved in the movement of dangerous waste: from a tank to a container or crib; from one tank to another tank; from a point of generation to a tank; and from a tank to a transfer box for routing and shipment (via pipe) to a tank farm.

Tank System

It may be difficult to distinguish a tank or tanks from the associated ancillary equipment. In some cases, it is easier to simply consider a unit to be a tank system, rather than to try to divide it into tank(s) and ancillary equipment. This tends to be most appropriate for accumulation, storage, or treatment processes for which the tanks, pipes, valves, pumps, etc., are all contained within a relatively small area.

In such cases, it may be best to identify the entire process as a tank system. Examples of how considering a relatively small set of separate units as a single tank system can be advantageous follow:

- Integrity assessment is a requirement under the tank standards. A pressure test can be run on an entire tank system, instead of on the individual tank(s) and ancillary equipment, thus simplifying the integrity assessment process;

- Secondary containment is a requirement under the tank standards. Rather than providing secondary containment for the individual tanks, pipes, pumps, etc., the tank system itself could be enclosed by a single containment system.

The discussion presented in this appendix assumes that a unit is, or is part of, a dangerous waste tank system. Certain tank systems are exempt from the dangerous waste tank standards. The following describes recycling units, an exempt tank system.

Recycling Unit

In general, recycling processes are "exempt from regulation unless the regulatory agency determines, on a case-by-case basis, that the recycling process poses a threat to public health or the environment" (WAC 173-303-120(4)). Thus, if a tank system can be identified as a recycling process, then it would be exempt from the tank standards. Care should be taken in this evaluation, because accumulation or storage of dangerous wastes prior to recycling is not considered part of the recycling process. Only if recycling actually occurs in the tank system, or if the tank system itself is part of a recycling process, can the tank system be considered to constitute an exempted recycling process unit.

Examples of tank systems that qualify for the recycling unit exemption are:

- Decontamination solutions are used in hot cells to decontaminate equipment and the cell itself. The solutions are routed to a tank for accumulation until they are needed for further decontamination purposes, much like an automotive parts washer is operated. As long as the decontamination solution is usable and is not "spent", the recycling process would not involve a dangerous waste.

  At the time that the decontamination solution is no longer usable (i.e., it is "spent"), the solutions become solid waste, and potentially dangerous waste, and must be routed from the tank to a unit or facility for treatment, or storage prior to treatment. As long as the spent solutions are expeditiously removed from the recycling process once they are determined to no longer be usable, the tank would not be subject to the tank system requirements.

- Nitric acid concentrators are used for reclamation of nitric acid in, or in part of, a tank system. Such a tank system would be exempt from the tank standards. Note, however, that a tank used to temporarily accumulate dangerous wastes between concentrators would not itself be a recycling process; thus the tank system associated with the temporary accumulation would not be exempt.

- A tank system is used for the distillation and recovery of spent solvents. The portions of the tank system used for solvent reclamation would be exempt. Note, however, that tank systems receiving the waste distillation bottoms would not be exempt, unless a second recycling process was conducted in that tank system.

APPENDIX G

REGULATORY CONFORMANCE STATUS AND OPTIONS FOR RLWS

This appendix identifies compliance-related information about the RLWS Facilities' dangerous waste tank systems and discusses compliance actions that may be needed for those tank systems. This appendix follows the order of requirements established in Appendix F to achieve compliance in these systems.

1.0 EXISTING TANK SYSTEMS

Integrity assessments are applicable to all dangerous waste tank systems, except those under interim status with secondary containment, in certain cases. Therefore, integrity assessments are required for the RLWS Facilities' dangerous waste tank systems.

1.1 General Description

The 560-square-mile Hanford Site is located due north of Richland, Washington. The 300 Area is located on the southeastern edge of the site. The tanks subject to compliance review are located in Buildings 324, 325, 340 and 340-A of the 300 Area. The following information is a summary of data provided by PNL and WHC pertinent to developing a plan for conducting integrity assessments of the tanks and ancillary equipment within and connecting the RLWS Facilities.

1.1.1 Building 324

Building 324 contains 10 vertical waste storage tanks, identified as tanks 101 through 108, 177, and one undesignated tank in room 3F. All of the tanks discharge their waste, directly or indirectly, to the 340 Facility. Tanks 101 through 106 and 108 were originally built in the 1940s and were subsequently modified in 1963. All of the circumferential shell and long seam welds were completely radiographed following modification. In addition the tanks were leak tested by filling with water after the modifications were completed. Tank 107 was built in 1963. It was hydrostatically tested to 3 psig. Tank 177 was built in 1962. It was leak tested by filling with water after construction was completed.

The waste storage tanks 101, 103, and 108 are 6.5 feet in diameter by 13.86 feet high and have a storage capacity of 3,380 gallons. Each tank's shell, top, and bottom plate consists of 0.5-inch-thick 25-12 CB stainless steel plate with a 1/8-inch-thick 18-8 CB stainless steel jacket, presumably to enable circumferential heating and cooling of the tanks. The tank rests on 18 pads placed in two concentric circles about the longitudinal axis of the tank and one in the center. The roof of the tank is flat and the floor is sloped. The tank operates at a very slight negative pressure.

The waste storage tank 102 is 8.0 feet in diameter by 13.86 feet high and has a storage capacity of 5,000 gallons. The roof of the tank is flat and the floor is sloped. The tank operates at a very slight negative pressure.

The waste storage tank 104 is 9.0 feet in diameter by 8.90 feet high and has a storage capacity of 4,000 gallons. The tank rests on 18 pads placed in two concentric circles about the longitudinal axis of the tank and one in the center. The roof of the tank is flat and the floor is sloped. The tank operates at a very slight negative pressure.

The waste storage tank 105 is 9.5 feet in diameter by 8.88 feet high and has a storage capacity of 5,000 gallons. The roof of the tank is flat and the floor is sloped. The tank operates at a very slight negative pressure.

The waste storage tank 106 is 4.0 feet in diameter by 5.00 feet high and has a storage capacity of 450 gallons. The tank's walls and bottom consist of 1/4-inch-thick stainless steel plate with a 3/16-inch-thick stainless steel plate jacket. The tank roof consists of 3/8-inch-thick stainless steel plate. The roof of the tank is flat and the floor is sloped. The tank operates at a very slight negative pressure.

The waste storage tank 107 is 5.5 feet in diameter by 6.0 feet high and has a storage capacity of 974 gallons. The tank's walls, top, and bottom consist of 1/4-inch-thick type 304L stainless steel plate. The tank's jacket extends 3.5 feet above the base of the tank. The tank is supported by 3 legs. The roof of the tank is flat and the floor is sloped. The tank operates at a very slight negative pressure.

The waste storage tank 177, a rectangular slab tank, is 8.53 feet in length by 0.36 feet thick by 6.03 feet high and has a storage capacity of 99 gallons. The tank's walls, top, and bottom consist of 3/16-inch-thick stainless steel plate. The tank operates at a very slight negative pressure.

The holding tank for room 3F has a 30-gallon capacity.

1.1.2 Building 325

Building 325 contains 8 storage tanks. All the tanks have a vertical longitudinal axis except tanks WT-1 and W-4 which are positioned horizontally. Tanks PT-1 through PT-5 transfer their contents into tank WT-1 which in turn is jet pumped to the 340 Facility. The tanks were originally built in 1944 and modified in 1961. The shells for tanks PT-1 through PT-5 were leak tested by filling with water at atmospheric pressure after all the modifications were completed in 1961. In addition the jackets were hydrostatically tested to 20 psi for 1 hour. Tank WT-1 was hydrostatically tested at 60 psi for 1 hour.

The waste tanks PT-1 and PT-2 are 9.00 feet in diameter by 8.72 feet high and have a storage capacity of 3,900 gallons each. The tanks' walls, top, and bottom consist of 3/8-inch-thick stainless steel plate with a 3/16-inch-thick stainless steel jacket extending 7.00 feet up the side of the tank. The tank is supported by 12 legs located around the perimeter of the shell. The roof of the tank is flat and the floor is sloped. The tank operates at a very slight negative pressure.

The waste tanks PT-3 and PT-5 are 3.50 feet in diameter by 4.00 feet high and have a storage capacity of 270 gallons. The tanks' walls consist of 3/16-inch-thick stainless steel plate. The top and bottom consist of 1/4-inch-thick stainless steel plate with a 1/8-inch-thick stainless steel jacket extending 2.83 feet up the side of the tank. The roofs of the tanks are flat and the floor is sloped. Each tank is supported by 4 legs. The tank operates at a very slight negative pressure.

The waste tank PT-4 is 3.50 feet in diameter by 6.00 feet high and has a storage capacity of 404 gallons. The tanks' walls, top, and bottom consist of 3/16-inch-thick stainless steel plate with a 3/16-inch-thick stainless steel jacket extending 5.00 feet up the side of the tank. The tank is supported by 4 legs. The roof of the tank is flat and the floor is sloped. The tank operates at a very slight negative pressure.

Although no drawings for tank WT-1 were available at the time this appendix was written, drawings for a reportedly similar tank were reviewed. The tank is 9.00 feet in diameter by 39.23 feet long and has a storage capacity of 17,500 gallons. The tank's walls and head consist of 9/16-inch-thick ASTM A70 carbon steel plate (Specification ASTM A70 has been discontinued and replaced by ASTM A285). The tank operates at a very slight negative pressure.

The waste tank 325B retention tank has a storage capacity of 200 gallons. The tank collects radioactive liquid from the hot cells in Building 325-B.

Tank W-4 is a horizontal steel tank located in Vault A. The contents of tank W-4 can be emptied by vacuum transfer through the pipeline to Building 324; however, the vacuum transfer system is no longer operational.

Slab tanks W-1, W-2, and W-3 are for the floor drains in A Gallery hot cells A, B, and C, respectively.

1.1.3 Building 340 Complex

The Building 340 Complex contains two 15,000-gallon underground neutralization tanks and six 8,000-gallon above-ground waste storage tanks. The entire facility collects Radioactive Liquid Waste (RLW) from several laboratories in the 300 Area. Waste can also be collected from railcar and barrels. The two underground tanks first accept the waste. If the underground tanks become full the waste can then be pumped into the six above-ground tanks. After a temporary period the waste is transferred into a rail-way tank car and transported to the 200 Area for disposal.

The two underground tanks are located in a vault adjacent to Building 340. The six above-ground tanks are located inside Building 340-A. A common fill and drain line interconnects the 340-A tanks. All of the 340-A tanks are either filled or drained to the same level automatically unless one or more of the fill and drain valves are closed. The tanks were originally built in the 1940s and put into service in the 1950s.

The vertical tanks in Building 340A are 10 feet in diameter by 14 feet high. The tanks' walls are stainless steel sheet metal with varying thicknesses at different elevations. The cylindrical sides are reinforced by vertical and horizontal carbon steel bands. The tanks have flat bottoms and originally had conical roofs.

1.1.4 Piping and Ancillary Equipment

The RLWS piping connecting Buildings 324, 325, 326, 327, 329, 340-A, and 340-B to Building 340 is stainless steel pipe. The piping is sloped downward toward Building 340 to prevent liquid retention in the lines which could lead to plugging and/or corrosion. Valves are strategically placed in the piping to provide on-off control of flow from the various generating facilities.

1.2 Failure and Integrity Assessments

Tanks

Corrosion is the prime cause of deterioration of steel storage tanks and accessories; therefore, finding and measuring the extent of corrosion is the major reason for inspecting tanks. Internal corrosion in tanks is dependent on their contents and the materials used in their construction. Tanks utilized for the storage of corrosive chemicals are most likely to exhibit severe corrosion.

Internal corrosion in the vapor space above the liquid surface may be caused by water vapor, oxygen, or acidic vapors. For the area of the tank below the liquid level, corrosion is caused by the presence of acid salts, hydrogen sulfide, or other sulphur compounds.

External corrosion of tank bottoms can be a serious problem. Atmospheric corrosion can occur on all external parts of a tank. This type of corrosion may range from negligible to severe, depending on the atmospheric conditions of the locality. An acidic atmosphere can destroy protective coatings and increase the rate of corrosion.

Caustic embrittlement results from a caustic solution such as sodium hydroxide being stored in a tank. Stressed areas are most susceptible to attack. This type of attack is more prevalent when the temperature rises above 150°F. The deterioration of the tank results in cracks which develop on the inside of the tank and continue through to the outside. The presence of this condition may be identified by the deposition of visible salts on the outside walls of the tank due to the slow leakage of the caustic material.

Tanks should also be examined for leaks, cracks, buckles, and bulges. Leaks are most often marked by discoloration or the absence of paint in the area below the leaks. The nature of the leaks found should be carefully determined. If there are any indications that a leak is through a crack, the tank should be removed from service as soon as possible and a complete inspection with subsequent repairs should be made.
Cracks may be triggered by many causes:

- Faulty welding;
- Unrelieved stress concentrations around fittings;
- Insufficient reinforcement at openings;
- Stresses caused by settlement or earth movement;
- Vibration; and/or
- Poorly designed repairs.

Cracks are most likely to be found at the connection of the bottom plate and shell of a welded tank, around nozzle connections and manholes, and at welded brackets and seams.

With austenitic stainless steel, which was used for most RLWS tanks and piping, stress corrosion cracking may be a problem. One way to reduce this concern is to limit the amount of halides present in the tank. If the halide levels are held to less than 10 ppm during severe service (i.e., high pressure and high temperature) austenitic stainless steel may be used safely. Service conditions in the tanks in the RLWS Facilities are benign; therefore limits on chloride and fluoride concentrations are 350 ppm and 190 ppm, respectively. Limits on bromide and iodide concentrations are lower.

Buckles and bulges will normally be evident by visual inspection, even from a distance. It is important to determine the cause of any distortion. Distortion can be caused by settlement of the tank, earthquake, internal pressure in the tank caused by defective vents or relief valves, excessive negative pressure in the tank, severe corrosion of the shell, movement of the connected piping, or other mechanical damage.

When a tank is of welded construction and has serious distortions, the welded seams may be severely overstressed at some points and may tend to crack. Where cracking is suspected, the magnetic particle method of inspection is one of the most suitable.

Tanks located in earthquake zones may be subject to buckling of the shell or cracking of the shell to bottom weld. In addition, stresses in attachment nozzles can be very high and can result in cracking the nozzle. A preliminary copy of the 324 Building Seismic Evaluation prepared by Westinghouse Hanford Company indicates that several of the tanks are subject to overturning in the event of a earthquake.

Overpressurization and underpressurization are likely to result if a pressure relief valve or vent fails to operate due to a malfunction. The consequence may be failure of the tank plate or any of the welds in the tank or the associated piping and valves. An example of the effects of underpressurization is the failure of the conical roofs on the tanks in Building 340-A.

Valves

Ideally all valves on the tank should be inspected when the tank is out of service. By design, valves are not employed by RLWS tanks, except in the piping between buildings. The first outside valve on all connections should be examined visually to ensure that the seating surfaces are in good condition and the body and bonnet are not seriously corroded. Where deterioration is indicated, thickness measurements should be determined. Possible damage by freezing should be considered. Bonnet and flange bolts should also be examined to see that they have not corroded and that they are tight.

Auxiliary Equipment

Pressure vents and breather valves should be inspected to see that they are not plugged, that the seats are tight and that all moving parts are free, not unduly worn, and not corroded. Thickness measurements should be taken where deterioration is suspected. Liquid level gaging equipment should be given careful visual inspection. For float type gages, the float should be examined for corrosion and cracks and to ensure that it does not contain liquid. Cables and chains should be inspected for corrosion and wear.

Methods of Testing

When the Hanford Site storage tanks were built, they were probably tested in accordance with the standards to which they were constructed. Information related to the original design of the tanks was not available at the time this appendix was written. The same methods used at that time to verify integrity can probably be used to inspect for leaks and to check any subsequent repair work.

Atmospheric storage tanks, such as those employed by the RLWS Facilities are designed to withstand no more than 0.5 psfg pressure over the static pressure of the liquid contained in the tanks. Such tanks are normally tested by filling the tanks with water. The strength of the lower portions of a tank is thus tested at a pressure that depends on the depth of water above. All exposed portions of the tank can be checked for leaks up to the water level. If water is not available and if the roof of the tank is reasonably airtight or can be made so, a slight air pressure not exceeding 2 inches of water pressure may be applied to the inside of the tank. This type of test is of very little use as a strength test and is used only in inspection of leaks. Soap solution is applied to the outside surface of all suspected areas of the tank, especially on the seams, so that the air escaping through the leaks will produce soap bubbles, thus disclosing the leaks.

Usually a close visual inspection is all that is required when checking for cracks. If any signs of cracking do exist, the entire suspected area should be sandblasted or similarly cleaned and the magnetic-particle or dye penetrant method used. Ultrasonic measurements should be taken in areas where corrosion is evident in order to determine the extent of the deterioration and the thickness of the plate.

1.3 Recommendations for Failure and Integrity Assessment Planning

At the time this appendix was being prepared, both PNL and WHC were conducting surveys to more accurately define the RLWS tank systems for which they are responsible. Thus, the background information provided in this report on the RLWS tank systems will require revision and enhancement. An accurate definition of the tank systems is a very important step in developing an integrity assessment plan that minimizes radiation exposure. If the systems are not accurately and completely defined, personnel involved in conducting the in-field physical and visual evaluations will necessarily spend more time (and be exposed to more radiation) when they encounter and have to deal with unexpected tank system components.

The information required to completely define the tank systems for conducting the integrity assessment should be that needed for answering the following questions:

- What tanks and ancillary equipment are included in the tank system(s) of interest? (Identified components should include piping, valves, pumps, instrumentation, structural support, secondary containment and other components whose failure could lead to leakage and/or spills.)

- Are accurate drawings and/or specifications available for each tank system component? (If not, deficiencies in information should be noted because undefined components may require a higher degree of in-field investigation as part of the integrity assessment.)

- Are maintenance manuals available for each component (e.g., a pump or instrument) whose failure could cause or contribute to a leak or spill? (Information contained in such manuals may provide insight into failure frequency and status.)

- Are maintenance records available? (Information contained in such records may provide insight into where deterioration has occurred in the past and its frequency.)

- Are all previous leaks and spills identified and their causes determined? (This information is required to assess the adequacy of existing instruments and procedures to prevent leaks and spills.)

- Are all incidents known that could have physically stressed the system? (Some incidents capable of causing damage include dropping a heavy object on the component, using improper welding techniques during modifications, and under- or overpressurizing a tank.)

- Are all types of corrosive wastes handled by the tank systems known, including their durations in the tank system? (This information is needed to determine the types of corrosion that may have occurred and where the corrosion is likely to have occurred in the tank system. Possible locations for corrosion include the general tank vapor space if corrosive vapors were present, the tank bottom if settled corrosive sludges were present, the liquid-air interface and areas near inlet ports to tanks and pipelines.)

Interviews with individuals who have used the tank systems over the 35-year history of the systems are an important source for filling the information needs identified above. Such individuals are the ones most likely to recall undocumented incidents (both physical and chemical) that may have compromised tank integrity.

Following the compilation of information on the tank systems, it may be possible to identify only one or two tanks (and similarly, ancillary components) whose designs and histories clearly mark them as most probable candidates for loss of integrity. If so, specific locations on tanks and ancillary equipment where damage is most likely to be found should be identified. Possible candidate tanks include Tank WT-1 if it is concluded that the tank was constructed of carbon steel plate as the drawings indicate and an undesignated stainless steel tank that has been exposed to the most corrosive halide concentrations. The purpose of identifying candidate tanks and components in this manner is to limit the degree of intrusive, hands-on assessments of other tanks and ancillary equipment. Limitation of hands-on work on other tanks and components (and, thereby, dose) may be technically defensible if limited damage is found in the candidate tanks.

If such candidate tanks and components can be identified, it will be necessary to determine which and the degree to which possible damage locations can be evaluated. The ability to evaluate these locations will be limited by the accessibility of humans and equipment to those locations. Accessibility problems include the presence of piping in the vicinity of tanks, lack of space between tanks and vault walls, the absence of acceptable tank ports for internal viewing purposes, and the presence of heating/cooling jackets on many tanks. It will not be possible to completely evaluate every questionable weld and component without significant disassembly of equipment. Therefore practical judgements must be made on the extent of physical tests (such as ultrasonic testing) and visual inspections required. These practical judgements should be based on factors such as the degree of reduction-of-integrity (if any) found at accessible, highest-potential-for-failure locations and the radiation doses received in evaluating those locations.

It is possible that the evaluator may discover sufficient damage after conducting a limited number of tests or inspections to conclude that a tank system is no longer suitable for service. Alternately, he may find some signs of deterioration that may lead him to conclude that certain inaccessible locations should be evaluated as well. Such a decision may require significant equipment disassembly and incur high radiation exposure. Because most, if not all of the tanks are constructed of corrosion-resistant stainless steel, it is possible and, perhaps likely, that the evaluator will conclude that the tank (or component) is acceptable for its intended service after conducting a limited number of tests and inspections that show no damage.

Therefore, a key early step in developing a carefully designed plan for conducting the tank system integrity assessments is evaluating drawings of the system and the space needed for conducting the various manual and remote inspections and tests that might be employed. Examples of candidate inspections and tests include ultrasonic testing, dye penetrant testing, magnetic particle testing, and viewing with the aid of remote television, cameras, and periscopes. Only after this step is taken can the inspection and testing strategy be reasonably developed.

Another important step required for developing the plan will be to evaluate the radioactive exposures likely to accrue at different locations as functions of distance (with and without shielding) and as functions of various dose rates resulting from different levels of decontamination effectiveness. Clearly, most, if not all, of the RLWS tanks and ancillary piping are too radioactive to conduct the evaluations safely without decontaminating the system unless only remote inspection and testing methods are used. The degree of decontamination achievable will be a function of the ability to gain access to locations where radioactivity is concentrated, the effectiveness and amounts of the decontamination fluid(s) used, and the procedures for their use.

The types and amounts of decontamination fluids will be limited by DST waste acceptance criteria and by available DST capacity. The volumes of fluids required to achieve decontamination to the point that would allow manned entry to the tank system location may exceed available capacity. It may also jeopardize other compliance activities that generate wastes that must be stored in DSTs. In such an event, remote methods must be used to acquire the information required as the basis for the integrity assessment.

Development of instruments and techniques will probably be required if the work must be conducted remotely. The time required to develop this equipment must be factored into the overall plan to achieve regulatory compliance in the RLWS Facilities. Because of the expected difficulties in achieving the levels of decontamination acceptable for manual inspection and testing, it seems likely that remote inspection and testing methods will require development.

These remote methods may include a means of removing visually obstructing surface materials from inner tank walls to enable inspections of base metal. Remote methods for conducting ultrasonic, dye penetrant, and magnetic particle testing may also be required, depending on the evaluator's judgement of their need. The specific remote methods requiring development will depend on which failure mechanisms the evaluator considers credible and the best methods of evaluating the mechanisms, considering accessibility constraints.

To achieve compliance while minimizing dose, it will be important to utilize information gained during evaluations of the first tanks and components when conducting subsequent evaluations. As recommended earlier, the first evaluations should be conducted on tanks and components likely to have been exposed to the most damaging conditions. If such evaluations show insignificant deterioration, it may be possible to make a defensible case that other tanks and ancillary equipment do not require physical testing and inspections.

This argument should be supported by making an adequate demonstration of the adequacy of secondary containment (vaults and valve boxes) by conducting simple water holding tests, if warranted. It will also be important to demonstrate the reliability of liquid sensing instrumentation in vault and valve box sumps. In the case of vaults, it will be important to demonstrate that sump pumps can be activated to expeditiously remove the entire volume of a worst-case leak to a reserved tank which has been demonstrated to be capable of containing the volume of the leak. Thus, the reserved tank would serve as backup secondary containment.

In the case of a valve box, it will be important to demonstrate that the worst-case rate of leakage into the valve box will not result in a spill to the environment before the leak can be detected and the pipeline flow stopped. Since no leak removal system is in place in the valve box, it will be important to demonstrate that leaked fluids can be expeditiously removed from a valve box of unverified integrity or a coating applied to render the valve box leak-tight. It will be important to keep careful records of all doses received in conducting the initial tank system integrity assessments, including doses received by those handling the decontamination solutions during transportation, evaporation, and subsequent tank farm operations. A recommended approach for achieving radiation doses that are as low as reasonably achievable (ALARA) for this activity is described in Appendix H.

2.0 NEW TANK SYSTEM/COMPONENT DESIGN AND INSTALLATION

The design of a new tank system must be assessed to assure that the system will not rupture, leak or fail. The new tank system must be designed to the standards given in Section 2.2.

2.1 Description

There are no new tanks in the system at present.

2.2 Failure and Integrity Assessment

When a new tank system is required to replace an existing one, the new tank system must be designed to ensure that the foundation, structural support, seams, connections and pressure controls have sufficient structural strength; are compatible with the waste to be stored or treated; and have corrosion protection so that they will not collapse, rupture, or fail.

The following information is required for the design of a new tank system :

- Tank location (above or below ground),
- Material type,
- Nominal capacity,
- Specific gravity of contents,
- Appurtenances (type, size and location),
- Design metal temperature,
- Design pressure,
- Foundation type,
- Wind velocity ,
- Earthquake requirements,
- Maximum operating temperature,
- Plate specification (bottom, shell and roof),
- Corrosion allowance,
- Hazardous characteristics of the waste to be handled.

In addition the design must comply with the criteria identified in Hanford Plant Standards, SDC-4.1, Standard Architectural-Civil Design Criteria, Design Loads for

Facilities. The tank must also be designed, constructed and tested to one of the nationally recognized design standards such as:

- API Standard 650, Welded Steel Tanks for Oil Storage, 8th Edition, November 1988, American Petroleum Institute, Washington, D. C., and/or
- API Standard 620, Recommended Rules for Design and Construction of Large, Welded, Low-pressure Storage Tanks, 7th Edition, September, 1982, Incorporating Revision 1, April 1985, American Petroleum Institute, Washington, D. C.

3.0 CONTAINMENT AND DETECTION OF RELEASES

Secondary containment must be installed for all tank systems and components, unless specifically exempted.

3.1 Description

Secondary containment has been provided for all RLWS Facilities tanks and piping in the form of vaults, basins, valve boxes, and encased piping.

3.1.1 Building 324

Tanks 101 through 108 and 177 are located within 3 vaults having concrete walls and floors. The vaults have removable concrete covers that provide radiation protection to workers. The walls and floors may be lined with stainless steel sheet or plate. The floor of each of the vaults is assumed to be sloping in the vault's shortest direction toward a trench located along one wall using a design similar to that used in Building 325 vaults. The trench in turn slopes from both ends of the vault toward its middle where a sump is located.. The sumps are equipped with liquid sensing alarms and pumps to transfer the liquid to other tanks in the system.

3.1.2 Building 325

Tank WT-1 is located in Vault A; Tanks PT-1 and PT-2 are in Vault B; and Tanks PT-3, PT-4, and PT-5 are in Vault C. All of the vaults have concrete walls and floors with the walls a minimum of 1.00-foot thick. The walls and floors are lined with 1/8-inch Type 304 L stainless steel. For vault A, the liner extends 3.0 feet above the high point for the floor. For vaults B and C, the liner extends 1.0 foot above the high point of the floor. The floor for all of the vaults is sloping in the vault's shortest direction toward a trench located along one wall. The trench in turn slopes from both ends of the vault toward its middle where a sump is located. The sumps are equipped with liquid sensing alarms and pumps to transfer the liquid to other tanks in the system.

The tank in Room 32 has a stainless steel drip pan located beneath it. The pan does not have sufficient capacity to hold the entire contents of the tank. The slab tanks also have a leak detection system and a stainless steel containment pan.

3.1.3 Building 340

No dedicated secondary containment system is in place at the present time for the above-ground tanks in Building 340-A other than a concrete basin that drains into the neutralization tanks. The neutralization tanks are located in an unlined concrete vault. The roof consists of removable concrete cover blocks. The vault contains a sump with an alarmed detector. The liquids in the sump can be pumped into Neutralization Tank No. 2. The railroad tank car loading building (340-B) has a concrete floor. Drains located in the floor drain into either of the neutralization tanks.

The tanks located in the vaults are not routinely inspected because they are completely enclosed by concrete to provide protection against radiation exposure. They are monitored by a leak detection system. The above-ground tanks are inspected on a daily and weekly schedule for which inspection reports are prepared.

The piping located between the buildings of the 340 Facility is encased in another pipe. The pipe encasement is pressure tested with air to check its integrity.

3.1.4 Piping

The RLWS piping connecting Buildings 324, 325, 326, 327, and 329 to Building 340 is encased in a reinforced epoxy pipe. The flow through the piping is controlled by on-off valves located at various points between the generating facilities and Building 340. The valves are located in covered concrete valve boxes that serve as secondary containment. The reinforced epoxy pipe terminates upon entrance into each valve box. The annulus is plugged at the ends of the pipe to provide a liquid-tight closure. The annulus of each pipe segment located between the valve boxes contains a leak detection sensor and an alarm. A liquid sensor found in each valve box sounds an alarm when activated.

3.2 Failure and Integrity Assessments

Existing secondary containment does not require an integrity assessment other than a visual inspection to determine if a failure has occurred.

3.2.1 Failure Mechanisms for Secondary Containment

The following are possible failure mechanisms for the secondary containment systems existing within the RLWS Facilities.

Reinforced Epoxy Pipe

The reinforced epoxy pipe encasing the RLWS piping may crack or break. The leak detection equipment or the alarm that monitors the annulus between the two pipes may malfunction and fail to operate.

Liner

The liner may fail to contain 100% of the capacity of the largest tank within its boundaries. The liner may also contain cracks or gaps, allowing leaked fluids to flow into the environment. The liner may not adequately prevent the infiltration of precipitation into the secondary containment and, thus, the capacity of the collection system may be exceeded when tank leaks occur.

Unlined Vault or Valve Box

The vault may fail to contain 100% of the capacity of the largest tank within its boundaries. The vault or valve box may develop cracks that allow leakage of the hazardous waste beyond the secondary containment.

The vault may allow the formation and accumulation of ignitable vapors that leads to an explosion. Active ventilation of the tanks and vault and limitations on the type and amounts of organics added to the tanks make this a very unlikely event, however.

3.3 Recommendations for RLWS Secondary Containment

Concrete vaults and valve boxes, whether lined or not, can be classified as secondary containment. Concrete is resistant to the effects of the weak acids and bases that are handled in the RLWS tanks and pipelines housed by vaults and valve boxes. Concrete is also resistant to most other chemical solutions that may be handled in the RLWS and that may infrequently leak into the vaults and valve boxes. Because the reported frequency of spills and leaks into vaults and valve boxes is so low and because their time in contact with concrete is short, it is doubtful that any significant chemical damage of vault and valve box concrete has occurred.

Damage may have occurred, however, if uneven settlement of foundation earth or inadequate reinforcement of the concrete resulted in formation of cracking beyond that which naturally occurs when the concrete cures. A structural assessment of vault and valve box design and construction practices may reveal if structural damage is a credible possibility. If such an assessment reveals that containment integrity is likely intact, the containment could be filled with water to the extent required to simulate a design-basis leak, and the rate of liquid level change observed. If the liquid level does not decrease after accounting for evaporative losses, containment integrity would be demonstrated.

Vaults or valve boxes whose containment integrities are suspect could be retrofitted with liners or spray-on, water-tight coatings. In the case of vaults, high dose rates and very lengthy down-times would be incurred as much or most equipment would require decontamination and/or removal to gain access to all floor and lower wall surfaces. Valve boxes may be much more amenable to the use of spray-on coatings because of superior accessibility, however. Accessibility includes the ability to clean the inner surfaces of valve boxes to ensure adequate bonding of the coating material to the concrete.

Secondary containment of RLWS piping is provided by reinforced epoxy encasement piping. Its integrity is periodically tested by subjecting the annulus to air pressure at several psig. Like the encasement piping, the vaults and valve boxes will require periodic reconfirmations of their integrities. The frequency must be determined on the basis of factors such as structural strength, life of coating, and intervening events, such as earthquakes and dropped equipment, that may have compromised integrity.

4.0 GENERAL OPERATING REQUIREMENTS

The RLWS must be operated in such a way that failure of the system due to ruptures, leakage, spills, overflows, or corrosion is prevented.

4.1 Procedures and Controls

Due to the potentially highly radioactive nature of effluents managed in the RLWS tanks and piping, protective enclosures are provided around all tanks and piping to prevent personnel from incurring unacceptable radiation exposures. The protective enclosures include covered vaults and valve boxes, buried pipelines, and enclosure of tanks and pipes within facilities. These physical enclosures also mitigate the potential for breaching tanks and piping by collisions with moving vehicles, for example.

Drawings of buried piping are maintained to alert excavators and heavy equipment operators of their locations. Modification of any of the RLWS equipment requires submittal of formal modification requests and proposed designs followed by approval by cognizant and responsible group managers or their delegates. This measure provides assurance that changes made to the RLWS or adjacent equipment will not compromise the integrity nor function of the RLWS.

Corrosive materials are prevented from addition to the RLWS through administrative procedures that identify and establish limits for addition of corrosive materials. The use of tanks without side entries as well as the extensive use of welded pipes minimizes potential for leakage at fittings. Tanks are equipped with audible high level alarms and level indicators to help avoid overfilling tanks. The appearance of vertical stains on the

Transfer of batches of waste exceeding 50 gallons by the generating facilities to Building 340 must be approved by WHC personnel, thus providing additional control to avoid overfilling tanks in Building 340. Procedures for large transfers of waste from tanks in Buildings 324 and 325 to Building 340 require two or more operators to operate equipment and closely monitor tank readings. Visual monitoring for leaks and overflows in vaults in Buildings 324, 325, and 340 is not currently possible due to the absence of viewing ports or remote television. WHC and PNL personnel work closely to coordinate effluent transfers to Building 340.

Secondary containment consisting of stainless steel-lined or unlined basins and encased piping is provided as spill and overflow catchment. When transferring loaded rail cars to 204-AR in the 200E Area for unloading, the allowable speed of the train is severely restricted. Hanford patrolmen escort the train, as well. These practices mitigate the potential for a collision. Contingency Plans, Emergency Plans, Spill Prevention, etc., are under various stages of completion and may require further changes.

4.2 Assessment of Adequacy

The RLWS was designed and is operated in a manner that minimizes radiation risks to personnel and the environment. Likewise, the RLWS, as designed and operated, should also minimize hazardous waste risks to personnel and the environment.

The ability to assess the environmental effectiveness of the RLWS operations at this time may not be adequate because information on the condition of the tanks, piping, sensors, secondary containment, etc., is generally lacking. If the condition of a tank system component has diminished with age, a higher level of administrative controls and operating care may compensate for the lowering of component condition. Although there is no reported evidence of an incident of environmental contamination or significant human exposure event in the 35-year history of the system, three RLWS component failures have occurred that give rise to concern that operating requirements and controls were not adequate when the failures occurred:

- Failure of the Building 329 stainless steel drainline;
- Failure of a segment of reinforced epoxy encasement around an underground RLWS pipe; and
- Apparent overflow of a tank in Building 340-A.

A comprehensive and systematic identification of potential tank system failure mechanisms and appraisal of existing information on the current functional abilities, conditions, and operating procedures of the associated RLWS components and controls may be prudent as a way to minimize high risk/high cost inspection and maintenance activities that may be considered to demonstrate and/or achieve regulatory compliance. A systematic audit and amendment (as required) of Contingency Plans, Emergency Plans, etc., may also be an important step in demonstrating compliance.

5.0 INSPECTIONS

A schedule and procedure must be developed and followed for inspecting the tank system and controls for preventing leaks and spills.

5.1 Description

A limited number of inspections are currently conducted due to the inaccessibility of most equipment created by their location in vaults, hot cells, valve boxes, and underground trenches (as in the case of piping).

5.1.1 Building 324

Instrument readings for those tanks equipped with bubbler tubes for measuring or observing liquid level, specific gravity, and tank pressure are recorded daily. Visual inspection of the tanks has been infrequently performed.

5.1.2 Building 325

Instrument readings for those tanks equipped with bubbler tubes for measuring or observing liquid level, specific gravity, and tank pressure are recorded daily. Visual inspection of the tanks has been infrequently performed.

5.1.3 Building 340

The floor in Building 340-A where the six above-ground tanks are located is inspected on a daily basis.

5.1.4 RLWS Piping and Valves

The integrity of the reinforced epoxy pipe casing is determined by a pressure test. The annulus is pressurized with air to several psi and the pressure drop is compared to historical data to determine the soundness of the pipe.

5.2 Failure and Integrity Assessments

It may be possible to minimize the number and frequency of integrity inspections of tanks for this program by first examining the tank(s) with the most corrosive service history. Each group of tanks with the same metal composition and design type may then require only one inspection on an infrequent basis if the tank that was inspected showed no problems. (Thus, it could be inferred that corrosion, being insignificant in 35 years of operating service, is unlikely to be an issue during the next 10 years, for example.) Such an approach would require the concurrence of Ecology. Permission to use this approach would require sound technical arguments based on ALARA considerations (see Appendix H) that the approach would ensure an equivalent level of environmental protectiveness to daily inspections of above-ground tanks and piping.

To limit the exposure of personnel and equipment to radiation, a determination should be made prior to the inspections as to where the potential corrosion problems are most likely to have occurred in the tank system and then those areas should be examined closely.

Tanks in vaults and hot cells are inaccessible to daily inspection due to the fact they are contained in vaults covered with large concrete blocks or in other highly radioactive areas. As such, daily visual inspection of these tanks is currently impractical. A feasible method for monitoring the conditions existing in the vaults is to check leak detection instruments, tank level indicators, and temperature and pressure indicators for evidence of problems. If there is a failure in a component of the tank system resulting in a leak, the secondary containment, if sound, will ensure no release of waste into the environment.

If visual inspection of the tanks in the vault or cell is needed, then remote television cameras or periscopes will be required to examine the tank system in the vault. This will limit the exposure of the personnel to a radioactive environment. More than one camera or periscope may be needed to provide a level of inspection equivalent to that achievable by an on-site inspector.

If the tanks and vaults cannot be adequately decontaminated to permit integrity assessment or inspection, ultrasonic testing (UT) of the tanks, if required, must be accomplished by a remote servo mechanism. In addition to the UT equipment, the device can be outfitted with visual inspection instruments for examination of the wall surface by video television and photographs. The mechanism can be equipped with a power-driven wire brush assembly to provide a clean surface for the ultrasonic testing equipment. Additionally, the wire brush can be used in conjunction with the visual inspection equipment to examine for pitting corrosion on the inner tank surface, if there is a tank port large enough to permit entry of the assembly.

The UT transducer assembly can contain several transducers, including longitudinal mode transducers to measure the wall thickness and any internal flaws within the wall and shear mode transducers to determine if there is any back surface anomaly within the area under investigation.

6.0 RESPONSES TO LEAKS AND SPILLS

In response to a leak or spill, operations must cease and the spilled material must be contained, removed, and properly disposed of.

6.1 Procedures

WHC has recently completed a Contingency Plan for the Building 340 Complex and PNL has recently completed a draft generic Contingency Plan that may be suitable for all PNL facilities.

6.2 Assessment of Adequacy

The WHC Contingency Plan has undergone a recent and considerable level of internal review. The PNL Contingency Plan was recently reviewed by Hart Crowser, Inc. A number of recommendations were made through that review. At the time of this writing, the Contingency Plan was still in draft form. An approach being considered by PNL was to supplement the generic Contingency Plan with building-specific Emergency Plans.

The regulations require specific steps for dealing with spills from tank systems. They also have specific notification and reporting requirements, as well as requirements concerning resumption of use following a leak or spill. A comprehensive audit of the WHC facility-specific Contingency Plan and the PNL joint Contingency/Building Emergency Plan for completeness was outside the scope of work for this project. A formal audit of contingency procedures, training plans, etc., may be the best method to identify and correct any deficiencies concerning spills and leaks.

7.0 CLOSURE

At closure of tank systems, all wastes, residues, contaminated components, and contaminated soils must be removed. For existing tank systems such as the RLWS, closure requirements are not applicable until the tank system is ready to be permanently removed from service.

8.0 IGNITABLE OR REACTIVE WASTE

Ignitable or reactive waste must not be placed in a tank system unless the waste is treated such that the waste no longer meets the regulatory definition of ignitable or reactive, or is handled in a manner that will not allow it to ignite or react.

8.1 Procedures and Controls

In general, the primary PNL and WHC procedures for the RLWS (R1-6 and WHC-CM-5-2, respectively) restrict the addition of organics and other chemicals that could make the waste ignitable and reactive. Certain materials such as concentrated acids and isopropyl alcohol are used in the laboratories. The resulting wastes could qualify as reactive and ignitable wastes if their method of use in the laboratories did not result in their neutralization and dilution. Any wastes added to the RLWS by PNL must undergo a book designation process by the Waste Management and Environmental Compliance (WM and EC) Section of PNL to establish whether the waste is ignitable or reactive. This process relies upon laboratory workers to provide complete compositional data to the WM and EC designator. At the designator's discretion, the waste may have to be tested in the laboratory against the regulatory criteria to positively establish whether these criteria are met. WM and EC designators are trained by a WHC organization responsible for waste designation.

8.2 Assessment of Adequacy

The approach used by PNL (the waste generator) appears to be suitable for designating wastes. It is unknown, however, if the laboratory workers are adequately knowledgeable of the regulatory criteria for ignitable and reactive waste so that they can provide the designator with all of the appropriate information for making an acceptable book-designation. A survey of laboratory worker training materials for the inclusion of the regulatory definitions of and tests for ignitable and reactive wastes may be needed, as well as a review of the decision-making process the designator uses to decide to either book-designate or to criteria-designate the waste.

9.0 INCOMPATIBLE WASTES

Incompatible wastes or materials must not be placed in the same tank system which could cause them to uncontrollably react or compromise the integrity of the tank.

9.1 Procedures and Controls

Ignitable and reactive wastes are precluded from addition to the RLWS as discussed above. Using a very similar approach, corrosive wastes are also administratively prevented from addition to the RLWS. The RLWS, being constructed entirely (or nearly entirely) of stainless steel components, is highly resistant to corrosion. WHC and PNL procedures also restrict the addition of halides to the RLWS to levels believed to preclude failure by stress-corrosion cracking.

9.2 Assessment of Adequacy

Although the regulatory definition of corrosive waste is simple and easy to verify, it is unknown if all workers have pH meters or, in their absence, adequate knowledge or procedures to ensure that pH limits are not exceeded. The corrosion-related failure of the RLWS drain pipe in Building 329 is evidence some may not. A survey of training information, certified worker-skill levels, and procedures regarding corrosive materials may be needed. Moreover, because information provided did not positively demonstrate that all RLWS components are constructed of stainless steel, a future finding that carbon steel is employed in some part of the system may require a revision of procedures and controls to ensure that low pH solutions do not come into contact with the carbon steel.

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APPENDIX H

DISCUSSION OF ALARA IMPACTS ON CONFORMANCE WITH TANK STANDARDS

1.0 INTRODUCTION

Compliance with the Resource Conservation and Recovery Act (RCRA) may be difficult at some Department of Energy (DOE) facilities handling hazardous waste that is also radioactive (mixed waste). This mixed waste is equally and dually regulated under both RCRA and the Atomic Energy Act (AEA). Occasionally it becomes difficult to comply with RCRA requirements while maintaining compliance with the radiation protection requirements of the AEA. Most of these compliance difficulties stem directly from the fact that RCRA regulations were developed for situations that did not involve occupational exposure to ionizing radiation. This appendix provides some background on the radiation protection requirements of the AEA, as amended, and provides a methodology which can be applied when evaluating how to perform a RCRA-mandated activity in conformance with the AEA. Specific reference is made to compliance issues surrounding treatment and storage tank systems in Buildings 324, 325, and 340 located in the 300 Area of the Hanford Site.

2.0 BACKGROUND

On May 1, 1987, DOE issued an interpretive rule under Section 161 of the AEA. The rule provides that the hazardous waste component of wastes that are both radioactive and hazardous are subject to RCRA. Prior to the "byproduct rule", DOE had maintained that the exclusion in Section 1004 of RCRA specifically excluded "source, special nuclear, or byproduct materials" from the definition of "solid waste." The effect of the DOE rule was to clarify that the exclusion pertained only to the actual radionuclides in the DOE waste. The hazardous waste portion of the waste would not be exempted from RCRA regulation. In those cases where the wastes are inseparable, both AEA and RCRA apply. Because most of the radioactive waste at DOE facilities is also hazardous, the interpretive rule dramatically affected the status of compliance of DOE facilities with RCRA.

In addition to assuring compliance with RCRA, the DOE must also assure compliance with the AEA. DOE is a self-regulating agency under the AEA and the Energy Reorganization Act of 1974. As part of its responsibilities under the AEA, DOE establishes and enforces radiation protection standards that are consistent with guidance on occupational exposure to ionizing radiation developed by the Environmental Protection Agency (EPA) and that developed by national and international standard-setting groups. In conformance with the federal guidance issued by EPA, DOE has established strict radiation protection limits and enforces these limits through implementation of its radiation protection programs.

There are three major components to the federal radiation protection guidance (52 FR 2825) which forms the basis for DOE's radiation protection programs:

> "The first is that any activity involving occupational exposure should be determined to be useful enough to society to warrant the exposure of workers; i.e., that a finding be made that the activity is 'justified'. This same principle applies to virtually any human endeavor which involves some risk of injury. The second is that, for justified activities, exposure of the work force should be as low as reasonably achievable (commonly designated by the acronym ALARA); this has most recently been characterized as 'optimization' of radiation protection by the International Commission of Radiological Protection (ICRP). Finally, to provide an upper limit on risk to individual workers, 'limitation' of the maximum allowed individual dose is required. This is required above and beyond the protection provided by the first two principles because their primary objective is to minimize the total harm from occupational exposure in the entire work force; they do not limit the way that harm is distributed among individual workers."

DOE's radiation protection programs, in conformance with this federal guidance developed by EPA, therefore, implement the concepts of benefit, ALARA, and numerical dose limits. DOE's radiation protection programs not only must determine how to conduct a task, but the DOE is also charged with the underlying responsibility of determining whether a task is to be performed at all. The ALARA philosophy, as developed by EPA and the ICRP and implemented by DOE, is goal-oriented, risk-based, cost-effective, and case-specific.

Given this goal oriented, risk-based, cost-effective, and case-specific approach embodied by the term ALARA, it is understandable that adherence to the prescriptive requirements of RCRA would cause compliance difficulties. Section 1006(a) of RCRA intended to resolve some of these difficulties. Adherence to RCRA is required for those situations that are "not inconsistent" with the requirements of the AEA. Conversely, a RCRA requirement that would cause violation of a radiation protection requirement, could be viewed as being inconsistent with the AEA. EPA, DOE, and the Nuclear Regulatory Commission (NRC) have reviewed areas of potential inconsistency between RCRA and the AEA. NRC and EPA considered three conditions where compliance with RCRA requirements could result in an inconsistency with NRC requirements (EPA, 1987):

- When RCRA compliance resulted in increased radiation hazards;

- When RCRA compliance is technologically infeasible; and

- When RCRA compliance adversely affects national security.

Although this guidance is not binding on DOE, neither EPA, NRC, nor DOE have been able to document a case where RCRA requirements are inherently inconsistent with AEA requirements. This appendix explores the first of the three potential areas of inconsistency: increased radiation hazards. All agencies recognize that difficulties in complying with both radiation protection and RCRA requirements will increase as the occupational risks from external radiation increase. EPA and DOE have acknowledged, therefore, that some accommodations will be necessary to provide for the protection of workers due to the additional hazards posed by ionizing radiation. EPA has stated that RCRA provides enough flexibility in its permitting processes to accommodate these special circumstances, and EPA and DOE expect to resolve most of these difficulties through issuance of Part B Permits, compliance orders, and consent decrees. While permitting flexibility may be a final solution, the compliance difficulties currently facing the 300 Area facilities involve interim status requirements. Facilities under interim status are required to meet 40 CFR 265 criteria.

3.0 IDENTIFICATION OF SITUATIONS NEEDING ACCOMMODATION

This section describes one method of determining when there are sufficient difficulties in meeting the dual requirements of the AEA and RCRA. In this context "sufficient difficulties" means when a significant increase in radiation dose to either an individual or to a group of individuals would result from meeting RCRA requirements. When sufficient difficulties exist, additional protective measures or alternative methods of meeting the intent or purpose of the RCRA requirements must be considered.

For the majority of RCRA requirements, compliance can be achieved with little or no incremental increase in radiation risks to workers. In those cases, there is little justification for seeking accommodations to the RCRA requirements. A simple example would be posting the entrance to an area containing mixed waste. Such entrances at Hanford are typically at radiation levels on the order of less than one millirem per hour.

However, for those instances where there will be a significant increase in either collective or individual radiation doses to bring about compliance with RCRA, further evaluation of alternative methods and application of additional protective equipment is required for AEA compliance. Extrapolating from the example given above, the placement of labels directly on tanks containing highly radioactive materials would not be a routine operation and would require further evaluation. Depending on the external and internal radiation hazards present, an equivalent method may be to label the entrance to the tank area, showing by a map or drawing the exact locations of the tanks and describing the chemically hazardous materials.

In an attempt to determine how much radiation risk is too much, the guidance developed by EPA, "Radiation Protection Guidance to Federal Agencies for Occupational Exposure," was consulted (52 FR 2822). This guidance sets forth three fundamental radiation protection criteria. The premise of Appendix H is that a situation involving a violation of any one of these three fundamental criteria would represent unacceptably high risks from radiation exposure. In this context, therefore, unacceptably high risks from radiation exist when:

- Performing the RCRA task results in increased radiation hazards without sufficient off-setting overall benefit, in spite of reasonable efforts to control the radiation exposure.

- Performing the RCRA task requires unnecessary radiation exposure since alternative methods are available that can provide substantive or equivalent compliance with the RCRA requirement while keeping radiation doses as low as reasonably achievable (ALARA).

- Performing the RCRA task results in radiation doses that are in excess of numerical radiation protection standards, in spite of efforts to maintain radiation exposures to levels that are as low as reasonable achievable (ALARA).

A schematic is provided on Figure H-1 of the overall process for determining if there are unacceptably high risks due to radiation exposure.

The first and primary criterion, that there be benefit from any radiation exposure, is the most difficult criterion to implement because of its inherently subjective nature. The same federal guidance document quotes the following NCRP guidance on the subject of benefit (52 FR 2826):

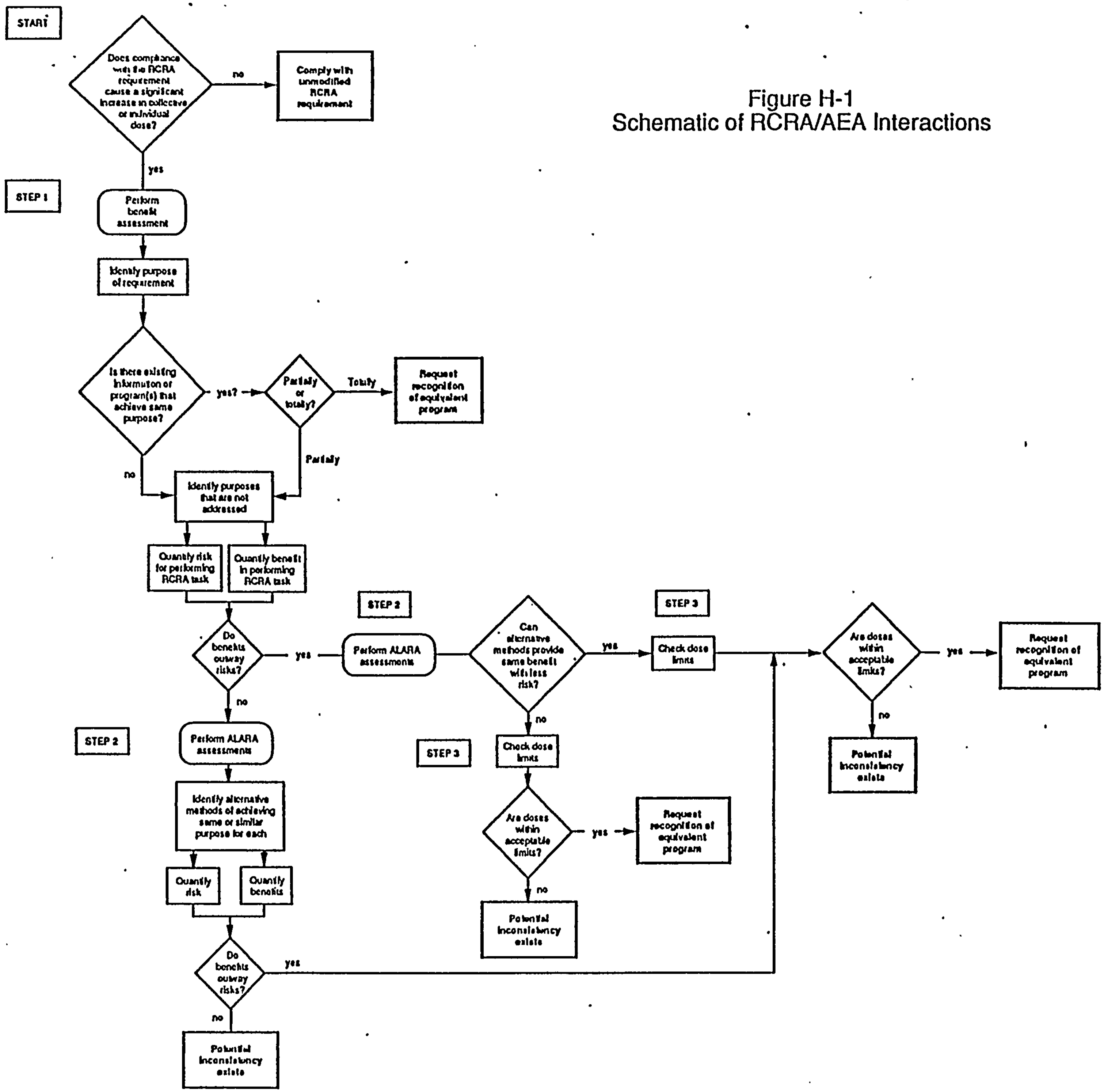
> "...all exposures should be kept to a practicable minimum;...this principle involves value judgments based upon perception of compensatory benefits commensurate with risks, preferably in the form of realistic estimates of both benefits and risks from activities involving radiation and alternative means to the same benefits."

The federal guidance document continues:

> "Decisions on whether or not particular tasks should be carried out (such as inspecting control systems or acquiring specific experimental data) require judgments which can, in the aggregate, be as significant for radiation protection as those justifying the basic activities these tasks support."

In determining whether there is benefit derived from a particular activity over and above the inherent benefit derived from achieving compliance, a series of questions should be

Figure H-1
Schematic of RCRA/AEA Interactions



If DOE insists that an inconsistency exists, the RCRA regulator, in this case the Department of Ecology (Ecology), would have the option of agreeing with DOE's determination, disagreeing with the determination, or agreeing to a modification of DOE's determination. If Ecology and DOE agreed on a course of action, the Tri-Party Agreement would likely need to be modified after appropriate notice. If Ecology disagreed with DOE's assertion, the conflict resolution portions of Article VIII of the Tri-Party Agreement would probably determine the outcome.

In most situations, however, an alternative method of achieving compliance with the intent of the RCRA requirement can be identified that will have a net benefit and, ideally, satisfy the requirements of the AEA. In accordance with federal guidance on occupational radiation exposure, an evaluation should be performed to determine whether the alternative measures (e.g., alternative methodology or additional protective equipment and measures to further minimize dose) are ALARA. The ALARA concept applies to annual dose, committed dose (dose from internally deposited, long-lived radionuclides), and collective dose (the total of all individual doses, usually measured in man-rem). ALARA is based on the assumption that no dose, regardless of how small, is entirely without risk. The concept recognizes the goal of managing risk at an acceptable level, but not eliminating risk. DOE has chosen to define the ALARA dose as "the dose that is as low as social, technical, economic, practical, and public policy permit" (DOE 5480.11).

Determining how low is "reasonably achievable" may be approached in different ways. It is expected that existing procedures would be employed to assess whether the alternative methods and protective actions to comply with RCRA were ALARA. For example, WHC uses its "ALARA Program Manual" (WHC, 1989) to provide a standard method of determining whether additional radiation protective measures are ALARA. This ALARA analysis involves determining the net benefit derived from applying radiation protection measures in terms of monetary gains and losses. The costs of the protective measure (including materials, manpower, and a dollar equivalent of radiation exposure incurred) are subtracted from the gross benefit expressed as the dollar equivalent of exposure saved, societal benefit, improved public relations, and other factors. If the difference is a positive number, the measure is deemed to be cost-effective. Usually, several alternatives are assessed to determine the optimum exposure reduction. It is this optimum balance between detriment and cost that is judged to be ALARA. PNL has their own method of determining when protective measures are ALARA, "Health Physics Manual of Good Practices for Reducing Radiation Exposure to Levels that are As Low As Reasonably Achievable (ALARA)" (PNL-6577).

In accordance with federal guidance on occupational radiation exposure, the third key component in a radiation protection program is to determine whether the dose to the individual(s) performing the task is within acceptable numerical dose limitations. Federal guidance recommends that each facility develop administrative limits to assure that the regulatory limits are not exceeded. DOE also recommends that, as part of a contractor's ALARA program, administrative levels be established and doses managed to remain as far below those administrative levels as reasonably achievable (DOE 5480.11). Consequently, each contractor at Hanford has established its own set of administrative limits, established to provide assurance that the regulatory limits of DOE 5480.11 will not be exceeded. The regulatory limits of DOE 5480.11 are listed in Table H-1 beside the proposed administrative guidelines for PNL. A planned exposure that would exceed the administrative guidelines requires specific approval of upper management at PNL and WHC. Consequently, the administrative guidelines become the *de facto* regulatory dose limits. The administrative guidelines for WHC are listed in Table H-2. The evaluation of whether a task will cause an employee to exceed regulatory limits is discussed further in Section 4.0 of this appendix.

In the unlikely event that the use of protective equipment or alternative measures is not ALARA and doses are in excess of acceptable limits, then a potential for inconsistency exists. PNL and WHC should re-evaluate the alternative measures and the ALARA analysis. Programmatic alternatives should also be explored including major capital improvements. If alternative measures continue to fail ALARA analyses and if doses continue to be in excess of acceptable limits, DOE-RL should be notified, and in turn, DOE-HQ. A similar situation occurs if the dose reduction methods are ALARA, but the doses are in excess of regulatory limits.

The most likely area for significant difficulties between RCRA and AEA requirements stems from the absence of cost considerations in complying with RCRA and the presence of cost-benefit considerations in determining what is ALARA. Given sufficient time and money, most, if not all the RCRA requirements dealing with high activity mixed waste should be able to be accommodated. The cost in both time and money of those accommodations can be balanced against the benefit and risk under ALARA; there is no mechanism for balancing cost and benefit under RCRA.

In the most likely scenario, however, DOE and its contractors will develop alternative approaches that are beneficial, ALARA, and within dose limits. In this case, DOE-RL should be notified, and the RCRA agency should be petitioned to consider the ALARA alternative. The process for modifying the Tri-Party Agreement will likely become the vehicle for formalizing those alternatives. Because of the screening and evaluations that occurred during the development of the alternative, the alternative should be beneficial, retain the purpose of the original RCRA requirement, and be fully compliant with AEA requirements.

TABLE H-1

DOE OCCUPATIONAL EXPOSURE LIMITS (DOE 5480.11)
COMPARED TO PNL'S PROPOSED ADMINISTRATIVE LIMITS

Exposed Portion of the Body	DOE Numerical Limit in rem/yr[1]	PNL Administrative Limits[1] in	
		rem/yr[2]	rem/qtr[2]
Stochastic Effects (Whole-body exposure)	5	4[3]	2.4
Non-Stochastic Effects			
Lens of the eye	15	12	4
Extremity	50	40	15
Skin of the whole body	50	40	15
Other organ or tissue	50	40	15
Unborn Child			
Entire gestation period	0.5	0.4	-----

1 The operational dose equivalent controls in this table apply directly to both bargaining and non-bargaining unit staff members. For bargaining unit staff members, additional occupational radiation exposure restrictions are covered by the current Agreement between the Pacific Northwest Laboratories of Battelle Memorial Institute and the Hanford Atomic Metal Trades Council.

2 Annual effective dose equivalent

3 Approval of the PNL Laboratory Safety Department Manager is required to exceed 2.8 rem.

TABLE H-2

WESTINGHOUSE HANFORD COMPANY
ADMINISTRATIVE GUIDELINES

Exposed Portion of the Body	DOE Numerical Limit in rem/yr[1]	PNL Administrative Limits[1] in	
		rem/yr[2]	rem/qtr[2]
Whole body, head, trunk, gonads, lens of eye, red bone marrow, active blood-forming organs	3 (0.3 in a seven-day period)[2]		1.25
Unlimited areas of skin	9		3
Other organs, tissues	7.5		
Bone	15		---
Hands, feet, and forearms	15		5

[1] Annual effective dose equivalent

[2] Per union contract

4.0 EXCEEDING REGULATORY LIMITS

The evaluation of whether an activity or task will cause an employee to exceed regulatory limits is complex and dependent on several factors. Among the factors to be considered are:

- Estimates of the working dose rates in the area where the task(s) is to be performed. The estimate should be based on recent radiological survey data with consideration of historical data to identify trends.
- Detailed descriptions of the task(s) to be performed, including the proposed frequency for each.
- Estimates of how many people will be assigned to perform the task(s).

For the purposes of determining when a radiation exposure limit is exceeded, it is assumed that the number of employees needed to perform a single RCRA task will not increase merely because of the presence of radiation[1]. That is, if a task requires one person in a non-radioactive industrial setting, it is assumed to require only one person in a similar setting where radiation was also present. (For purposes of industrial or radiation safety, however, additional personnel may be required as part of the buddy system. These personnel were not included in this assessment as their role would be secondary and they would probably receive less radiation dose.) It is similarly assumed that one employee will perform the same task for the same tank or RCRA-regulated unit whenever it is required. To determine the dose limit for that task, it is assumed that the employee will receive the maximum dose allowed as a result of performing only that single RCRA task.

For example, a daily inspection task is performed by the same two WHC employees for a year (Employee 1 works Monday through Friday and Employee 2 works Saturday and Sunday). Employee 1, because he works 5 days a week, 50 weeks a year, with 10 holidays off each year, cannot receive more than 12.5 mrem/day and remain within the

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[1]On some non-routine nuclear jobs a task may be divided into several subtask components, with a single person receiving the maximum exposure allowable during the short duration subtask. This type of practice is not encouraged in federal guidance or by DOE and is reserved for non-routine situations of a critical nature. Routine compliance activities would generally not qualify for this type of manpower and exposure management.

3.0 rem/year administrative guideline. Thus, if Employee 1 were to perform the RCRA task every day, the regulatory exposure limit for that task would be 12.5 mrem.

Similarly, if the task were to be performed annually and could be performed by one person working no more than a few weeks, the employee's dose would be managed to stay within the 300 mrem weekly limit. The employee would be able to receive 300 mrem each week until the 1.25 rem quarterly administrative limit or the 3.0 rem annual administrative limit were approached.

Generically, this relationship between task frequency and the administrative dose limit can be represented as an effective task dose limit, as follows:

$$\text{Effective Task Dose Limit} = \frac{\text{Administrative Guideline}}{\text{Frequency of the Task}}$$

This effective task dose limit can be used to assess whether the task can be performed within the numerical dose limits. Table H-3 presents the effective task dose limits for various task frequencies. WHC's administrative guides were used as the applicable limit.

TABLE H-3

EFFECTIVE TASK DOSE LIMITS (WHC)

Task Frequency	Effective Task Dose Limit in mrem
Daily	12.5
Weekly	60
Monthly	250
Bi-Monthly or Less Frequently	300

5.0 APPLICATION OF THESE CONCEPTS

The tank systems in the 300 Area provide an opportunity for testing these concepts as they relate to interim status tank integrity assessments. WAC 173-303-400, Interim Status Facility Standards, requires adherence to 40 CFR 265 Subpart J for tanks and tank systems having interim status, except for compliance schedule. The primary test is to designed and has sufficient structural strength and compatibility with the waste(s) to be stored or treated, to ensure that it will not collapse, rupture, or fail. The requirement lists several attributes of the tank system that must be evaluated:

- Design standards according to which the tank system was constructed (40 CFR 265.191.(b)(1));
- Dangerous characteristics of the waste(s) that have been or will be handled (40 CFR 265.191(b)(2));
- Existing corrosion protection measures (40 CFR 265.191(b)(3));
- Documented age of the tank system (40 CFR 265.191(b)(4)); and
- Results of leak test, internal inspection or other tank integrity examination such that for other than non-enterable underground tanks and for ancillary equipment, this assessment must be either a leak test, or an internal inspection and/or other tank integrity examination certified by an independent, qualified, registered professional engineer that addresses cracks, leaks, corrosion, and erosion (40 CFR 265.191(b)(5)(ii)).

One of the two 15,000-gallon tanks in Building 340 will be used to illustrate how the methodology depicted in Figure H-1 would be applied. This tank is located in a concrete vault-like structure with removable concrete shielding blocks providing the only manned access to the area. Typically, radiation exposure rates are in excess of 500 mrem/hr and can easily exceed several rem/hr on contact with the tanks. There is no routine entry made into this area of Building 340 .

Using the methodology presented on Figure H-1, the first question to be considered is whether compliance with RCRA would cause a significant increase in collective or individual dose. Compliance with the tank integrity assessment provisions of 40 CFR 265.191(b)(1) - (4) should not pose any additional significant radiation hazard. There is no reason why DOE should not be able to comply with these requirements, providing the records can be located. Compliance with 40 CFR 265.191 (b)(5), however, implies entry and physical examination of the tank system. With radiation exposure rates on the order of several hundred to several thousand mrem/hr, entry into the area would represent a significant increase in collective or individual dose.

The next step in the process is to determine if there is sufficient benefit in performing the leak test, internal inspection, or other tank system integrity examination. This is a highly subjective determination that would involve consideration of both chemical and radiological hazards to workers, the public, and the environment. The purpose of the RCRA requirement is to prevent a collapse, rupture, or failure of this 15,000-gallon tank potentially filled with highly radioactive and hazardous waste. After the purpose of the requirement is identified, an evaluation is made of existing information or programs that can achieve the same purpose. For example, in addition to the information required in 40 CFR 265.191(b)(1) - (4), a search of records could reveal that upon two occasions photographs of the vault area were taken; operational logs exist that document when leaks have occurred, their size, and operational parameters. Design bases and non-destructive tests performed upon installation could be reviewed to determine the level of conservativeness and degree of quality of the tank designs. This information could be compared to the operational record and a calculation of the extent of corrosion could be made. An evaluation of the operational history and design documentation would also lead a competent engineer to identify those areas of the tank most likely to be subject to cracks, leaks, corrosion, and erosion.

This information only partially addresses the requirements of 40 CFR 265.191(b)(5) as a record search does not satisfy the need to confirm calculations and professional judgement. The need to confirm the information obtained from records review appears to have considerable benefit; however, entry into the tank vault also carries with it considerable hazard. A rigorous evaluation of risk and benefit should be performed. For the purposes of this example, since there does not appear to be a dramatic imbalance in risk as compared to benefit, let us assume that the benefits sufficiently outweigh the risks to allow consideration of alternative methods to achieve the same benefits.

Step 2 of the methodology requires that alternative methods be evaluated to provide the needed information in a manner that involves less radiation risk. At this point, the concepts of time, distance, and shielding are combined to determine the optimum means of providing confirmatory measurements on the tank to determine the extent of cracks, leaks, corrosion and erosion. In a non-radiation setting, cracks could be determined by dye penetrant testing or by magnetic particle inspection. These techniques tend to require approximately two hours for each area examined. It would be reasonable for a 15,000-gallon tank to have at least 36 areas examined. Unprotected workers could receive on the order of 10 rem to perform these inspections. Alternatively, customized remotely operated visual and testing equipment could be hung from an access area under a protective "greenhouse" to perform a surface examination, and remotely operated ultrasonic testing equipment could be used to determine wall thickness. The number of areas examined could be determined both statistically and from an assessment of the tank history. This type of analytical assessment has been used successfully in determining integrity of reactor vessels in the commercial power industry and the equipment and techniques could be adapted to the DOE setting.

Step 3 requires that calculated dose estimates for the examinations be compared with applicable limits. In this hypothetical case, since the duration of the inspection task is likely to require more than a week, but less than a month and the task is infrequently performed, the radiation doses must not exceed the weekly limit of 300 mrem. However, if these same employees were to perform many tank integrity assessments, their routine exposures would need to remain below 60 mrem/week in order to stay within WHC's quarterly administrative limit of 1,250 mrem. Experience with performing similar assessments of reactor vessels has shown that, using remote measuring and observation equipment, doses can stay well within these administrative limits. Discussions with Ecology should confirm that the alternative approach would meet Ecology's expectations for compliance with WAC 173-303-400.

6.0 SUMMARY

This appendix provided a rationale for determining how compliance difficulties between radiation protection criteria and RCRA requirements could be reconciled in an iterative manner. The proposed process provides full recognition of the equal and dual jurisdiction of both RCRA and AEA requirements. The methodology provides for recognition of the potential for irreconcilable differences between the two sets of requirements, and follows DOE-approved protocol for dealing with those particular, and expected to be rare, circumstances at the headquarters level of both DOE and EPA. The proposed process does not develop any new criteria, but draws from and applies existing radiation protection criteria and procedures. The ultimate goal of the proposed process is to provide a rational methodology for achieving compliance with both AEA and RCRA requirements in a manner that is fully protective of human health and the environment.

APPENDIX I

NON-RLWS COMPLIANCE ISSUES

1.0 INTRODUCTION

This appendix briefly discusses compliance issues related to systems that are associated with the RLWS Facility.

Although the focus of the work is on RLWS compliance issues, the RLWS interfaces with a variety of other systems to which other local, state, and federal regulations may apply. This appendix will briefly identify and discuss compliance issues associated with these other systems, including the Retention Process Sewer, the Process Sewer, the Sanitary Sewer, solid waste (hazardous and RMW), and product tanks. These systems were discussed in Appendix A. If PNL and WHC adopt our recommendation that a comprehensive survey of wastes added to the RLWS be conducted, we recommend that a similar approach be taken to determine the compliance status of the other systems and then, if deficiencies are identified, make the necessary changes required to attain compliance. This approach, if implemented, will improve or verify the overall compliance status of facilities associated with the RLWS.

2.0 RETENTION PROCESS SEWER (RPS)

Although by design the RPS should not be radiologically or chemically contaminated, the periodic detection (real and otherwise) of radioactivity in the RPS suggests the possibility of occasional chemical contamination. Because the RPS is periodically diverted to the RLWS, there is a need to verify the regulatory status of the RPS. In addition, the RPS stream must be properly designed. If the RPS is found to contain RMW, it would also be subject to the requirements of WAC 173-303-640 (double containment, inspections, leak detection, etc.). The RPS piping would be considered part of a dangerous waste tank system, such as the Building 340 tank system or the new waste pretreatment system to be installed per Tri-Party Agreement Milestone. The following steps are recommended to address the compliance status of the RPS:

1. Conduct a comprehensive survey of all possible contributing sources to the RPS and attempt to identify potential sources of RMW. Isolate these sources if possible.

2. Properly designate liquid contributions to the RPS system using existing information. If necessary, conduct sufficient sampling and analysis of contributions to the RPS system such that the regulatory status of the RPS stream can be determined. In addition, sampling during a diversion is recommended. If the RPS stream is

determined to be nonregulated, no futher action is needed except for periodic verification that the waste remains nonregulated.

3. If the source of contamination cannot be found and/or isolated from the RPS, the RPS piping may require upgrading (double containment leak detection, etc.). Achieving Tri-Party Agreement Milestone M-17-09 will establish a pretreatment facility for RPS and process sewer waste streams, making them suitable for discharge to the Richland sewer system or alternate system.

3.0 PROCESS SEWER

The Process Sewer is of concern because it is connected to various floor and sump drains associated with operations that handle or may handle listed and other dangerous materials. Although significant efforts have been made toward plugging or disconnecting drains that present risks of contaminating the Process Sewer, a final determination of the regulatory status of this stream has not been made. Therefore, it is recommended that steps 1 through 3, above, be followed.

4.0 SANITARY SEWER

The Sanitary Sewer is of concern because approximately 20 laboratory drains in Building 329 are connected to this effluent discharge system. Several activities and analyses conducted in the building involve the use of hazardous (including listed) chemicals. Again, conducting steps 1 through 3 outlined in Section 2.0 of this appendix are recommended. Even if sampling and analysis show that the stream does not have chemicals or characteristics that would require its regulation as a dangerous waste, the disconnection or replumbing of the 20 Building 324 drains is recommended. Also recommended is a survey of all connections to the sanitary sewer that could be sources of materials that could compromise effective septic operation or give rise to liability concerns if the sanitary sewer is eventually connected to the Richland sewer system.

5.0 SOLID (NON-LIQUID) WASTE

Careful segregation of listed waste from wastes added to the RLWS was recommended in Appendix D. The purpose of this recommendation was to limit the presence of listed chemicals in the RLWS to, at most, incidental levels. Implementing this recommendation will require that greater attention be given to not exceeding allowable accumulation volumes and times in satellite accumulation areas.

6.0 PRODUCT TANKS

A number of tanks containing chemicals were identified during our tour. Some of these tanks held concentrated nitric acid and sodium hydroxide. Certain of the tanks have been out of service for long, but unspecified, periods of time. An internal audit of the compliance status of these tanks is recommended.

APPENDIX J

DANGEROUS WASTE HANDLING: DEFINITIONS, TERMS, AND PERTINENT REGULATIONS

This appendix presents relevant regulatory definitions of terms used in previous appendices related to dangerous waste and dangerous waste handling activites. Also presented is a table outlining some of the pertinent regulatory requirements of Chapter 173-303 WAC.

Regulatory Definitions

Above-ground Tank	means a device meeting the definition of "tank" ... and that is situated in such a way that the entire surface area of the tank is completely above the plane of the adjacent surrounding surface and the entire surface area of the tank (including the tank bottom) is able to be visually inspected.
Ancillary Equipment	means any device including, but not limited to, such devices as piping, fittings, flanges, valves, and pumps, that is used to distribute, meter, or control the flow of dangerous waste from its point of generation to a storage or treatment tank(s), between dangerous waste storage and treatment tanks to a point of disposal on-site, or to a point of shipment for disposal off-site.
Component	means either the tank or ancillary equipment of a tank system.
Container	means any portable device in which a material is stored, transported, treated, disposed of, or otherwise handled.
Disposal	means the discharging, discarding, or abandoning of dangerous wastes or the treatment, decontamination, or recycling of such wastes once they have been discarded or abandoned. This includes the discharge of any dangerous wastes into or on any land, air, or water.
Existing Tank System or Existing Component	means a tank system or component that is used for the storage or treatment of dangerous waste and that is in operation, or for which installation has commenced on or prior to February 3, 1989. Installation will be considered to have commenced if the owner or operator has obtained all federal, state, and local approvals or permits necessary to begin physical construction of the site or installation of the tank system and if either: (a) A continuous on-

site physical construction or installation program has begun; or (b) The owner or operator has entered into contractual obligations, which cannot be canceled or modified without substantial loss, for physical construction of the site or installation of the tank system to be completed within a reasonable time.

Facility	means all contiguous land, and structures, other appurtenances, and improvements on the land used for recycling, reusing, reclaiming, transferring, storing, treating, or disposing of dangerous waste. Unless otherwise specified [in Chapter 173-303 WAC], the terms "facility," "treatment, storage, disposal facility," "TSD facility," "dangerous waste facility" or "waste management facility" shall be used interchangeably.
Generator	means any person, by site, whose act or process produces dangerous waste or whose act first causes a dangerous waste to become subject to regulation.
New Tank System or New Tank Component	means a tank system or component that will be used for the storage or treatment of dangerous waste and for which installation has commenced after February 3, 1989; except, however, for purposes of WAC 173-303-640(4)(g)(ii) and 173-303-400(3), a new tank system is one for which construction commences after February 3, 1989. (See also "existing tank system.")
On-site	means the same, geographically contiguous, or bordering property. Travel between two properties divided by a public right of way, and owned, operated, or controlled by the same person, shall be considered on-site travel if: (a) The travel crosses the right of way at a perpendicular intersection; or (b) the right of way is controlled by the property owner and is inacceessible to the public.
Permit	means an authorization which allows a person to perform dangerous waste transfer, storage, treatment, or disposal operations, and which typically will include specific conditions for such facility operations. Permits must be issued by one of the following: (a) The Department [of Ecology], pursuant to [Chapter 173-303 WAC]; (b) United States EPA, pursuant to 40 CFR Part 270; or (c) Another state authorized by EPA, pursuant to 40 CFR Part 271.
Permit-by-Rule	means a provision [of Chapter 173-303 WAC] stating that a facility or activity is deemed to have a dangerous waste permit if it meets the requirements of the provision.

Storage	means the holding of dangerous waste for a temporary period. "Accumulation" of dangerous waste, by the generator on the site of generation, is not storage as long as the generator complies with the applicable requirements of WAC 173-303-200 and 173-303-201.
Sump	means any pit or reservoir that meets the definition of tank and those troughs/trenches connected to it that serves to collect dangerous waste for transport to dangerous waste storage, treatment, or disposal facilities.
Tank	means a stationary device designed to contain an accumulation of dangerous waste, and which is constructed primarily of nonearthen materials to provide structural support.
Tank System	means a dangerous waste storage or treatment tank and its associated ancillary equipment and containment system.
Totally Enclosed Treatment System	means a facility for treating dangerous waste which is directly connnected to a production process and which prevents the release of dangerous waste or dangerous waste constituents into the environment during treatment.
Transportation	means the movement of dangerous waste by air, rail, highway, or water.
Transport Vehicle	means a motor vehicle or rail car used for the transportation of cargo by any mode. Each cargo-carrying body (trailer, railroad freight car, etc.) is a separate transport vehicle.
Treatment	means the physical, chemical, or biological processing of dangerous waste to make such wastes non-dangerous or less dangerous, safer for transport, amenable for energy or material resource recovery, amenable for storage, or reduced in volume.
Underground Tank	means a device meeting the definition of "tank" ... whose entire surface area is totally below the surface of and covered by the ground.

Unfit-for-Use Tank System means a tank system that has been determined through an integrity assessment or other inspection to be no longer capable of storing or treating dangerous waste without posing a threat of release of dangerous waste to the environment.

Wastewater Treatment Facility means a device which: (a) Is part of a wastewater treatment facility which is subject to regulation under either: (i) Section 402 or section 307(b) of the Federal Clean Water Act; or (ii) Chapter 90.48 RCW, State Water Pollution Control Act, provided that any dangerous waste treated at the facility is designated only by this chapter 173-303 WAC and is not regulated as hazardous waste under 40 CFR Part 261; and (b) Handles dangerous waste as defined in WAC 173-303-070 through 173-303-103 in either of the following manner: (i) Receives and treats or stores an influent dangerous wastewater; or (ii) Generates and accumulates or treats or stores a dangerous wastewater treatment sludge; and (c) Meets the definition of "tank" or "tank system."

Water or Rail (Bulk Shipment) means the bulk transportation of dangerous waste which is loaded or carried on board a vessel or railcar without containers or labels.

Other Terms

Generator Accumulation means the process whereby a generator of dangerous waste collects such waste in containers or tanks, on-site, for a period of not longer than 90 days and then ships it to a permitted or interim status facility, either on- or off-site. During the 90-day period, dangerous waste must be handled according to the requirements of WAC 173-303-200. As long as the wastes are removed to an interim status or permitted facility with 90 days, and the conditions of WAC 173-303-200 are satisfied, the generator is not required to have a storage facility permit.

The 90-day accumulation period begins when the dangerous waste is first generated, or when the aggregated quantity of dangerous waste being accumulated first exceeds the quantity exclusion limit for such waste(s). In areas that are at or near the point of dangerous waste generation where the waste inititally accumulate and that are under the control of the operator who controls the process generating the waste (satellite accumulation areas), the 90-day accumulation period begins on the date that the dangerous waste exceeds fifty-five gallons or one quart of acutely hazardous waste.

Final Status means a dangerous waste TSD facility's final status permit application has been submitted to and approved by EPA and the Department of Ecology. The final status permit application consists of a Part A and a Part B submittal. Part A contains general facility information and consists of a standard form; this is the same form initially submitted to qualify for interim status. Part B includes extensive technical information and detailed analysis of the facility seeking to be permitted. There is no standard form for the Part B; the owners and operators of the dangerous waste facility must submit all necessary information (WAC 173-303-806(3)) to demonstrate compliance with regulatory requirements.

Interim Status means a transitional period during which a TSD facility is allowed to operate under less stringent regulations until such time as a final status permit is approved. Only certain TSD facilities can qualify for interim status. These are non-RMW TSD facilities that were in existence, or for which construction had commenced, prior to November 19, 1980, and RMW TSD facilities in existence, or for which construction had commenced, prior to November 23, 1987. Interim status is gained by submitting Part A of the permit application as part of the notification process.

Owners and operators of TSD facilities that were not in existence, or for which construction had not commenced, prior to the interim status deadlines are not eligible for interim status. Owners and operators of new TSD facilities (including significant reconstruction of existing TSD facilities) must submit both Parts A and B of a permit application at least 180 days prior to the date construction (or reconstruction) is expected to commence.

Permit-by-Rule means that owners and operators of those facilities and activities that manage dangerous waste and are listed in WAC 173-303-802, are not required to submit an application for a dangerous waste TSD facility permit. Such facilities and activities are deemed to have a permit-by-rule, provided that certain regulatory requirements and conditions are met. The facilities explicitly listed are: Ocean disposal barges or vessels permitted under the Marine Protection, Research, and Sanctuaries Act; underground injection wells permitted under the Safe Drinking Water Act; publicly owned treatment works permitted under the Clean Water Act; and totally enclosed treatment facilities or elementary neturalization or wastewater treatment units. The permit-by-rule conditions for each of these facilities are specified in WAC 173-303-802.

Treatment by Generator	means on-site treatment of a dangerous waste, by the generator of such waste, in the generator's own accumulation containers or tanks. (See "accumulation" and "treatment" above.) The accumulation containers and tanks must comply with the provisions of WAC 173-303-200 and other referenced requirements. In addition, treatment by generator must be approved on a case-by-case basis by the Department of Ecology. Request for approval must be initiated by the generator in accordance with Ecology's Technical Information Memorandum No. 86-3.

Regulatory Requirements

Table J-1 presents pertinent regulatory requirements of Chapter 173-303 WAC and indicates the relevant sections for reference.

TABLE J-1
SUMMARY OF PERTINENT DANGEROUS WASTE REQUIREMENTS

Activity	Applicable Sections of WAC 173-303
Dangerous Waste Designation	-070
► EPA and State	-080 through -083 and -090
► State Only	-084 and -100 through -104
Generator Requirements	
► General	-170 through -230
► Accumulation	-200
- Tanks	-640 except 8(c)
- Containers	-630(2), (3), (4), (5), (6), (8), and (9) After 9/30/86, or case-by-case: -630(7)
TSD Facility Requirements	
► General	-280 through -420
► Interim Status	-805
- Tanks	-400(3)(iii) and 40 CFR Part 265 Subparts G & J
- Containers	-400(3)(ii) and 40 CFR Part 265 Subparts G & I

TABLE J-1 (Continued)
SUMMARY OF PERTINENT DANGEROUS WASTE REQUIREMENTS

Activity	Applicable Sections of WAC 173-303
► Final Status	-806
- Tanks	-600, -610, -640
- Containers	-600, -610, -630

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