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Department of Energy
Richland Operations Office
P.O. Box 550
Richland, Washington 99352

MAY 14 1997

97-SWT-147

Mr. Ron E. Skinnarland
State of Washington
Department of Ecology
200 Area Section
1315 West Fourth Avenue
Kennewick, Washington 99336

Dear Mr. Skinnarland:

DEMONSTRATION PER WAC 173-303-140(4)(b)(v)/40 CFR 265.314(g)

Transmitted herewith is a demonstration as required by the Dangerous Waste Regulations, Chapter 173-303-140(4)(b)(v)/40 CFR 265.314(g) demonstrating that disposal of liquid waste (less than 1 percent by volume) in the Low-Level Burial Grounds is the only reasonably available alternative for disposal and will not present a risk of contamination to any underground source of drinking water as defined in 40 CFR 144.3. The State of Washington, Department of Ecology was contacted by Rust Federal Services of Hanford Inc., concerning this subject, and per this discussion, a demonstration has been prepared and is enclosed with this letter.

If you have any questions regarding this demonstration, please contact Rudy Guercia, of RL, on (509) 376-5494 or Robert Giroir, of RFSH, on (509) 373-4617.

Sincerely,

TK Teynor

Thomas K. Teynor, Director
Waste Programs Division

WPD:KDB

Attachment

cc w/attach:
EDMC, H6-08
J. B. Buckley, Jr., RFSH
R. H. Engelmann, RFSH
R. J. Giroir, RFSH
K. M. McDonald, RFSH
A. G. Miskho, FDH
S. M. Price, FDH
J. A. Winterhalder, RFSH

cc w/o attach:
L. J. Cusack, Ecology
N. T. Hepner, Ecology
M. N. Jaraysi, Ecology
A. G. Miskho, FDH
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G. C. Triner, RFSH

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EDMC

ENCLOSURE

DEMONSTRATION PER WAC 173-303-140(4)(b)(v)/40 CFR 265.314(g)

Consisting of 5 pages,
including cover page

DEMONSTRATION PER WAC 173-303-140(4)(b)(v)/40 CFR 265.314(g)

BACKGROUND:

The U.S. Department of Energy, Richland Operations Office (RL) has operated the Low-Level Burial Grounds (LLBG) under the requirement that waste will contain no free liquids. However, recent verification activities have identified certain waste packages that contain very small amounts of free liquids causing the waste to be rejected even though there is no potential for the liquids to impact the environment. This liquid is usually the result of condensation on the many layers of plastic in which the waste is packaged. This is sometimes required to prevent the spread of radiological contamination. In addition, small vials and jars are placed into containers but are not opened and absorbed because of radiological concerns. These containers are usually empty containers with small amounts of free liquids, condensate, and packaging of many layers of plastic that prevent the absorption of liquids (e.g., life sciences wastes). However, there is more than ample absorbent present (e.g., placed between the outermost liner and the container, surrounding vials, jars, etc.,) that these liquids will be absorbed before reaching the environment.

INTRODUCTION:

There have been many separate agreements concerning the disposal of small amounts of free liquid in the LLBG; however, no documented demonstration could be identified that fulfills the requirements identified in the Dangerous Waste Regulations, Chapter 173-303-140(4)(b)(v) Washington Administrative Code (WAC) and 40 Code of Federal Regulations (CFR) 265.314(g).

In this regulatory position paper (hereafter referred to as "demonstration report"), RL will fulfill the regulatory demonstration requirement found in WAC 173-303-140(4)(b)(v) and 40 CFR 265.314(g). This demonstration report provides a comprehensive discussion concerning the disposal of waste that contains a small quantity (less than 1 percent by volume) of free liquids in the LLBG. The LLBG are an interim status unit and are operating under an approved Dangerous Waste Part A Permit Application.

Disposal of all waste (both low-level and mixed) is, and will continue to be, conducted in accordance with DOE Order 5820.2A, *Radioactive Waste Management*, and all applicable federal and state requirements. All waste destined for disposal in the LLBG is required to be packaged per the *Hanford Site Solid Waste Acceptance Criteria* (HSSWAC), WHC-EP-0063, as amended. With regards to free liquids, the HSSWAC requires waste that contains free liquids to be provided with twice the amount of absorbent required as necessary to absorb any potential free liquids.

REGULATORY CRITERIA:

Per DOE Order 5820.2A, low-level waste must meet the following requirements before disposal in order to protect groundwater resources:

> "Liquid waste, or waste containing free liquid, must be converted into a form that contains as little freestanding and

noncorrosive liquid as is reasonably achievable, but, in no case, shall the liquid exceed
1 percent of the volume of the waste when the waste is in a disposal container, or 0.5 percent of the volume of the waste processed to a stable form."

In conjunction with DOE Order 5820.2A, HSSWAC identifies the following additional requirement for free liquids:

> "Liquid waste can result in migration of radionuclides to the soil column. For this reason free liquids must be restricted as much as possible. Sorbents can be used as long as they will not release the liquid when subjected to the conditions found within the burial trenches. The quantity of sorbent material shall be sufficient enough to sorb at least twice the volume of the liquid potentially present. This is fashioned after a Department of Transportation requirement and is meant to provide an extra degree of safety."

The LLBG are managed in accordance with applicable federal and state regulations. Therefore, the LLBG must comply with WAC 173-303-140(4)(b)(v), which reads as follows:

> "Effective November 8, 1985, the placement of any liquid which is not a hazardous waste in a landfill is prohibited unless the owner or operator of such landfill demonstrates to the department, or the department determines, that:
>
> (A) The only reasonably available alternative to the placement in such landfill is placement in a landfill or unlined surface impoundment, whether or not permitted or operating under interim status, which contains, or may reasonably be anticipated to contain, hazardous waste; and
>
> (B) Placement in such owner or operator's landfill will not present a risk of contamination of any underground source of drinking water (as that term is defined in 40 CFR 265.144.3)."

DEMONSTRATION:

In accordance with the above regulatory requirements, RL is providing the following information to support this demonstration.

A. **No reasonable available alternative for placement of low-level waste containing free liquids:**

- The LLBG is the only available option for placement of low-level waste containing small amounts of nonhazardous free liquids (less than 1 percent of the waste by volume in a disposal container). This waste contains such a small amount of liquid that it is impractical to capture and place in a surface impoundment. In many cases, the waste has been absorbed, but due to heating and cooling cycles, condensation forms on the many layers of packaging.

Radiological concerns (ALARA) far outweigh the benefits (in personnel exposure) of trying to absorb this small volume.

B. No impact to drinking water:

- The LLBG has an aggressive groundwater monitoring program in place. This groundwater monitoring program consists of Low-Level Waste Management Areas (LLWMA) 1 through 5 and 84 groundwater monitoring wells. To date, there have been no known releases (radiological or mixed) from the LLBG.

- The LLBG are located in an arid climate with an annual precipitation rate of approximately 51.24 centimeters (6 inches). Most water discharges to cribs, ditches, and ponds on the Hanford Facility have been eliminated. As a result, groundwater elevations are returning to their "pre-Hanford" levels. Currently, groundwater elevation in the 200 West Area, where six burial grounds are located, is approximately 88.4 meters (290 feet) and is continuing to increase in depth. The 200 East Area groundwater elevation, where the two remaining burial grounds are located, is approximately 61 meters (200 feet) and is continuing to increase in depth.

- Based upon the packaging requirements identified in the HSSWAC and DOE order 5820.2A, the liquid will not present a risk of contamination to the groundwater since the liquid would be completely absorbed prior to coming in contact with the environment. In addition, the verification process will ensure that the waste has been packaged per the established acceptance criteria.

- During the last revision of WAC 173-303, Ecology received several comments from various interest groups on the removal of the carcinogen state-only dangerous waste numbers WC01/WC02. These comments were specifically addressed toward the Hanford Facility. In the "*Responsiveness Summary, Amendments to the Dangerous Waste Regulations, Chapter 173-303 WAC,*" October 1995, AO #94-30, Publication #95-423, Ecology responded to public comments with the following statements:

  Page 83: "The following information addresses groundwater contamination at the LLBG: Contamination at the LLBG has occurred at three of the low-level waste management areas (LLWMAs). Data indicates that this contamination stems from previous discharges at upgradient facilities (outside of the LLBG). <u>There is no data that suggests that the present practices at the LLBG have contributed to this contamination.</u> A summary of the groundwater contamination at the 5 LLWMAs in the LLBG is as follows...."

  Page 84: "In summary, a review of the hydrostratigraphy, infiltration rates, waste stream descriptions, current and

future disposal practices and groundwater monitoring history indicates the following:

(1) The groundwater monitoring history of the LLBGs area indicates that the present groundwater contamination in the Central Plateau of the Hanford Site is a function of the past practices (both intentional and unintentional) of discharging to the soil column through trenches and cribs large volumes of process wastewater associated with the various plant facilities on the Central Plateau. The monitoring programs directly associated with the various LLWMAs indicate that the LLBG has not impacted groundwater.

(2) Based on the present waste practices at the LLBG, i.e., the limited liquid disposal, the non-leaching nature of the waste, the waste packaging procedures, and coupling this with the infiltration rates of the soil in the LLBG, there is not a likely potential for the formation of leachate. Therefore, there is no likely impact to the groundwater from present practices at the LLBG. The proposed rule changes will affect disposal practices of small quantities of DOP contaminated filters at the LLBG. There is no likely impact to groundwater from these final rule changes."

SUMMATION:

Based upon the many layers of containment present within each waste package, at least twice the amount of absorbent in each package, and very small quantities of liquids present as compared to those studied by PNNL, and Ecology's previous concurrence on LLBG waste management operations as a result of the last revision to WAC 173-303, RL has clearly demonstrated that the disposal of properly packaged waste that contains small amounts of free liquids will not present a risk of contamination of any underground source of drinking water.