



Department of Energy

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93-DSB-023

MAY 28 1993

Mr. George C. Hofer  
Hanford Project Manager  
U.S. Environmental Protection Agency  
Region 10  
1200 Sixth Avenue  
Seattle, Washington 98101



Mr. Roger Stanley, Director  
Tri-Party Agreement Implementation  
State of Washington  
Department of Ecology  
P.O. Box 47600  
Olympia, Washington 99504-7600

Dear Messrs. Hofer and Stanley:

TRANSMITTAL OF THE GROUT TREATMENT FACILITY LAND DISPOSAL RESTRICTION (LDR) COMPLIANCE WHITE PAPER

Transmitted herewith is the subject white paper. This white paper was developed to address questions raised by Mr. Paul T. Day of the U. S. Environmental Protection Agency (EPA) regarding the manner in which the Grout Disposal Program is addressing Land Disposal Restrictions.

The white paper concludes that the Grout Disposal Program has sufficient analytical capabilities available and that disposal of anticipated wastes by grouting is appropriate under LDR. This document also provides a brief outline of how compliance with LDR requirements will be achieved and the administrative options available to ensure compliance. It is requested that the EPA provide formal concurrence on the Grout Treatment Facility's methods for maintaining LDR compliance described within the white paper.

If you have any questions regarding this transmittal, please contact Rudy Carreon of Tank Waste Division on (509) 376-9461.

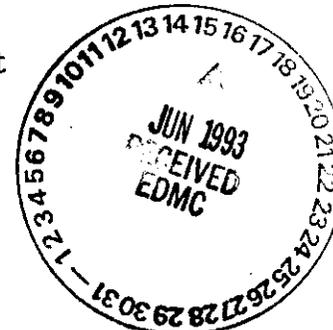
Sincerely,

*John H. Wisness*  
Steven H. Wisness  
Hanford Project Manager

TWF:RC

Attachment  
cc w/att:  
B. A. Austin, WHC

cc w/o att:  
D. Duncan, EPA  
R. Cordts, Ecology  
R. J. Murkowski, WHC



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# **WHITE PAPER**

**GROUT LAND DISPOSAL RESTRICTION COMPLIANCE**

EXECUTIVE SUMMARY

This document has been prepared upon request from the United States Department of Energy-Richland Field Office (RL) to address questions raised by the United States Environmental Protection Agency (EPA) regarding the manner in which the Grout Disposal Program is addressing Land Disposal Restrictions (LDR). The document contains sections discussing estimated quantitation limits, waste feed acceptance criteria, and applicability of LDR treatment standards. It is concluded that the Grout program has sufficient analytical capabilities available, and that disposal of anticipated wastes by grouting is appropriate under LDR. This document describes how compliance with LDR requirements will be addressed, and administrative options available to assure compliance.

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## 1.0 PURPOSE:

This document will describe and assess the Grout Treatment Facility's plans and capability to comply with those regulations promulgated pursuant to the Resource Conservation and Recovery Act (RCRA), §3004(d) "Prohibitions on Land Disposal of Specified Wastes," §3004(e) "Solvents and Dioxins," and §3004(m) "Treatment Standards for Waste Subject to Land Disposal," codified in Title 40 of the Code of Federal Regulations (CFR), Part 268, as "Land Disposal Restrictions" (LDR).

## 2.0 SCOPE:

This paper is intended to provide an overview of Grout Facility compliance with LDR requirements. Pertinent references are attached for details. Most of the material contained herein has already been transmitted or presented to members of the Environmental Protection Agency (EPA) and Washington Department of Ecology (Ecology). This paper will review this information, summarize the key points, and reexamine the areas with greatest sensitivity.

## 3.0 TREATMENT STANDARDS:

The Grout facility will manage wastes from the onsite generating units, double-shell tanks (DSTs). Operation of the Grout facility will also result in the generation of hazardous wastes, including leachate and miscellaneous debris from discarded equipment. This section will discuss the requirements under the Land Disposal Restriction Program contained in 40 CFR Part 268 applicable to these activities.

### 3.1 LDR Waste Acceptance Requirements:

LDR specifies requirements for the acceptance of wastes at onsite treatment and disposal units. LDR requires that hazardous waste constituents be properly treated and meet the prescribed treatment standards found in 40 CFR §268 Subpart D prior to land disposal.

For grout feeds, applicable waste codes for which treatment standards apply include both organic and inorganic chemical constituents (contained in Table A). Organic constituents must be below LDR treatment standards in order for the waste feed to be acceptable for grouting. EPA requires that organic constituents, such as those in Table A, that are above the treatment standard must be treated through an extraction and/or destruction technology. An immobilization technology, such as grout, would be a form of impermissible dilution [40 CFR §268.3]. Therefore, LDR regulated organic constituents must be below the concentration based treatment standard in order to be accepted for grout treatment. Generator verification of organic constituent concentrations in the waste feed will be required prior to grouting. Such verification can include testing of the waste or knowledge of the waste in lieu of testing (40 CFR §268.7(a)). An evaluation of Grout's capacity to verify organic concentrations in grout feed is given in Section 6.0.

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Treatment standards for organic waste codes are expressed in terms of dependence upon whether the waste is defined as a wastewater or a non-wastewater (40 CFR §268.2, 55 FR 22537, and 51 FR 40612). Grout candidate tank 241-AN-106 (106-AN) has been designated as a nonwastewater for F001-F005 constituents. EPA concurred with this designation in a letter to DOE dated April 4, 1991. The criteria for wastewater/nonwastewater determinations are evaluated for each candidate waste, as it remains possible that specific candidate wastes may vary between wastewater and nonwastewater depending on relative dilution and other factors.

Hazardous metal constituents in grout feeds can be properly treated through immobilization technologies such as grouting. Therefore, acceptance of waste feed into the grout treatment unit is not based purely on whether these metals are in concentrations above or below the treatment standard. Rather, it is based on the metal components of the waste feed's ability to effectively bind with the grout dry material formulation and result in leachate concentrations (using the Toxicity Characteristic Leaching Procedure) below the LDR treatment standard in the grouted waste. A discussion of the bounding criteria for acceptance of metal constituents into the grout treatment unit is given in Section 5.0.

Waste feeds will also be accepted into the grout treatment facility that exhibit the characteristic of corrosivity. The treatment standard for this characteristic is a specified technology - Deactivation, (Table A). Deactivation is described as any technology that "removes the hazardous characteristic of a waste" (40 CFR §268.42 Table 1). Grouting will effectively remove the corrosivity definition from the untreated waste. As with metal constituents, there are no regulatory constraints for acceptance of wastes exhibiting a corrosive characteristic into the grout treatment unit.

Should a waste feed become a candidate for grouting that does not meet LDR organic treatment standards and cannot be treated through reasonable or available means, a variance from the treatment standard may be required. If this need occurs, the Grout Program will comply with requirements pursuant to 40 CFR §268.44. The process by which candidate wastes are evaluated for LDR compliance, and the administrative responses that will be taken, are detailed in Figure 1, which has been taken from the *Grout Land Disposal Restriction Management Plan* [attachment 1].

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TABLE A. APPLICABLE TREATMENT STANDARDS FOR GROUT FEED COMPLIANCE<sup>1</sup>

WASTE CODE	CONSTITUENT/CHARACTERISTIC	TREATMENT STANDARD <sup>2</sup>	
		WASTEWATER(mg/L) <sup>3</sup>	NONWASTEWATER(mg/kg) <sup>3</sup>
D002	CORROSIVITY/ALKALINE SUBCAT		DEACTIVATION <sup>4</sup>
D004	ARSENIC	5.0	5.0
D006	CADMIUM	1.0	1.0
D007	CHROMIUM	5.0	5.0
D008	LEAD	5.0	5.0
D011	SILVER	5.0	5.0
F001	METHYLENE CHLORIDE	0.089	33
F001	1,1,1 TRICHLOROETHANE	0.054	5.6
F003	ACETONE	0.28	160
F003	METHYL ISOBUTYL KETONE	0.14	33
F003	n-BUTYL ALCOHOL	5.6	2.6
F005	METHYL ETHYL KETONE	0.28	36

<sup>1</sup> Constituents and characteristics shown are those that are currently identified in double-shell tanks and are destined for the grout treatment facility.

<sup>2</sup> From 57 FR 37194 and 40 CFR §268 Subpart D

<sup>3</sup> Grout waste feed organic constituents (F001-F005) may be defined under either the wastewater or nonwastewater treatability groups (40 CFR §268.2(d)) depending upon whether they originate from a dilute or concentrated tank, respectively. Grout waste feed non-organic constituents, D-listed organics, and the corrosivity characteristic treatability groups are defined as wastewaters (40 CFR §268.2(f)).

<sup>4</sup> Deactivation is a technology-based treatment standard defined as any treatment to remove the characteristic of corrosivity (2.0 < pH < 12.5).

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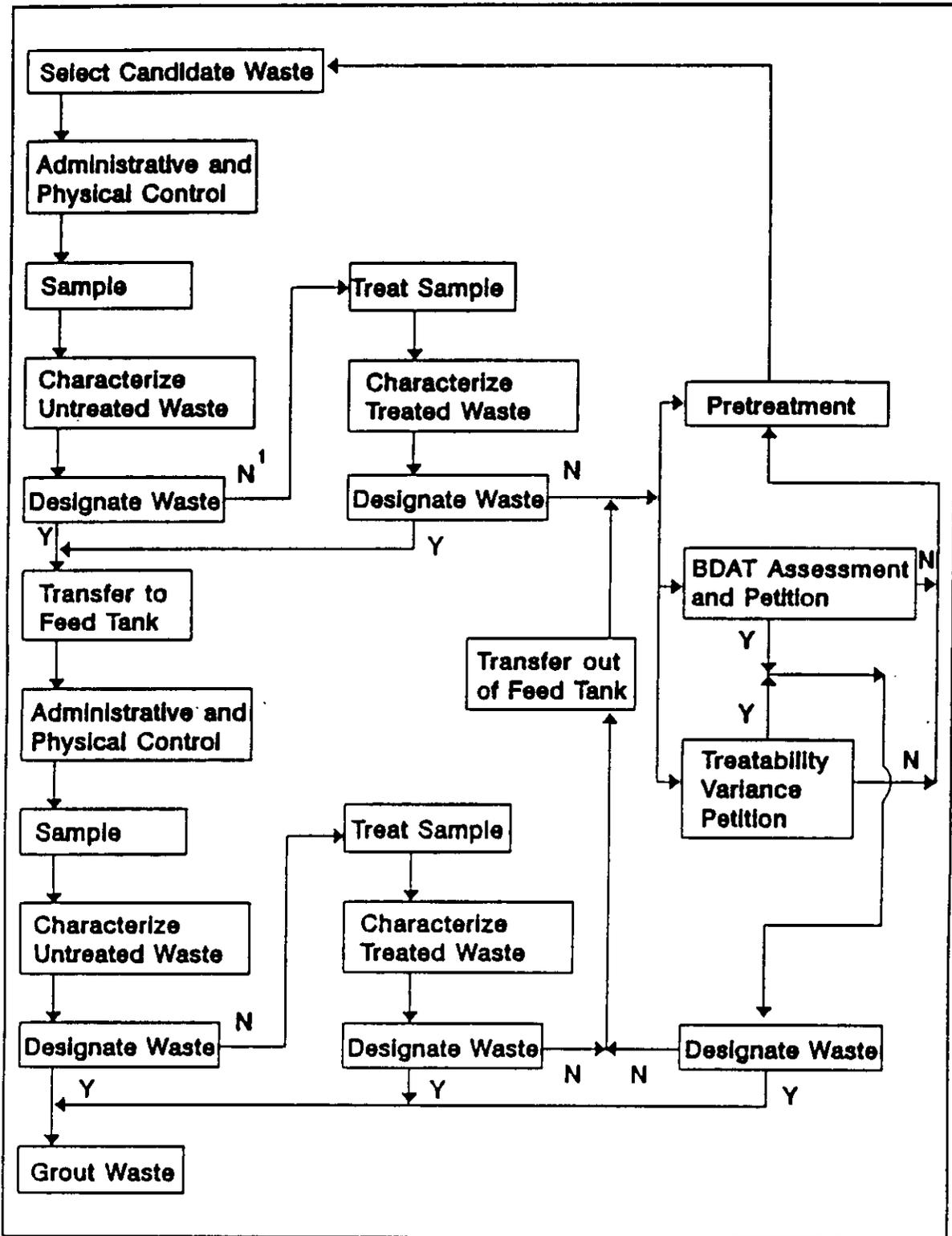


Figure 1: Grout LDR Management Action Flowchart

<sup>1</sup> Flowchart Directions: Designation "Y" for LDR compliance. Designation "N" for LDR noncompliance. Petitions "Y" for approved, "N" for not approved.

### 3.2 LDR Requirements for Grout Treatment and Disposal Units:

Operators of the grout treatment and disposal units are required to test treated wastes according to the frequency specified in the waste analysis plan (40 CFR §§268.7[b][1],[2], and [3] and 268.7[c][2]). Treated wastes will normally be defined as nonwastewaters and must be verified to meet treatment standards for all waste codes identified in the grout feed (Table A) prior to disposal.

### 3.3 LDR Requirements for Hazardous Wastes Generated During Grout Operations:

Upon generation of a waste, operators of the Grout facility will be required to determine whether the waste is restricted from land disposal. Generators can do this through testing or knowledge of the waste (40 CFR §268.7[a]). The assumption is that these wastes will be treated onsite. As such, no notifications or certifications will be required. However, all supporting waste analysis information must be retained onsite in the generator's files for at least five years from the date that the waste was sent to onsite treatment, storage, or disposal (40 CFR §268.7[a][7]). The primary sources of generated waste are expected to be decontamination fluids, vault leachate, and miscellaneous contaminated debris.

### 4.0 CANDIDATE WASTE CHARACTERIZATION DATA:

Preliminary sampling of two candidate tanks indicates that regulated constituent concentrations will be below treatment standards. Table B contains a summary of these initial results, extracted from *Tank 241-AN-106 Characterization Results* [attachment 2] and *Tank 241-AW-101 Characterization Results* [attachment 3].

TABLE B. INITIAL TANK CHARACTERIZATION RESULTS

CODE	ANALYTE	106-AN	101-AW	TREATMENT
		CONCENTRATION	CONCENTRATION	STANDARD <sup>1</sup>
		mg/L	mg/L	mg/kg
F001	methylene chloride	none detected	none detected	33
F001	1,1,1-trichloroethane	none detected	none detected	5.6
F003	acetone	0.074	none detected	160
F003	methyl isobutyl ketone	none detected	none detected	33
F003	n-butyl alcohol	n/a <sup>2</sup>	n/a	2.6
F005	methyl ethyl ketone	0.075	none detected	36

<sup>1</sup> Tanks 106-AN and 101-AW are evaluated as nonwastewaters

<sup>2</sup> not analyzed for

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The sampling and testing which produced these results was not conducted to confirm or deny LDR compliance, and as such these values have not been generated utilizing compulsory quality assurance measures. These characterizations were performed for general waste feed acceptance evaluations, including radiolytical analyses, grout formulation development, and preliminary waste designation and LDR compliance evaluations. Candidate tanks are also sampled to provide data for wastewaters/nonwastewaters designations.

Wastes are again sampled and a full characterization is performed subsequent to transfer to the waste feed tanks to provide assurance that wastes to be grouted are within waste feed acceptance criteria and are in compliance with LDR regulations.

#### 5.0 WASTE FEED ACCEPTANCE CRITERIA:

Limits for maximum allowable feed concentrations of toxicity characteristic metals, organics, and many other non-LDR regulated constituents and characteristics are tabulated and discussed in WHC-SD-WM-RD-019, Rev. 1 *Grout Treatment Facility Waste Feed Acceptance Criteria* [attachment 4]. Table B is a summary from that document of the feed concentration versus Toxicity Characteristic Leaching Procedure (TCLP) or Extraction Procedure Toxicity (EPTOX) results for the anticipated metal constituents from three previously studied actual grout formulations. Waste feed acceptance criteria for LDR regulated organics are derived from the concentration based treatment standards discussed in the previous section of this document.

Acceptance criteria that have been established for LDR metals were based upon linear extrapolation of waste concentration and performance under EPTOX and TCLP conditions as demonstrated in the following equation for chromium. This assumption is considered to be conservative because the leachate concentration of individual metal species are expected to be governed by solubility limits at a given pH rather than by initial inventory.

$$\frac{1260 \text{ (Table C for DSSF)}}{0.3 \text{ (Table C for DSSF)}} * 5 \text{ (Table A reg. limit)} = 21000 \text{ mg/L}$$

The acceptance criteria which have been developed are intended as guidelines. As each tank is analyzed and a new formulation is developed, leach resistance performance is reevaluated, as is shown in Figure 1. Metal leach resistance, however, is expected to be equal to or better than that required under LDR for all candidate wastes and formulations.

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TABLE C. METAL STABILIZATION DATA (all values in mg/L)

ANALYTE	PSW (FEED)	PSW (TCLP)	106-AN (FEED)	106-AN (EPTOX)	DSSF SIMULANT (FEED)	DSSF SIMULANT (EPTOX)	ACCEPTANCE CRITERIA
ARSENIC	<0.08	<0.5	n/a	<0.25	0.03	<1.0	0.15
CADMIUM	<0.004	<0.008	n/a	<0.01	8.0	<0.1	80
CHROMIUM	3.5	0.04	662	0.07	1260	0.1 - 0.3	21000
LEAD	<0.06	<0.12	n/a	<0.10	2.5	<0.1	12.5
SILVER	n/a	<0.5	n/a	<0.01	162	0.06 - 0.16	5063

## 6.0 SAMPLE ANALYSIS AND QUANTITATION LIMITS:

In the March 1991 Grout Treatment Facility Unit Managers Meeting (UMM), a presentation was given [attachment 5] to clarify questions raised in the January UMM concerning practical quantitation limits (PQLs) and contract required quantitation limits (CRQLs). It is anticipated that the laboratory will be able to quantify to the CRQLs presented.

Listed below are the organic compounds that have been called out specifically for LDR compliance analysis, and the expected analytical quantitation limits.

CODE	ANALYTE	EQL	MOST STRINGENT REQUIREMENT <sup>3</sup>
F001	Methylene chloride	0.05 mg/L	0.089 mg/L
F001	1,1,1-Trichloroethane	0.05 mg/L	0.054 mg/L
F003	n-Butyl alcohol	0.05 mg/L *	2.6 mg/kg
F003	Methyl isobutyl ketone	0.05 mg/L	0.14 mg/L
F003	Acetone	0.05 mg/L	0.28 mg/L
F005	Methyl ethyl ketone	0.05 mg/L	0.28 mg/L

\* n-Butyl alcohol has NOT been evaluated for detection limits or linearity

The estimated quantitation limit (EQL) is based on an instrument quantitation limit of 0.01 mg/L and a dilution of 1:5. Note that the EQLs for these analytes exceed neither the CRQLs nor the most stringent regulatory limits.

Dilutions are anticipated for two reasons. The radiological dose rate may require smaller sample sizes to be used. Past experience has also shown that the samples, when purged with an inert gas, generate a lot of foam. The foam must not escape the purge vessel, or extended instrument downtime will occur.

<sup>3</sup>From 57 Federal Register 37194

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n-Butyl alcohol is not a target compound in either SW-846 or Contract Lab Program (CLP) protocols and will need to be evaluated for quantitation limits and linearity before samples can be analyzed. It is expected that it will have comparable values to acetone. It should be noted that the method to be used consists of purging an inert gas through the sample and entraining the organic compounds in the gas. The compounds are then trapped on an organic cartridge, which is then analyzed. Organic compounds that are polar and very soluble in water, such as the ketones and alcohol, do not purge very well. However, a better method does not exist at this time.

## 7.0 CONCLUSIONS:

It is anticipated that Grout feed wastes may be designated as F001, F003, F005 (organic solvents), D004, D006, D007, D008, and D011 (toxicity characteristic metals), and D002 (corrosivity). The Grout Program is capable of quantifying these constituents to an adequate level and appropriately treating all known and expected LDR regulated wastes in the Hanford double shell tanks, as long as LDR organic concentrations are below treatment standards. Waste feed acceptance criteria for LDR organics have been set equal to the treatment standard. If LDR organics are present at levels above treatment standards, Grout will not process the waste without further organic treatment (through evaporation and chemical oxidation or through pretreatment by thermal destruction) to levels below the treatment standard or unless a treatability variance is granted. Acceptance criteria have tentatively been set for toxicity characteristic metals based on leachability testing of actual Grout formulations, and double shell tank concentrations of these constituents are expected to be below these criteria. Requirements have been established to verify compliance with these criteria. Grout is an acceptable technology for corrosivity. Grout will comply fully with all Land Disposal Restrictions applicable on the Hanford site, including requirements for notification, certification, characterization, treatment standards, and generation.

## 8.0 SUMMARY:

Grout LDR compliance must be demonstrated on a campaign by campaign basis. At this time, it is impossible to predict waste feed composition for all potential Grout candidates, although sampling has been done to develop safe and proper laboratory procedures, to gain an appreciation of the waste character and variability, and to preliminarily designate and characterize the first few candidate wastes.

Candidate wastes are sampled prior to being transferred to the Grout waste feed tank to determine character and acceptability for disposal. Preliminary LDR compliance is one of the evaluations performed at this time. Once a waste has been transferred to the feed tank, it is sampled and tested again to assure all criteria (including LDR) are met. Figure 1. represents the flow of events for LDR compliance assurance.

Waste acceptance criteria have been established which restrict waste components or characteristics. Some of the organic species within the waste

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feed are subject to the acceptance criteria due to LDR. If at any time a candidate waste is identified which is found to be LDR prohibited for organics, it is to be either rerouted for pretreatment or a subject to a treatability variance application prepared in accordance with 40 CFR §268.44. A variance will only be sought if it can be shown that the candidate waste differs significantly from wastes analyzed in developing the treatment standard and that Grout is a more appropriate technology for that particular waste.

Waste feed acceptance criteria for the LDR regulated metal species have been developed from leachability testing of simulated and actual wastes using representative grout formulations. If there is evidence the grouted waste extract concentration will exceed D004 - D011 treatment standards, the waste will undergo additional treatment testing to develop an acceptable disposal form. If these efforts are unsuccessful, the waste will be pretreated or a treatability variance will be sought as above. Section 5.0 summarizes and discusses leachability results obtained with Grout simulants and actual candidate wastes.

In addition to inorganic, radiological, and other analyses, volatile and semi-volatile organic constituents will be analyzed in conjunction with a reference library containing at a minimum all current and future LDR regulated organic species anticipated in DST wastes. Predicted analytical quantitation limits for the identified organic and inorganic LDR constituents are acceptably below the regulatory limits. The alkaline nature of the waste and potentially high radiological dose rates may necessitate sample dilutions prior to analysis. Quantitation will be most difficult when dilution is necessary and the waste has been designated a wastewater, although estimated quantitation limits are still below applicable treatment standards for this case. Furthermore, most wastes to be processed are anticipated to be nonwastewaters.

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REFERENCES

- 1) *Title 40 of Code of Federal Regulations*, Part 268, "Land Disposal Restrictions."
- 2) *51 Federal Register 40612*, "Hazardous Waste Management System; Land Disposal Restrictions," dated November 7, 1986.
- 3) WHC-SD-CP-TP-065, Revision 0, "Tank 241-AN-106 Characterization Results," dated March 8, 1991.
- 4) WHC-SD-WM-PLN-005, Revision 1, "Grout Land Disposal Restriction Management Plan," dated April 17, 1991.
- 5) WHC-SD-WM-TRP-005, Revision 0, "Tank 241-AW-101 Characterization Results," dated December 19, 1991.
- 6) *57 Federal Register 37194*, "Land Disposal Restrictions for Newly Listed Wastes and Hazardous Debris," dated August 18, 1992.
- 7) WHC-SD-WM-RD-019, Revision 1, "Grout Treatment Facility Waste Feed Acceptance Criteria," dated October 18, 1991.
- 8) *55 Federal Register 22537 et seq.*, "Land Disposal Restrictions for Third Third Scheduled Wastes; Rule," dated June 1, 1990.

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**ATTACHMENT 2**

**Total pages - 167**

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**ATTACHMENT 3**

**Total pages - 141**

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**ATTACHMENT 4**

**Total pages - 68**

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**ATTACHMENT 5**

**Total pages - 10**

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**Action Item 1-29-91:1**

**J. A. Voogd  
Westinghouse Hanford Company  
Richland, Washington**

**Grout Treatment Facility Unit Managers' Meeting  
March 1991**

**Action Item 1-29-91:1**

**WHC and DOE will provide greater detail on the practical quantitation limits and the relationship with the contract laboratory procedures by the next Unit Managers Meeting.**

**Basis**

**On January 29, 1991, Westinghouse provided results from organic chemical analyses conducted upon wastes withdrawn from Tank 241-AN-106. These wastes are planned to constitute the waste feed to the first Grout Treatment Facility mixed waste disposal action.**

**Discussion developed surrounding the effect of laboratory dilution of sample extracts for volatile organic analyses. In particular, a contrast between published quantitation limit values and values applied in these results were questioned.**

## What is a PQL?

A "Practical Quantitation Limit (PQL) is the lowest level that can be reliably achieved within specified limits of precision and accuracy during routine laboratory operating conditions."<sup>1</sup>

## How is a PQL applied?

PQLs are applied specific to the method of analysis. Method 8240 of SW-846 "Gas Chromatography/Mass Spectrometry for Volatile Organics" states:

1.3 The practical quantitation limit (PQL) of Method 8240 for an individual compound is approximately 5  $\mu\text{g}/\text{kg}$  (wet weight) for soil/sediment samples, 0.5  $\text{mg}/\text{kg}$  (wet weight) for wastes, and 5  $\mu\text{g}/\text{L}$  for ground water (see Table 2). PQLs will be proportionately higher for sample extracts and samples that require dilution or reduced sample size to avoid saturation of the detector.

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<sup>1</sup> SW-846, Test Methods for Evaluating Solid Waste Physical/Chemical Methods, Third Edition, Revision 1, December 1987 (p. ONE - 9).

## What is the value of a PQL?

Table 2 of SW-846, Method 8240, lists groundwater and low soil/sediment PQL values for 35 organic constituents, e.g.:

**TABLE 2. PRACTICAL QUANTITATION LIMITS (PQL) FOR VOLATILE ORGANICS<sup>a</sup>**

		CAS Number	Practical Quantitation Limit <sup>b</sup>	
			Ground Water	Low Soil/Sediment
			$\mu\text{g/L}$	$\mu\text{g/Kg}$
1.	Chloromethane	74-87-3	10	10
5.	Methylene Chloride	75-09-2	5	5
6.	Acetone	67-64-1	100	100
13.	2-Butanone	78-93-3	100	100
14.	1,1,1-Trichloroethane	71-55-6	5	5

<sup>a</sup> Sample PQLs are highly matrix dependant. The PQLs listed herein are provided for guidance and may not always be achievable. See the following information for further guidance on matrix-dependant PQLs.

<sup>b</sup> PQLs listed for soil/sediment are based on wet weight. Normally data is reported on a dry weight basis; therefore, PQLs will be higher based on the % moisture in each sample."

## How is a PQL increased for other matrices?

For samples which are not ground water, the PQL for a constituent is multiplied by a specified factor for that other sample type. This is due to the increasing interference and complexity of other components in the sample which change the accuracy and precision (the basis of a PQL) of measurement.

From SW-846, Method 8240:

<u>Other Matrices:</u>	<u>Factor</u> <sup>1</sup>
Water miscible liquid waste	50
High-level soil & sludges	125
Non-water miscible waste	500

<sup>1</sup> PQL = [PQL for groundwater (Table 2)] X [Factor]. For non-aqueous samples, the factor is on a wet-weight basis.

**What is a CRQL and how does it compare to a PQL?**

**A Contract Required Quantitation Limit (CRQL) is effectively a negotiated PQL between a client and the laboratory based upon the achievable limit of measurement for that laboratory. They are thereafter treated as "laboratory specific PQLs"**

**The CRQLs between Westinghouse Hanford Company and Battelle Pacific Northwest Laboratories for SW-846 Method 8240 analysis are generally at or near the PQLs of SW-846.**

**Are the CRQLs used in these analyses any better or more representative than the PQLs?**

**YES. Although PQLs are multiplied up to 500 times for different matrices CRQLs are only multiplied by dilution factors - in this case, five.**

**As an example, the corrected PQL for acetone is 5,000  $\mu\text{g/L}$ , while the corrected CRQL for acetone is 50  $\mu\text{g/L}$ .**

## SUMMARY

- **The quantitation limits applied to these analyses were considerably lower than PQLs for water miscible liquid waste and our analyses more stringent than that required by SW-846.**

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Laboratory Quantitation Limit Comparisons For Analysis of 241-AN-106 Organic Analytes <sup>1</sup>						
Volatile Analyte	PQL Groundwater Analysis (SW-846)	CRQL <sup>2</sup> Water Analysis	PQL Water Miscible Waste	CRQL Diluted Waste Analysis <sup>3</sup>	Reported Value	Hit <sup>4</sup>
Chloromethane	10	10	500	50	50	U <sup>5</sup>
Bromomethane	10	10	500	50	50	U
Vinyl Chloride	10	10	500	50	50	U
Chloroethane	10	10	500	50	50	U
Methylene Chloride	5	10	250	50	5	U
Acetone	100	10	5,000	50	74	X
Carbon Disulfide	5	10	250	50	25	U
1,1-Dichloroethene	5	10	250	50	11	J
1,1-Dichloroethane	5	10	250	50	25	U
trans-1,2-Dichloroethene	5	* <sup>6</sup>	250	*	25	U
Chloroform	5	10	250	50	25	U
1,2-Dichloroethane	5	10	250	50	25	U
2-Butanone	100	10	5,000	50	75	X
1,1,1-Trichloroethane	5	10	250	50	5	U
Carbon Tetrachloride	5	10	250	50	25	U
Vinyl Acetate	50	*	2,500	*	50	U
Bromodichloromethane	5	10	250	50	25	U

Laboratory Quantitation Limit Comparisons For Analysis of 241-AN-106 Organic Analytes <sup>1</sup>						
Volatile Analyte	PQL Groundwater Analysis (SW-846)	CRQL <sup>2</sup> Water Analysis	PQL Water Miscible Waste	CRQL Diluted Waste Analysis <sup>3</sup>	Reported Value	Hit <sup>4</sup>
1,1,2,2-Tetrachloroethane	5	10	250	50	25	U
1,2-Dichloropropane	5	10	250	50	25	U
trans-1,3-Dichloropropene	5	10	250	50	25	U
Benzene	5	10	250	50	5	U
cis-1,3-Dichloropropene	5	10	250	50	25	U
Bromoform	5	10	250	50	25	U
2-Hexanone	50	10	2,500	50	10	U
4-Methyl-2-pentanone	50	10	2,500	50	10	U
Tetrachloroethene	5	10	250	50	25	U

- All units reported in  $\mu\text{g/L}$ .
- Contract Required Quantitation Limit listed in Contract Laboratory Program (CLP) statement of work.
- For a dilution factor of five.
- Reported value above CRQL.
- U = Analysis conducted, but compound not detected.  
J = Analyte detected, but below quantitation limit.  
X = Analyte detected above quantitation limit.
- No QL listed.

# CORRESPONDENCE DISTRIBUTION COVERSHEET

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(LDR) COMPLIANCE WHITE PAPER

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		L. L. Humphreys	R2-50	
		P. J. Mackey	B3-15	X
		H. E. McGuire	B3-63	
		S. R. Moreno	B3-06	
		R. J. Murkowski (Assignee)	R4-02	X
		D. J. Newland	B1-58	
		J. H. Roecker	B1-59	
		G. F. Williamson	R4-01	
		R. F. Wood	R4-01	
		TPA File (M-01)	B2-35	
		EDMC	H6-08	X

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