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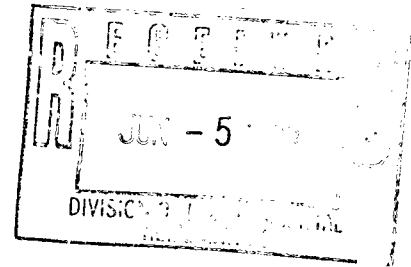
1200 NINETEENTH STREET, N.W.  
WASHINGTON, D.C. 20036-2430  
202-861-3900  
FAX: 202-223-2085

BALTIMORE  
NEW YORK  
PHILADELPHIA  
EASTON.

ANTHONY L. YOUNG  
202/861-3882  
FAX: 202/223-2085  
ayoung@pipermar.com

June 4, 1998

Mr. Damian Duda  
Love Canal Site Project Manager  
Chief, New York/Caribbean Compliance Branch  
Emergency and Remedial Response Division  
U.S. Environmental Protection Agency  
Region II  
290 Broadway  
New York, NY 10007-1866



Re: United States of America, et al. v. Occidental Chemical Corporation, et al.  
Civil Action No. 7-990 (JTC) (Love Canal Landfill)  
Petition for Site Specific Treatability Variance  
Response to USEPA Comments Received March 30, 1998

Dear Mr. Duda:

As requested in Doug Garbarini's letter of May 20, 1998, Occidental Chemical Corporation has made the changes set forth in Dr. Alan Weston's earlier letter to Mr. Garbarini. Other changes have been made to reflect the Agency's promulgation of a final rule regarding treatability variances (62 Fed. Reg. 64504 (Dec. 5, 1997), amending to C.F.R. § 268.44(h)) and a final rule regarding alternative LDR treatment standards for soil. 63 Fed. Reg. 28556, adding 40 C.F.R. § 268.49(c)(1)(C).

Ten copies of the petition are enclosed herewith to be distributed within the Agency as necessary. Please call me or Dr. Alan Weston (716/773-8321) if you have any questions.

Mr. Damian Duda  
June 4, 1998  
Page 2

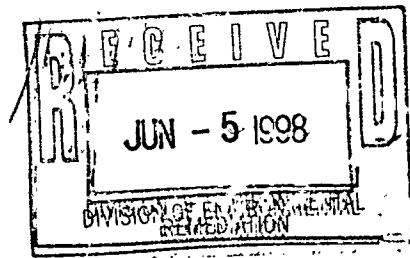
The complete package of validated TCLP data is being prepared and will be submitted separately.

Sincerely yours,

  
Anthony L. Young

ALY/jek  
Enclosures

cc: Ms. Jeanne M. Fox (w/o enclosure)  
Mr. Doug Garbarini (w/o enclosure)  
George Shanahan, Esq. (w/ enclosure)  
Mr. G. Rider, NYSDEC (w/ enclosure)  
Mr. C. Jackson, NYSDEC (w/ enclosure)



**PETITION FOR SITE SPECIFIC  
TREATABILITY VARIANCE**

**Submitted by Occidental Chemical Corporation  
to U. S. EPA Region II**

**Alan F. Weston, Ph.D.  
Director of Remedial Programs  
Occidental Chemical Corporation  
P.O. Box 809050  
Dallas, Texas 75380-9050**

## INTRODUCTION

Pursuant to 40 C.F.R. § 268.44, Occidental Chemical Corporation ("OCC"), petitions for a site-specific treatability variance for certain wastes generated during the remediation of the Love Canal Superfund Site ("Site") in Niagara Falls, New York. As described below, these wastes are contaminated environmental media from a CERCLA remediation. The Agency has already determined that the otherwise applicable treatment standards are generally "inappropriate" or "unachievable" for such contaminated media. Because this determination clearly applies to the Love Canal wastes, the requested variance should be granted.

Specifically, OCC requests the establishment of a treatment standard of 10 micrograms/kilogram ("ppb") for total tetrachlorinated, total pentachlorinated, and total hexachlorinated dibenzo-p-dioxins and total tetrachlorinated, total pentachlorinated, and total hexachlorinated dibenzofurans in sediments removed from Love Canal-associated sewers and creeks and stabilized in accordance with the Love Canal Partial Consent Decree ("LCPCD"), crushed stone generated during remediation of the haul roads used to transport those sediments, and various soils and other materials generated during the closure of the facility used to stabilize the sediments and prepare them for transport (all collectively referred to as "Love Canal bagged wastes").

\* \* \* \* \*

The Love Canal Landfill was operated during the period 1942 to 1954 by the Hooker Electrochemical Company, predecessor to OCC. The landfill received a wide variety of chemical process wastes and fly ash generated by Hooker's Niagara Falls Plant. Later, the property was transferred to the Board of Education of the City of Niagara Falls. A French drain and sewers were built adjacent to and through the landfill. These sewers carried leachate from the landfill to creeks near the landfill. The sediments that are the subject of this petition result from the remediation of these creeks.

The Love Canal creek and sewer sediments are classified as RCRA hazardous waste code F039. 40 C.F.R. § 261.31(a). Under the LCPCD as modified in January 1997, these sediments will be placed in

a permitted RCRA hazardous waste landfill once it is determined that they meet all requirements under the land disposal restrictions ("LDRs"). The requested treatment standard of 10 ppb is equivalent to the level the Agency has determined to apply to contaminated soil, is well within the levels specified in EPA guidance, and is below the levels in treatability variances previously granted by EPA for similar wastes.

**1. Petitioner's Name and Address**

This petition for a treatability variance is filed by Occidental Chemical Corporation. Occidental Tower, 5005 LBJ Freeway, P.O. Box 809050, Dallas, Texas 75380-9050.

**2. Petitioner's Interest in the Proposed Action**

OCC is a liable party at the Love Canal Landfill Superfund Site. Remedial activities at the Site began in October 1978, including Site containment and the closure of sewer lines through the Site that were impacted by leachate migrating from Love Canal.

On May 6, 1985, EPA issued a Record of Decision ("ROD") for the Site, which among other things called for the removal of dioxin-contaminated sediments from specific stretches of Black and Bergholtz creeks and storm and sanitary sewers, and the interim storage of these sediments in a containment facility. The sewer cleaning work was completed in late 1987.

On October 26, 1987, EPA issued a second ROD for the Site which required that all sewer and creek dioxin-contaminated sediments together with contaminated debris and treatment residuals from the on-site leachate treatment facility be thermally treated at the Site in a Thermal Destruction Unit ("TDU") to six nines (99.9999%) destruction removal efficiency ("DRE"). Residuals from thermal treatment were to be disposed in selected areas on-site. The 1987 proposed plan identified alternatives in which the action level of 1 part per billion (ppb) of dioxin would have triggered a requirement that the waste be treated; and materials contaminated with dioxin at levels below 1 ppb would have been able to be land-disposed without treatment. However, because segregation of material above and below the threshold was considered to be impracticable, the ROD called for the thermal destruction of all materials.

In 1988, OCC advised the EPA and the State of New York that in lieu of an EPA-constructed TDU in the Love Canal neighborhood, it wished to build a TDU at its Niagara Falls Plant to treat the sediments.

In 1989, the United States, the State of New York, and OCC entered into the LCPCD, in which OCC agreed to implement portions of the 1987 ROD at its Niagara Falls Plant instead of at Love Canal. The LCPCD modified certain requirements of the October 26, 1987 ROD. The most significant modification was the change in the siting of the TDU from the Site to the OCC Niagara Falls Plant site. OCC was also required to process, bag and transport the excavated sediments and other remedial wastes from a staging area at the 93rd Street School site to its Niagara Falls Plant. OCC was required to store these materials in a centralized, permitted storage facility and to seek a permit to incinerate the waste materials in a TDU that was to have been built at its Niagara Falls Plant instead of at the Site. A subsequent modification of the LCPCD provided that, after contaminated materials were treated at its Niagara Falls Plant, the residual materials from the thermal treatment process would not be disposed of at the Love Canal Landfill Superfund Site.

The selected remedy in the 1987 ROD, as modified by the LCPCD, required that all sediments from the sewers (2,500 yds<sup>3</sup>), and creeks (31,000 yds<sup>3</sup>) remediation, as well as debris (1,300 yds<sup>3</sup>), haul road materials (3,900 yds<sup>3</sup>), and leachate treatment residues such as spent carbon (200 yds<sup>3</sup>) be incinerated in a TDU to be constructed on the Niagara Falls Plant, or in a commercial incineration unit, if available. Federal statutes and regulations require that the residues from thermal treatment be disposed of in a Resource Conservation and Recovery Act (RCRA) Subtitle C permitted secure landfill.

Subsequent to the entry of the LCPCD in 1989, the utilization of existing commercial incineration capacity outside the City of Niagara Falls became a viable cost-effective alternative for OCC. The consideration of commercial alternatives to the TDU was also responsive to public concern about the construction and permitting of new hazardous waste incinerators within Niagara Falls.

In addition, in June 1990, EPA promulgated regulations that affected the waste classification under RCRA of the dioxin-contaminated materials addressed by the 1987 ROD and LCPCD. Prior to the 1990 regulations, the leachate from Love Canal (as well as the sediments which contained contaminants from the leachate and treatment residues that were derived from the leachate) carried an F020 RCRA-listed

waste classification which required incineration for destruction of dioxin irrespective of the level of dioxin contamination in these materials.

The June 1990 regulations created a new hazardous waste category, F039, which applies to leachate from multiple wastes, environmental media containing such leachate, and residuals derived from management of this leachate. Because the Love Canal remedial wastes contain leachate from wastes bearing multiple waste codes, EPA determined that they should be classified as F039 wastes under RCRA rather than F020 wastes. F039 wastes must be treated to meet all applicable universal treatment standards (UTS) (regulatory treatment standards for over 200 organic and inorganic contaminants, including dioxin). The UTS for dioxin is 1 ppb. Once compliance with all UTS is demonstrated, treatment residues must be disposed of in a RCRA Subtitle C landfill.

In summary, as specified in the 1987 ROD and as modified by the LCPCD, the selected remedy for the Love Canal sewer and creek cleanup required that all Love Canal sediments, debris, and treatment residues be incinerated in a TDU to be constructed at the Niagara Falls Plant. However, as a result of the above-discussed regulatory changes, OCC's implementation of sediment conditioning and handling procedures that were necessary for the interim storage of sediments, as well as the availability of commercial incineration facilities, the existing remedy was determined to no longer be the only practicable and safe alternative for remediating the wastes. As a result, EPA in November 1996 issued an Explanation of Significant Differences in which it set forth its determination that it was no longer necessary to thermally treat all contaminated materials, irrespective of the level of contamination. Therefore, EPA decided to modify the 1987 ROD to allow segregation of wastes based upon concentrations of contaminants in those wastes. Consistent with the F039 requirements, those segregated wastes that have concentrations of contaminants below the UTS will not require additional treatment before land disposal. This decision was memorialized in a modification to the LCPCD which was entered by the Court on January 14, 1997.

Under the 1997 LCPCD modification, thermal treatment will be conducted at commercial facilities instead of at the OCC Niagara Falls plant. All such commercial facilities that are authorized for the



treatment of F039 wastes containing dioxin are located outside of New York State. The residues from treatment, or wastes that meet UTS without treatment, will be disposed of in a RCRA Subtitle C landfill. All of these disposal facilities also are located outside of New York State.

Pursuant to the LCPCD modification, the dewatered and conditioned creek sediments, which are currently being stored at the Niagara Falls Plant, have now been analyzed for the purpose of segregating those portions that will meet the 1987 ROD action level of 1 ppb of dioxin from those that would not. The UTS for dioxin is also 1 ppb. In addition to analysis for dioxin, the RCRA regulations also required that the bagged waste materials be analyzed for the over 200 contaminants for which there are UTS, including metals. These analyses have also been completed.

Those waste materials that have low levels of contaminants that do not exceed UTS can be landfilled without additional treatment. Those organic waste materials that do not meet RCRA UTS for organic chemicals, including dioxin, would require thermal treatment prior to final disposal unless a treatability variance is granted. RCRA requirements further mandate that, after materials are treated, the residues must be tested to ensure that the UTS have been met. If the UTS have not been met, the materials must be retreated until the UTS have been met. Once the UTS are met, the treatment residuals would be disposed in a RCRA Subtitle C hazardous waste landfill.

Under the LCPCD modification, OCC agreed that certain categories of Love Canal waste (including sediments from the sewer remediation and Love Canal Leachate Treatment Facility spent carbon) would be incinerated. However, it was anticipated that most of the haul road materials and much of the 31,000 cubic yards of creek sediments would not require treatment. Further analysis of these sediments is now required to provide a determination of which sediments meet UTS and may be able to be land disposed without further treatment and which would require thermal treatment. In the Explanation of Significant Differences, EPA recognized that, under certain circumstances, the data from these analyses might be utilized by OCC to support a petition for a site-specific variance from treatment standards in accordance with RCRA regulations (40 C.F.R. § 268.44). OCC is therefore submitting this petition.

**3. Action Being Requested**

OCC requests that the following alternative treatment standard be established for the Love Canal bagged wastes.

All hexachlorodibenzo-p-dioxins	10 ug/kg
All hexachlorodibenzofurans	10 ug/kg
All pentachlorodibenzo-p-dioxins	10 ug/kg
All pentachlorodibenzofurans	10 ug/kg
All tetrachlorodibenzo-p-dioxins	10 ug/kg
All tetrachlorodibenzofurans	10 ug/kg

### Reasons for Granting the Petition

Under the Agency's contained-in and derived-from rules, the Love Canal bagged wastes are classified as hazardous waste F039, multi-source leachate. As such, according to Agency policy, they must be treated to meet the LDR treatment standards for F039. 40 C.F.R. § 268.40. The Love Canal bagged wastes generally meet those standards for all constituents except for the dioxin and furan standards of 1 ppb. Because the Love Canal bagged wastes consist of soil and other environmental media with extremely low levels of organic constituents, a treatability variance of 10 ppb is appropriate under the Agency's regulations, guidance, and precedents.

A very small portion of the waste may fail to meet the treatment standard for a constituent other than dioxins or furans. Any such portion will be treated to meet that standard prior to land disposal as set forth below:

<b>Constituent</b>	<b>LDR Treatment Standard</b>	<b>Units</b>	<b>Treatment Required</b>
TCLP Lead	0.37	mg/L	Stabilization
Fluoranthene	3.4	mg/Kg	Incineration
Phenanthrene	5.6	mg/Kg	Incineration
Aldrin	0.066	mg/Kg	Incineration
Alpha-BHC	0.066	mg/Kg	Incineration
Beta-BHC	0.066	mg/Kg	Incineration
Delta-BHC	0.066	mg/Kg	Incineration
Gamma-BHC	0.066	mg/Kg	Incineration

The LDR regulations provide that a treatability variance is appropriate when either (1) the waste cannot be treated to the specified level or (2) the treatment technology is not appropriate to the waste. 40 C.F.R. § 268.44. See also 62 Fed. Reg. 26041, 26058-60 (May 12, 1997) (treatability variance can be

granted on "appropriateness" grounds even if the otherwise applicable standards are technically achievable). The Love Canal bagged wastes qualify under either criteria. First, the bagged wastes consist of soil, sediment and other environmental media, wastes which the Agency has presumptively determined qualify for a treatability variance. Second, the treatment standards for dioxins and furans are based on incineration, and the use of incineration is not appropriate for large volumes of environmental media that contain concentrations of organic constituents only marginally above the treatment standard.

A. EPA Has Already Determined That LDR Treatment Standards Are "Inappropriate" or "Unachievable" For These Waste Types.

EPA's numerical waste treatment standards are based on the application of Best Demonstrated Available Technology ("BDAT") to industrial process wastes. For organic constituents, BDAT is generally incineration. However, EPA has never determined the numerical treatment standards that would be obtained by applying BDAT to environmental media. Rather, the Agency has determined that:

until specific standards for soils and debris are developed, current BDAT standards are generally inappropriate or unachievable for soil and debris from CERCLA response actions and RCRA corrective actions and closures. Rather, EPA presumes that, because contaminated soil and debris is significantly different from the wastes evaluated in establishing the BDAT standards, it cannot be treated in accordance with those standards, and thus qualifies for a treatability variance from those standards under 40 CFR 268.44. Accordingly, persons seeking a treatability variance from LDR treatment standards for contaminated soil and debris do not need to demonstrate on a case-by-case basis that BDAT standards for prohibited hazardous wastes are inappropriate or not achievable.

55 Fed. Reg. 8760, 8761 (March 8, 1990).

The Agency reached this same conclusion in the preamble to the Hazardous Waste Identification Rule ("HWIR") for contaminated media when it stated that "data gathered for the Phase II Soil proposal do not demonstrate conclusively that the Universal Treatment Standards can be met using technologies other than combustion," which the Agency has determined is generally inappropriate for contaminated soils. 61 Fed. Reg. 18780, 18807 (April 29, 1996).

EPA also elaborated on this determination in guidance. Superfund LDR Guide 6A, "Obtaining a Soil and Debris Treatability Variance for Remedial Actions, OSWER Doc. 9347.3-06FS (Sept. 1990) ("6A Guidance") (Att. 1). That guidance provides that for soils containing initial dioxin concentrations less than 500 ppb, alternative treatment standards should be established in the range of .01 to 50 ppb. (Since publication of that guidance, the treatment standards for dioxins have been revised from nondetectable to 1 ppb, making the relevant range 1 to 50 ppb). The Agency has granted a treatability variance of 5 ppb for dioxin-containing wastes at the Vertac Superfund site and for environmental media containing up to 50 ppb at Dow Chemical's Midland, Michigan site. The standard of 10 ppb proposed by OCC is therefore well within the range EPA has in the past indicated is appropriate for land disposal in a Subtitle C landfill.

At Vertac and Dow, EPA specifically examined the achievability of the 1 ppb standard for environmental media containing low levels of organic constituents and concluded that the treatment standard was not achievable. In the Vertac case, the Agency performed test incinerations and determined that the 1 ppb standard was not achievable. In the Dow case, EPA Region V compared the nature of the wastes for which a variance had been requested with the character of the waste used to establish the 1 ppb treatment standard and determined that "Dow's wastes (contaminated soils) are significantly different from the wastes analyzed in developing the [dioxin and furans] treatment standard (process wastes from the production of chlorinated aliphatic hydrocarbons)." USEPA Response to Comments on Dow Petition at 9-10. (Att. 2).

According to the EPA document "Best Demonstrated Available Technology (BDAT) Background Document for U and P Wastes and Multi-Source Leachate (F039) Volume C: Nonwastewater Forms of Organic U and P Wastes and Multi-Source Leachate (F039) for which There Are Concentration-Based Treatment Standards" EPA/530-SW-90-060H, the F039 treatment standards for dioxins and furans were based on results from the treatment of wastes from the production of chlorinated aliphatic hydrocarbons (F024).

The F024 wastes analyzed in developing this treatment standard were liquid process wastes from the DuPont Chemical Company in LaPlace, Louisiana, and the Shell Chemical Company in Norco,

Louisiana; and sludge process wastes from the Vista Chemical Company in Lake Charles, Louisiana, and the Vulcan Chemical Company in Wichita, Kansas. "Best Demonstrated Available Technology (BDAT) Background Document for Wastes from the Production of Chlorinated Aliphatic Hydrocarbons (F024)." Parameters for the waste analyzed for the F024 treatment standards and the Love Canal bagged waste are compared in the table below.

Parameter	Waste Analyzed for F024 Treatment Standards	Love Canal Bagged Wastes
Heating Value (BTU/lb)	7,876 - 9, 565	<500
Ash Content (%)	ND - 13.8	83-88
Total Carbon (g/kg)	350-453	31

As these values make clear, the Love Canal bagged wastes, which consist of stabilized sediment and gravel, have extremely low carbon content and heating values and correspondingly high ash content. They are thus fundamentally different from the high BTU and high organic content waste streams used to establish the dioxin and furan standard for F039 wastes. (These F039 standards are taken from the F024 treatment standards.) Therefore, the Love Canal bagged wastes fit squarely within the Agency's presumption that incinerator-based treatment standards are not achievable or appropriate for soils and environmental media. Thus, the requested variance is consistent with the Agency's interpretation of its regulations as expressed in guidance and the Agency's precedents, and should be granted.

The proposed variance would apply to four waste categories -- creek sediment 1, creek sediment 2, haul roads, and facility cleanup. As set forth in the attached Phase I Report, submitted May 30, 1997 (Att. 3), these wastes are similar in both the identity and concentrations of constituents found in the wastes. These wastes are also similar in physical characteristics. The creek sediments are primarily soil and natural organic matter (e.g., leaves) that was washed into the creeks, and the facility clean-up wastes are essentially sediment that was spilled during the stabilization process. The haul roads category consists primarily of the gravel and soil that made up the roads and sediment that dripped onto the roads from trucks.

Analysis of samples from these four waste categories shows that much of the waste already meets the LDR treatment standard, while the rest of the waste is only marginally above the limit, specifically, in the range of 1 to 5 ppb. Consistent with EPA's presumption that contaminated environmental media should qualify for a treatability variance, these waste categories should be granted a variance.

The requested variance is also consistent with the LDR treatment standards for contaminated media that the Agency has adopted in its HWIR media rule. 63 Fed. Reg. 28556, 28751, 40 C.F.R. § 268.49(c)(1)(C) (May 26, 1998). In proposing that rule, the Agency recognized that combustion technologies are generally inappropriate for contaminated soil, but that the data available to the Agency indicates that the as-generated treatment standards are not achievable with alternative technologies. 61 Fed. Reg. 18805, 18807 (Apr. 29, 1996). The Agency, therefore, proposed to set the treatment standard for contaminated soils at the higher of a 90 percent reduction in constituent concentration or 10x the UTS. Id. at 18806. For contaminated media other than soil, the proposal would establish a procedure to grant treatability variances when the otherwise applicable standard is unachievable or inappropriate or where an alternative standard meets the requirement to minimize threats to human health and the environment. Id. at 18810-11. For soils, the 10 x UTS (.001 mg/kg<sup>5</sup>) "standard for dioxans and furans are based on the performance of dechlorination, or thermal desorption." 63 Fed. Reg. at 28605.

The alternative treatment standard proposed by OCC is 10 times the UTS and therefore is equivalent to the Agency's alternative LDR treatment standard for contaminated soil. 40 C.F.R. § 268.49. Moreover, as demonstrated above, OCC's sediment wastes are sufficiently similar to soil that the same rationale should apply. The Agency justified its proposed alternative treatment standards on the ground that "the Agency believes that soil is, in most cases, most appropriately treated using non-combustion technologies" and the data gathered by the Agency did not demonstrate that the UTS were achievable by such technologies. 61 Fed. Reg. at 18807. OCC's sediment wastes are composed primarily of soil and are similarly inappropriate for treatment by combustion. Therefore, the requested treatability variance is consistent with the Agency's policy on establishing alternative treatment standards for environmental media.

B. Incineration Is Not Appropriate For These Wastes.

EPA proposed that a treatability variance should be granted when use of the treatment technology needed to achieve numerical treatment standards is not appropriate for the waste, even if the numerical standards are technically achievable. 62 Fed. Reg. at 26058-60.<sup>1</sup> One specific example of a situation where a treatability variance should be granted under this rationale is where "the treatment standard would result in combustion of large amounts of soil or wastewater." Id. at 26059. More generally, a treatability variance should be granted where "imposition of BDAT treatment would lead to environmentally counterproductive results." Id.

EPA expanded on this rationale in the HWIR media proposal:

EPA believes that it is appropriate to set soil-specific LDR standards because the soil matrix often poses distinct treatment issues. Specifically, the Part 268 Universal Treatment Standards that would otherwise apply to soil subject to the LDRs based, in large part, on incineration for organics and high temperature metal recovery (HTMR) for metals. Although incineration and HTMR are highly effective technologies, their selection was based on treatment of concentrated, as generated hazardous wastes, and they are not generally appropriate for the large volumes of low and moderately contaminated soil typically encountered during site remediation. Thus, the Agency believes that technology-based standards for contaminated soil should not rely exclusively on incineration or HTMR and that, in many cases, innovative (i.e., non-combustion) technologies will be more appropriate (See 55 FR 8666, 8760-8761, (March 8, 1990) and 58 FR 48092, 48125, (September 14, 1993)).

61 Fed. Reg. at 18807.

This rationale clearly applies in this case. Requiring the Love Canal bagged wastes to meet the 1 ppb treatment standard for dioxins/furans would require the combustion of massive amounts of soil for the destruction of minuscule amounts of dioxin. Moreover, given the emissions generated in the incineration

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<sup>1</sup> See also 61 Fed. Reg. 55718 (Oct. 28, 1996) (granting variance to CITGO for petroleum refinery sludge to be removed from Surge Pond because use of incineration was inappropriate even though treatment standards technically could have been met).



process itself, and the minimal (if any) reduction in the risk posed by the wastes, incineration of this material is clearly not appropriate.

EPA has elaborated on this principle in guidance. In a January 8, 1997, memorandum from Michael Shapiro and Steve Luftig to RCRA/CERCLA Senior Policy Managers entitled "Use of Site-Specific Land Disposal Restriction Treatability Variances under 40 C.F.R. 268.44(h) During Cleanups" (Att. 4), the Agency states that "A site-specific variance may also be approved when the generally applicable treatment standard is based on a Best Demonstrated Available Technology (BDAT) that is inappropriate for the waste in question." Id. at 2. One specific circumstance that the Agency identifies as appropriate for a variance is "Clean-up of contaminated soils where the generally applicable land disposal treatment standards are based on combustion." Id. at 3. The Agency goes on to state that "For large quantities of contaminated soils with relatively low concentrations of hazardous constituents, EPA generally considers treatment standards based on combustion inappropriate." Id.

The Agency recently reiterated this position in papers filed in the United States Court of Appeals for the District of Columbia Circuit. There the Agency represented that it had granted "hundreds of site-specific treatability variances authorizing treatment by means other than combustion for organic hazardous constituents in contaminated soils." Louisiana Environmental Action Network v. EPA, No. 97-1054 (D.C. Cir.), EPA Br. at 32 n. 22 (Att. 5).<sup>2</sup> In that same brief the Agency stated:

the Agency has recognized that combustion, although the most effective method for treating certain wastes, is a difficult and costly approach to

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<sup>2</sup> Louisiana Environmental Action Network v. EPA, supra, was subsequently dismissed as moot when the underlying variance request was withdrawn by petitioner CITGO. As this statement makes clear, in the remediation context, the Agency often allows contaminated media that exceeds the otherwise applicable treatment standards to be consolidated and disposed of on-site in an appropriate containment unit. At Love Canal, OCC proposed that the creek sediments be disposed of in Love Canal, which would have a cap and leachate control system. See letter dated January 5, 1984 from Thomas H. Truitt to Norman E. Nosenchuck, P.E, Att. 6. This alternative was not pursued because of the relative timing of the Love Canal area closure and the creek remediation, but, importantly, was not rejected because of any concern that the land disposal of the sediments in an appropriate unit would pose a risk to human health and the environment.

treating large quantities of soil with low levels of contamination. Accordingly, EPA has adopted a liberal policy of granting treatability variances for soil.

Id. (internal citation omitted).

Most significant, however, is the fact that the Agency has now promulgated a final rule effectuating the change proposed in May of 1997. 62 Fed. Reg. 64504 (Dec. 5, 1997). Specifically, the final rule amends 40 C.F.R. § 268.44(h) to read in relevant part:

(h) Based on a petition filed by a generator or treator of hazardous waste, the Administrator or his or her delegated representative may approve a site-specific variance from an applicable treatment standard if:

....

(2) It is inappropriate to require the waste to be treated to the level specified in the treatment standard or by the method specified as the standard, even though such treatment is technically possible. To show that this is the case, the petitioner must either demonstrate that:

(i) Treatment to the specified level or by the specified method is technically inappropriate (for example, resulting in combustion of large amounts of mildly contaminated environmental media where the treatment standard is not based on combustion of such media);

....

62 Fed. Reg. at 64509.

The final rule clarifies the Agency's authority to grant a treatability variance for wastes such as the Love Canal bagged wastes where the treatment standard could be achieved but is technically inappropriate. In fact, the Love Canal bagged wastes fall specifically within the example given in the rule itself, i.e. where compliance with the otherwise applicable treatment standard would require "combustion of mildly contaminated environmental media." In the case of the Love Canal bagged wastes, compliance with the otherwise applicable treatment standard could require the combustion of thousands of tons of soil and sediment containing low parts per billion concentrations of dioxin. (In fact, containing concentrations of dioxin below the 10 x UTS concentration the Agency has adopted as the treatment standard for soil in the HWIR-media rule.)

The preamble to the final treatability variance rule makes the appropriateness of a treatability variance for the Love Canal bagged wastes even clearer. There the Agency states:

Another potential example of where treatment for organic contaminants may be technically inappropriate is when a waste contains low concentrations of non-volatile organic contaminants (for example, concentrations slightly exceeding a Universal Treatment Standard) and the waste, for legitimate reasons, has been stabilized. If the mobility of the non-volatile organic contaminants has been reduced, it might be inappropriate to require further treatment of non-volatile organic contaminants.

62 Fed. Reg. at 64505.

This description fits the Love Canal bagged wastes exactly. As described herein, these wastes contain low concentrations of non-volatile organic contaminants and the wastes were stabilized for legitimate reasons. Specifically, the wastes contain dioxin, which is non-volatile, in the low ppb range, which is just above the Universal Treatment Standard of 1 ppb. The wastes consist primarily of soil and gravel sediments (the sediments are basically soil and organic material (leaves) that were washed into the creeks). The incineration of material with so little organic content will consume a large amount of fuel. The burning of this fuel will generate greenhouse gases such as carbon dioxide, increased levels of NOx, and solid waste in the form of baghouse and scrubber residuals. Evaluation of multi-media impacts would show that incineration of these wastes would result in a net increase in total pollutants entering the environment compared with placing the wastes directly in a landfill. In addition, incineration would require the wastes to be transported and handled twice, increasing the potential for environmental impacts associated with rail or truck transportation and increasing the risk of accident in transport or handling. Because dioxins and furans are relatively immobile in soils, incineration has no net environment benefit compared to placement of these wastes in a RCRA permitted landfill.<sup>3</sup>

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<sup>3</sup> In its recent brief in the D. C. Circuit, EPA made clear that its policy is to consider the "totality of the circumstances" in determining whether a treatability variance meets the statutory requirement that threats to human health and the environment be minimized. EPA Br., Att. 5, at 37-38.

C. The Love Canal Bagged Wastes Have Received Substantial Treatment that Minimizes the Threat to Human Health and the Environment.

The placement of soil materials containing up to 10 ppb of dioxins and furans in a Subtitle C landfill that RCRA requires be carefully monitored clearly minimizes the threat that this small amount of dioxin contained in large amounts of soil may pose to the environment and is thus consistent with the statutory requirement for treatment standards in section 3004(m) of RCRA. Moreover, the Love Canal wastes have received substantial treatment.

The Love Canal bagged wastes were treated and stabilized at the time of removal from the sewers and creeks to reduce the mobility of constituents, including dioxins/furans, believed to be present. The sediment stabilization process utilized for the Love Canal bagged wastes was as follows:

1. The dredged sediments were placed in a holding basin to dewater the material, thus reducing its water content.
2. The sediment was then further dewatered using a filter press.
3. The sediment was blended with clay.
4. The sediment was further treated by the addition of powdered quicklime to a pH of 12 to 14. The addition of lime is a common treatment method to stabilize soil and sediment. The lime reacts with the soil/sediment material and moisture present in the material to stabilize constituents that may be present, thereby reducing the potential for the constituents to leach from the media in the future. In the treatment process used for these Love Canal bagged wastes, the lime also served to further remove any free moisture that might be present, thus also reducing any potential for free water to be released from the bagged waste.
5. The material was placed in double lined bags prior to storage.

The above treatment of the bagged waste provided physical stabilization of the material, which OxyChem believes decreased the material's leachability by solidifying the sediment.

A review of the available literature involving the stabilization of organics indicates that the results are highly dependent on the sample matrix and the organic constituents of interest. Therefore, to assess the leachability of the treated Love Canal bagged wastes, OxyChem performed a toxicity characteristic leaching procedure (TCLP) study. This study provided actual leachability data on the treated bagged

waste materials. A summary of the results of the study is set forth as Table 1. The bags with the highest total dioxin/furan content from each category were sampled for the study. The ratios clearly show that the leachability of this dried and stabilized waste is very low. The results detected in the leachate were at very low levels, which were achievable because the most sensitive instrumentation was used for the analysis. The waste clearly has been stabilized and presents no significant risk to the environment given that it will be placed in a secured hazardous waste landfill designed to eliminate the migration of leachable chemicals to the groundwater.

EPA itself has recognized that dioxins bind tightly to soils and that soils contaminated with low levels of dioxin pose little risk when properly managed. In the preamble to its proposed rule imposing the LDRs on dioxin wastes, the Agency stated that "Investigations have documented the extreme immobility of TCDD in most soils and its low solubility in water. . . . the other CDDs and CDFs are expected to be immobile in soils and water insoluble." 51 Fed. Reg. 1602, 1731 (Jan. 14, 1986). The Agency stated further that "CDDs and CDFs are not expected to leach into groundwater and percolate through soils if proper precautions are taken to prevent co-disposal with solubilizing agents." Id. The Agency has thus recognized that low concentrations of soil-bound dioxins can be safely managed in an appropriate landfill. All of this investigation and evaluation work was performed on untreated soil/sediment material. The material from this project has been treated to further immobilize any constituents present. Thus, if dioxins are immobile without treatment, they will be even less likely to leach after lime stabilization.

As set forth above, the stabilized, dried material was placed in double lined bags at the treatment facility. These bags provide a double plastic liner to protect the waste material from coming in contact with any moisture in the air. These bags have remained fully intact over the storage period and provide sound protection during transportation. The bags will be placed in the triple lined landfill (described below) intact. Thus, the bags themselves will add an additional level of technology protection to the treatment of the material and the use of a triple lined permitted RCRA landfill. The bags will also protect against the material coming in contact with any other waste in the landfill cell.

The landfill currently proposed to receive this waste is Laidlaw's Grassy Mountain Landfill in Utah. This landfill is a new facility and is designed to meet or exceed all Subtitle C requirements. The landfill is a triple lined landfill located in an area with little or no rainfall (semi-arid region) and is isolated from contact with the general population (42 miles to the nearest home). This facility provides an extremely secure and protective location for the disposal of these waste materials. Moreover, implementation of the LDRs has eliminated the placement of liquid wastes in hazardous waste landfills and reduced to trace levels the concentration of organic solvents that could mobilize dioxins from the soil to which they are bound. See EPA Response to Comments on Dow Petition at 30-31. Thus, there is virtually no realistic scenario under which the materials in this waste will leach or that any leached material would reach the environment.

Moreover, incineration of this material will not significantly reduce the volume of material ultimately landfilled and thus cannot be justified on the grounds of conserving landfill space. In fact, if the material is burned with other waste materials in the incinerator, the resulting volume can actually increase if the "mixed residue" (soil and other wastes burned together) requires stabilization prior to being placed in the landfill. In addition, the particulate matter removed in the incinerator gas cleaning train generally is light and fluffy, resulting in a larger volume than the original soil and debris. Thus, the granting of this variance will result in no significant increase in the volume of material landfilled and may actually slightly decrease the overall volume of waste requiring land disposal.

The proposed variance will substantially shorten the schedule for completion of this project. While there are no realistic risks posed by the current storage of the wastes, project completion and movement of these wastes from OCC's Niagara Falls Plant is another step towards bringing closure to Niagara Falls' environmental and landfill matters. Currently, the capacity at the receiving incinerators is the rate limiting step for completion of this project. Based on data from the Phase I investigation, the project will take approximately 3 - 4 years to complete at the current rate of incineration. The variance would reduce the amount of material requiring incineration and reduce the total time for project completion to approximately two years. This shorter project schedule would result in material being stored for a shorter period of time in the Niagara Falls area and more timely completion of the total project.

CONCLUSION

Therefore, given the nature of the waste, the very low concentration of hazardous constituents, the stabilization treatment already achieved, and the design of the landfill cells, land disposal of material with up to 10 ppb regulated dioxins and furans (10 x UTS) is the appropriate treatment and disposal technology for this waste. On the basis of the foregoing, OCC requests this petition be granted.

Respectfully submitted,

Alan F. Weston, Ph.D.

CERTIFICATION

The following certification is made pursuant to the requirements of 40 C.F.R. § 268.44 for a variance from a treatment standard:

I certify under the penalty of law that I have personally examined and am familiar with the information submitted in this petition and all attached documents, and that, based on my inquiry of those individuals immediately responsible for obtaining the information, I believe that the submitted information is true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment.

OCCIDENTAL CHEMICAL CORPORATION

Signature: Alan F. Weston  
Name: Alan F. Weston, Ph.D  
Title: Director of Remedial Programs  
Date: 5/28/98



TABLE 1					
COMPARISON OF PHASE I PCDD/PCDF RESULTS					
TOTAL VERSUS LEACHABLE					
OCCIDENTAL CHEMICAL CORPORATION					
LOVE CANAL BAGGED WASTES					
Sample ID	Category	Parameter	Total Result (ppb)	TCLP Result (ppb)	Ratio of Leaching
CS-00897	Creek Sediment 1	Total TCDD	25	0.0029	1:8600
		Total PeCDD	ND 0.5	0.00006	NA
		Total HxCDD	0.7	0.00016	1:4400
		Total TCDF	ND 0.4	0.00025	NA
		Total PeCDF	ND 0.5	0.00006	NA
CS-0096	Creek Sediment 1	Total TCDD	22	0.0025	1:8800
		Total PeCDD	ND 2.6	0.00004	NA
		Total HxCDD	0.5	0.00011	1:4500
		Total TCDF	ND 1.5	0.00017	NA
		Total PeCDF	ND 0.5	0.00003	NA
CS-08221	Creek Sediment 2	Total TCDD	1.6	0.0007	1:2300
		Total PeCDD	0.9	0.00031	1:2900
		Total HxCDD	0.6	0.00079	1:760
		Total TCDF	ND 0.4	0.00048	NA
		Total PeCDF	1.1	0.00032	1:3400
HR-10241	Haul Roads	Total TCDD	4.6	0.0015	1:3100
		Total PeCDD	4.1	0.00075	1:5500
		Total HxCDD	7.9	0.002	1:4000
		Total TCDF	1.3	0.0011	1:1200
		Total PeCDF	2.2	0.00078	1:2800
FC-15421	Facility Cleanup	Total TCDD	1.5	0.0004	1:3800
		Total PeCDD	1.3	0.00014	1:9300
		Total HxCDD	2.1	0.00034	1:6200
		Total TCDF	ND 0.4	0.00012	NA
		Total PeCDF	ND 0.5	0.0001	NA
		Total HxCDF	ND 0.4	0.00005	NA
Notes:					
NA	Not available due to non-detect total result.				
NDx	Not detected at or above x.				



RECYCLED

ED11 800-222-0510 ALL-STATE\*LEGAL



# Superfund LDR Guide #6A (2nd Edition) Obtaining a Soil and Debris Treatability Variance for Remedial Actions

Office of Emergency and Remedial Response  
Hazardous Site Control Division

Quick Reference Fact Sheet

The Office of Emergency and Remedial Response (OERR) issued a series of Superfund LDR Guides in July and December of 1989. This series included: *Overview of RCRA Land Disposal Restrictions (LDRs)* (Superfund LDR Guide #1); *Complying with the California List Restrictions* (Superfund LDR Guide #2); *Treatment Standards and Minimum Technology Requirements Under the LDRs* (Superfund LDR Guide #3); *Complying with the Hammer Restrictions Under the LDRs* (Superfund LDR Guide #4); *Determining When the LDRs are Applicable to CERCLA Responses* (Superfund LDR Guide #5); *Obtaining a Soil and Debris Treatability Variance for Remedial* (Superfund LDR Guide #6A) and *Removal* (Superfund LDR Guide #6B) *Actions*; and *Determining When the LDRs are Relevant and Appropriate to CERCLA Responses* (Superfund LDR Guide #7). Since the issuance of these guides, the Environmental Protection Agency, with cooperation from outside parties (e.g., environmental groups, industry representatives), has conducted an analysis of the potential impacts associated with applying the LDR treatment standards to Superfund and RCRA Corrective Action cleanups. As a result of these analyses, it was decided that the Agency will promulgate a third set of treatment standards (in addition to the wastewater and nonwastewater categories currently in effect) specifically for soil and debris wastes. In the interim, there is the presumption that CERCLA response actions involving the placement of soil and debris contaminated with RCRA restricted wastes will utilize a Treatability Variance to comply with the LDRs and that, under these variances, the treatment levels outlined in Superfund LDR Guide #6A will serve as alternative "treatment standards." This guide (a revision to the original Superfund LDR Guide #6A) has been prepared to outline the process for obtaining and complying with a Treatability Variance for soil and debris that are contaminated with RCRA hazardous wastes until such time that the Agency promulgates treatment standards for soil and debris.

## BASIS FOR A TREATABILITY VARIANCE

When promulgating the LDR treatment standards, the Agency recognized that treatment of wastes to the LDR treatment standards would not always be possible or appropriate. In addition, the Agency recognized the importance of ensuring that the LDRs do not unnecessarily restrict the development and use of alternative and innovative treatment technologies for remediating hazardous waste sites. Therefore, a Treatability Variance process (40 CFR §268.44) is available to comply with the LDRs when a Superfund waste differs significantly from the waste used to set the LDR treatment standard such that:

- The LDR standard cannot be met; or
- The best demonstrated available technology (BDAT) used to set the standard is inappropriate for the waste.

Superfund site managers (OSCs, RPMs) should seek a Treatability Variance to comply with the LDRs when managing restricted soil and debris

## Highlight 1: SOIL AND DEBRIS

**Soil.** Soil is defined as materials that are primarily of geologic origin such as sand, silt, loam, or clay, that are indigenous to the natural geologic environment at or near the CERCLA site. (In many cases, soil is mixed with liquids, sludges, and/or debris.)

**Debris.** Debris is defined as materials that are primarily non-geologic in origin, such as grass, trees, stumps, and man-made materials such as concrete, clothing, partially buried whole or empty drums, capacitors, and other synthetic manufactured materials, such as liners. (It does not include synthetic organic chemicals, but may include materials contaminated with these chemicals).

wastes (see Highlight 1) because the LDR treatment standards are based on treating less complex matrices of industrial process wastes (except for the dioxin standards, which are based on treating contaminated soil). A Treatability Variance does not remove the requirement to treat restricted soil and debris wastes. Rather, under a Treatability Variance, alternate treatment levels based on data from actual treatment of soil, or best management practices for debris, become the "treatment standard" that must be met.

### COMPLYING WITH A TREATABILITY VARIANCE FOR SOIL AND DEBRIS WASTES

#### Soil Wastes

Once site managers have identified the RCRA waste codes present at the site, the next step is to

identify the BDAT constituents of those RCRA waste codes and to divide these constituents into one of the structural/functional groups shown in column 1 of Highlight 2. After dividing the BDAT constituents into their respective structural/functional groups, the next step is to compare the concentration of each constituent with the threshold concentration (see column 3 of Highlight 2) and to select the appropriate concentration level or percent reduction range. If the concentration of the restricted constituent is less than the threshold concentration, the waste should be treated to within the concentration range. If the waste concentration is above the threshold, the waste should be treated to reduce the concentration of the waste to within the specified percent reduction range. Once the appropriate treatment range is selected, the third step is to identify and select a specific technology

**Highlight 2: ALTERNATE TREATABILITY VARIANCE LEVELS AND TECHNOLOGIES FOR STRUCTURAL/FUNCTIONAL GROUPS**

Structural Functional Groups	Concentration Range (ppm)	Threshold Concentration (ppm)	Percent Reduction Range	Technologies that achieved recommended effluent concentration guidance**
<b>ORGANICS</b>	<b>Total Waste Analysis/**</b>	<b>Total Waste Analysis/**</b>		
Halogenated Non-Polar Aromatics	0.5 - 10	100	90 - 99.9	Biological Treatment, Low Temp. Stripping, Soil Washing, Thermal Destruction
Dioxins	0.00001 - 0.05	0.5	90 - 99.9	Dechlorination, Soil Washing, Thermal Destruction
PCBs	0.1 - 10	100	90 - 99.9	Biological Treatment, Dechlorination, Soil Washing, Thermal Destruction
Herbicides	0.002 - 0.02	0.2	90 - 99.9	Thermal Destruction
Halogenated Phenols	0.5 - 40	400	90 - 99	Biological Treatment, Low Temp. Stripping, Soil Washing, Thermal Destruction
Halogenated Aliphatics	0.5 - 2	40	95 - 99.9	Biological Treatment, Low Temp. Stripping, Soil Washing, Thermal Destruction
Halogenated Cyclics	0.5 - 20	200	90 - 99.9	Thermal Destruction
Nitrated Aromatics	2.5 - 10	10,000	99.9 - 99.99	Biological Treatment, Soil Washing, Thermal Destruction
Heterocyclics	0.5 - 20	200	90 - 99.9	Biological Treatment, Low Temp. Stripping, Soil Washing, Thermal Destruction
Polynuclear Aromatics	0.5 - 20	400	95 - 99	Biological Treatment, Low Temp. Stripping, Soil Washing, Thermal Destruction
Other Polar Organics	0.5 - 10	100	90 - 99	Biological Treatment, Low Temp. Stripping, Soil Washing, Thermal Destruction
<b>INORGANICS</b>	<b>TCLP</b>	<b>TCLP</b>		
Antimony	0.1 - 0.2	2	90 - 99	Immobilization
Arsenic	0.30 - 1	10	90 - 99.9	Immobilization, Soil Washing
Barium	0.1 - 40	400	90 - 99	Immobilization
Chromium	0.5 - 6	120	95 - 99.9	Immobilization, Soil Washing
Nickel	0.5 - 1	20	95 - 99.9	Immobilization, Soil Washing
Selenium	0.005	0.05	90 - 99	Immobilization
Vanadium	0.2 - 20	200	90 - 99	Immobilization
Cadmium	0.2 - 2	40	95 - 99.9	Immobilization, Soil Washing
Lead	0.1 - 3	300	99 - 99.9	Immobilization, Soil Washing
Mercury	0.0002 - 0.008	0.08	90 - 99	Immobilization

- \* TCLP also may be used when evaluating waste with relatively low levels of organics that have been treated through an immobilization process.
- \*\* Other technologies may be used if treatability studies or other information indicates that they can achieve the necessary concentration or percent-reduction range.

that can achieve the necessary concentration or percent reduction. Column 5 of **Highlight 2** lists technologies that (based on existing performance data) can attain the alternative Treatability Variance levels.

During the implementation of the selected treatment technology, periodic analysis using the appropriate testing procedure (i.e., total waste analysis for organics and TCLP for inorganics) will be required to ensure the alternate treatment levels for the BDAT constituents requiring control are being attained and thus can be land disposed without further treatment.

Because of the variable and uncertain characteristics associated with unexcavated wastes, from which only sampling data are available, treatment systems generally should be designed to achieve the more stringent end of the treatment range (e.g., 0.5 for chromium, see column 2 of **Highlight 2**) to ensure that the treatment residuals from the most contaminated portions of the waste fall below the "no exceedance" levels (e.g., 6.0 ppm for chromium). Should data indicate that the treatment levels set through the Treatability Variance are not being attained (i.e., treatment residuals are greater than the "no exceedance" level), site managers should consult with EPA Headquarters.

### Debris Wastes

Site managers should use the same process for obtaining a Treatability Variance described above for types of debris that are able to be treated to the alternate treatment levels (e.g., paper, plastic). However, for most types of debris (e.g., concrete, steel pipes), which generally cannot be treated, site managers should use best management practices. Depending on the specific characteristics of the debris, these practices may include decontamination (e.g., triple rinsing) or destruction.

### **OBTAINING A TREATABILITY VARIANCE FOR SOIL AND DEBRIS WASTES**

Once it is determined that a CERCLA waste is a soil or debris, and that compliance with the LDRs will be required (i.e., the wastes contain restricted RCRA waste(s) and placement will occur), site managers should initiate the process of obtaining a Variance. For remedial actions this will involve: (1) documenting the intent to comply with the LDRs through a Treatability Variance in the FS Report; (2) announcing the intent to comply through a Treatability Variance in the Proposed Plan; and (3) granting of the Treatability Variance by the Regional Administrator or the

### **Highlight 3 - INFORMATION TO BE INCLUDED IN AN RI/FS TO DOCUMENT THE INTENT TO COMPLY WITH THE LDRs THROUGH A TREATABILITY VARIANCE FOR ON-SITE AND OFF-SITE CERCLA RESPONSE ACTIONS INVOLVING THE PLACEMENT OF SOIL AND DEBRIS CONTAMINATED WITH RESTRICTED RCRA WASTES**

#### ON-SITE

- Description of the soil or debris waste and the source of the contamination;
- Description of the Proposed Action (e.g., "excavation, treatment, and off-site disposal");
- Intent to comply with the LDRs through a Treatability Variance; and
- For each alternative using a Treatability Variance to comply, the specific treatment level range to be achieved (see Highlight 2 to determine these treatment levels).

#### OFF-SITE

For off-site Treatability Variances, the information above should be extracted from the RI/FS report and combined with the following information in a separate document:

- Petitioner's name and address and identification of an authorized contact person (if different); and
- Statement of petitioner's interest in obtaining a Treatability Variance.

\* This document may be prepared after the ROD is signed (and Treatability Variance granted) but will need to be compiled prior to the first shipment of wastes (or treatment residuals) to the receiving treatment or disposal facility.

LDRs as an ARAR and indicate that a Treatability Variance is being used to comply.

Under some circumstances, the need to obtain a Treatability Variance may not be evident until after a ROD is signed. For example, previously undiscovered evidence may be obtained during a remedial design/remedial action (RD/RA) that the CERCLA waste contains a RCRA restricted waste and the LDRs are then determined to be applicable. In such situations, a site manager would need to prepare an explanation of significant differences (ESD) from the ROD and make it available to the public to explain the need for a Treatability Variance. In addition, unlike other ESDs that do not require public comment under CERCLA section 117(c), if the ESD involves granting a Treatability Variance, an opportunity for public comment would be required to fulfill the public notice and comment requirements for a Treatability Variance under 40 CFR §268.44.

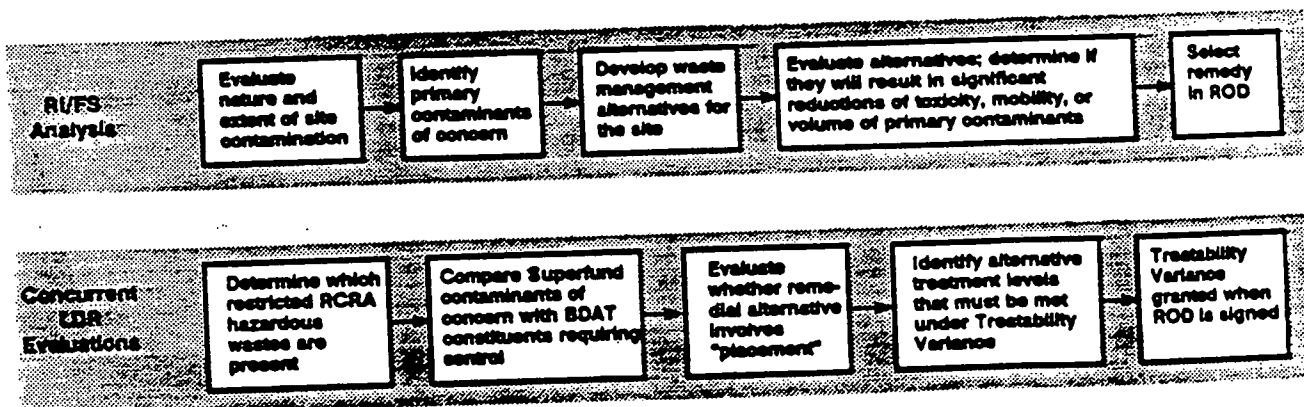
### LDRs IN SUPERFUND ACTIONS

Because of the important role the LDRs may play in Superfund cleanups, site managers need to incorporate early in the RI/FS the necessary investigative and analytical procedures to determine if the LDRs are applicable for remedial alternatives that involve the "placement" of wastes.

When the LDRs are applicable, site managers should determine if the treatment processes associated with the alternatives can attain either the LDR treatment standards or the alternate levels that would be established under a Treatability Variance.

Site managers must first evaluate whether restricted RCRA waste codes are present at the site, identify the BDAT constituents requiring control, and compare the BDAT constituents with the Superfund primary constituents of concern from the baseline risk assessment. This process identifies all of the constituents for which remediation may be required. Once the viable alternatives are identified in the FS, site managers should evaluate those involving the treatment and placement of restricted RCRA hazardous wastes to ensure their respective technology process(es) will attain the appropriate treatment levels (i.e., either LDR treatment standard or Treatability Variance alternate treatment levels for soil and debris containing restricted RCRA hazardous wastes) and, in accordance with Superfund goals, reductions of 90 percent or greater for Superfund primary contaminants of concern. The results of these evaluations are documented in the Proposed Plan and ROD. An illustration of the integration of LDRs and Superfund is shown in Highlight 6. An example of the process for complying with a Treatability Variance for contaminated soil and debris is presented in Highlight 7.

Highlight 6: LDRs IN THE RI/FS PROCESS



Assistant Administrator/OSWER when the ROD is signed.

### FS Report

The FS Report should contain the necessary information (see Highlight 3) to document the intent to comply with the LDRs for soil and debris through a Treatability Variance. In the Detailed Analysis of Alternatives chapter of the FS Report, the discussion should specify the treatment level range(s) that the treatment technology would attain for each waste constituent restricted under the LDRs, as well as the Superfund primary contaminants of concern identified during the baseline risk assessment. In addition, under the Comparative Analysis of Alternatives section, when discussing the "Compliance with ARARs Criteria," site managers should indicate which alternatives will comply with the LDRs through the use of a Treatability Variance.

### Proposed Plan

The intent to comply with the LDRs through a Treatability Variance for a particular alternative should be clearly stated in the Description of Alternatives section of the Proposed Plan. Because the Proposed Plan solicits public comment on all of the alternatives and not just the preferred

### Highlight 4 - SAMPLE LANGUAGE FOR THE PROPOSED PLAN

#### Description of Alternatives section

*This alternative will comply with the LDRs through a Treatability Variance under 40 CFR 268.44. This Variance will result in the use of [specify technology] to attain the Agency's interim "treatment levels/ranges" for the contaminated soil at the site (see Detailed Analysis of Alternatives Chapter of the FS Report for the specific treatment levels for each constituent).*

#### Evaluation of Alternatives section, under "Compliance with ARARs"

*The LDRs are ARARs for [Enter number] of [Enter total number of alternatives] remedial alternatives being considered. [Enter number] of the [Enter total number of alternatives] alternatives would comply with the LDRs through a Treatability Variance.*

### Highlight 5: SAMPLE LANGUAGE FOR A RECORD OF DECISION

#### Description of Alternatives section:

*This alternative will comply with the LDRs through a Treatability Variance for the contaminated soil and debris. The treatment level range established through a Treatability Variance that [Enter technology] will attain for each constituent as determined by the indicated analyses are [Example shown below]:*

<i>Barium</i>	<i>0.1 - 40 ppm (TCLP)</i>
<i>Mercury</i>	<i>0.0002 - 0.008 ppm (TCLP)</i>
<i>Vanadium</i>	<i>0.2 - 20 ppm (TCLP)</i>
<i>TCE</i>	<i>95-99.9% reduction (TWA)</i>
<i>Cresols</i>	<i>90-99% reduction (TWA)</i>

option, the intent to obtain a Treatability Variance should be identified for every alternative for which a Variance would be used. This opportunity for public comment on the Proposed Plan fulfills the requirements for public notice and comment (off-site actions only) on the Treatability Variance as required in RCRA §268.44. Sample language for the Proposed Plan is provided in Highlight 4.

#### Record of Decision

A Treatability Variance is granted and becomes effective when the Record of Decision (ROD) is signed by the Regional Administrator or Assistant Administrator/OSWER. In the Description of Alternatives section, as part of the discussion of major applicable requirements associated with each remedial option, site managers should include a statement (as was done in the FS report) that a Treatability Variance will be used to comply with the LDRs, and list the treatment level range(s) that the selected technology will attain for each constituent. Sample language for the ROD is provided in Highlight 5.

In the Comparative Analysis section, under "Compliance with ARARs," site managers should indicate which of the alternatives will comply with the LDRs through a Treatability Variance. Under the Statutory Determination section (Compliance with ARARs), site managers should identify the

### Highlight 7: IDENTIFICATION OF TREATMENT LEVELS FOR A TREATABILITY VARIANCE

As part of the RI, it has been determined that soils in one location at a site contain F006 wastes and cresols (which site records indicate were an F004 waste). Arsenic also was found in soils at a separate location. The baseline risk assessment identified cadmium, chromium, lead, and arsenic as primary contaminants of concern. The concentration range of all of the constituents found at the site included:

Constituent	Total Concentration (mg/kg)	TCLP (mg/l)	Constituent	Total Concentration (mg/kg)	TCLP (mg/l)
Cadmium	2,270 - 16,200	120 - 146	Nickel	100 - 140	1 - 6.5
Chromium	3,160 - 4,390	30 - 56	Silver	1 - 3	—
Cyanides	80 - 150	1 - 16	Cresols	50 - 600	.25 - 4
Lead	500 - 625	2 - 12.5	Arsenic	800 - 1,900	3 - 9

Four remedial alternatives are being considered: (1) Low temperature thermal stripping of soil contaminated with cresols followed by immobilization of the ash; (2) Immobilization of the soil in a mobile unit; (3) In-situ immobilization; and (4) Capping of wastes. Each of these alternatives must be evaluated to determine if they will result in significant reduction of the toxicity, mobility, or volume of the waste; whether "placement" occurs; and, if "placement" occurs, whether the treatment will attain the alternative treatment levels established through a Treatability Variance for the BDAT constituents requiring control.

#### STEP 1: IDENTIFY THE RESTRICTED CONSTITUENTS

- Because F006 and F004 wastes have been identified in soils at the site, the Superfund site manager must meet alternate treatment levels established through a Treatability Variance for the BDAT constituents. These constituents are: Cadmium, Chromium, Lead, Nickel, Silver, and Cyanide for F006 and Cresols for F004.

AND DIVIDE THE CONSTITUENTS INTO THEIR STRUCTURAL/FUNCTIONAL GROUPS (see Highlight 2):

- All of the F006 constituents are in the Inorganics structural/functional group.
- Cresols are in the Other Polar Organic Compounds structural/functional group.
- In accordance with program goals, the preferred remedy also should result in the effective reduction (i.e., at least 90 percent) of all primary constituents of concern (i.e., Cadmium, Chromium, Lead, and Arsenic).

#### STEP 2: COMPARE THE CONCENTRATION THRESHOLD FOUND IN HIGHLIGHT 2 TO THE CONCENTRATIONS FOUND AT THE SITE AND CHOOSE EITHER THE CONCENTRATION LEVEL RANGE OR PERCENT REDUCTION RANGE FOR EACH RESTRICTED CONSTITUENT.

Constituent	Site Concentration	Threshold Concentration	Appropriate Range		Range to be achieved (compliance analysis)
			Concentration	Percent Reduction	
Cadmium	120 - 146 ppm	> 40 ppm		X	95-99.9 Percent Reduction (TCLP)
Chromium	30 - 56 ppm	< 120 ppm	X		0.5 - 6 ppm (TCLP)
Lead	2 - 12.5 ppm	< 300 ppm	X		0.1 - 3 ppm (TCLP)
Nickel	1 - 6.5 ppm	< 20 ppm	X		0.5 - 1 ppm (TCLP)
Cresols (Total)	50 - 600 ppm	> 100 ppm	X		90-99 Percent Reduction (TCLP)
Cresols (TCLP)	.25 - 4 ppm			X	
Arsenic	3 - 9 ppm	< 10 ppm	X		0.27 - 1 ppm (TCLP)

#### STEP 3: IDENTIFY TREATMENT TECHNOLOGIES THAT MEET THE TREATMENT RANGES.

- Highlight 2 lists the technologies that achieved the alternate treatment levels for each structural/functional group.
- Because cresols are present in relatively low concentrations (assumed for the purposes of this example), a TCLP may be used to determine if immobilization results in a sufficient reduction of mobility of this restricted RCRA hazardous waste. (Measures to address any volatilization of organics during immobilization processes will be necessary.)
- Based on the results of treatability tests conducted at the site, immobilization also will result in the effective reduction in leachability (i.e., at least 90 percent) of arsenic, a Superfund primary contaminant of concern.

Alternative	Effective Reduction of Toxicity, Mobility, Volume?	"Placement?"	Meet Treatability Variance Alternate Levels?
1. Low temperature stripping/ Immobilization	Yes	Yes	Yes
2. Immobilization in mobile unit	Yes	Yes	Yes
3. In-situ immobilization	Yes (Mobility)	No (LDRs not ARARs)	—
4. Capping in Place	No	No (LDRs not ARARs)	—

#### STEP 4: PREPARE PROPOSED PLAN, OBTAIN COMMENTS

- Highlight 4 provides sample language for the Proposed Plan that announces the intent to comply with the LDRs through a Treatability Variance.

#### STEP 5: PREPARE ROD

- Highlight 5 provides sample language for a ROD signed for a site that will comply with the LDRs through a Treatability Variance.



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**RESPONSE TO COMMENTS ON THE DRAFT DECISION ON  
A PETITION FOR A SITE-SPECIFIC TREATABILITY VARIANCE  
SUBMITTED BY  
THE DOW CHEMICAL COMPANY  
MIDLAND, MICHIGAN  
MID 000 724 724**

**U.S. ENVIRONMENTAL  
PROTECTION AGENCY  
REGION 5**



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II. Comments and Responses  
B. Comments on Regulatory Aspects of the Treatability Variance

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**B. COMMENTS ON REGULATORY ASPECTS OF THE TREATABILITY VARIANCE**

**19. COMMENT**

Several commenters disagreed with U.S. EPA, Region 5's justification for its draft decision to approve the petition.

**RESPONSE**

The U.S. EPA, Region 5 acknowledges that the commenters disagree with Region 5's justification for its draft decision to approve the petition. The U.S. EPA, Region 5's justification for its draft decision is further explained in the responses to comments 20, 22, and 23.

**20. COMMENT**

Several commenters stated that the U.S. EPA guidance document 6A says the standard for dioxin contaminated waste was derived using soils, thus the argument that the standard is not applicable to this waste stream is invalid.

**RESPONSE**

The contaminated soils that will be generated by the RGIS replacement process are significantly different from the wastes analyzed in developing the treatment standards for F039 wastes. The parenthetical in Superfund LDR Guidance #6A, "(except for the dioxin standards, which are based on treating contaminated soil)", refers to the standards for the dioxin waste codes F020, F021, F022, F023, F026, and F027. However, the waste code applicable to the RGIS soils is F039.

The document "Best Demonstrated Available Technology (BDAT) Background Document for U and P Wastes and Multi-Source Leachate (F039) Volume C: Nonwastewater Forms of Organic U and P Wastes and Multi-Source Leachate (F039) for which There Are Concentration-Based Treatment Standards" EPA/530-SW-90-060H indicates that the treatment standards for dioxins and furans in F039 were based on treatment performance data transferred from the treatment of wastes from the production of chlorinated aliphatic hydrocarbons (F024).

The document "Best Demonstrated Available Technology (BDAT) Background Document for Wastes from the Production of

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*Chlorinated Aliphatic Hydrocarbons F024*" indicates that the F024 wastes analyzed in developing the treatment standard were liquid process wastes from the DuPont Chemical Company in LaPlace, Louisiana, and the Shell Chemical Company in Norco, Louisiana; and sludge process wastes from the Vista Chemical Company in Lake Charles, Louisiana, and the Vulcan Chemical Company in Wichita, Kansas. Parameters from the waste analyzed for the F024 treatment standards and Dow's contaminated soils are compared in the table below.

Parameter	Waste Analyzed for F024 Treatment Standards	Dow Chemical RGIS Soils
Heating Value (BTU/lb)	7,876 - 9,565	0
Ash Content (%)	ND - 13.8	95
Total Carbon (g/kg)	350 - 453	1

It is apparent from these values that Dow's wastes (contaminated soils) are significantly different from the wastes analyzed in developing the treatment standards (process wastes from the production of chlorinated aliphatic hydrocarbons). Therefore, the F039 standard is inappropriate for contaminated soils. This interpretation is consistent with the presumption against combustion of soils set out in the National Contingency Plan (55 FR 8760, March 8, 1990).

21. COMMENT

A commenter stated that the U.S. EPA guidance documents state that a treatability variance should be considered only in the instances of certain CERCLA response actions or RCRA corrective actions, and that the RGIS upgrade is neither.

RESPONSE

The RGIS is regulated under Condition V.F.6.A.1. of the Federal HSWA permit as part of the Groundwater Containment Program for the Facility Solid Waste Management Unit. Therefore, the U.S. EPA, Region 5 considers the upgrading of the RGIS to be a RCRA corrective action. In addition, in the upcoming relicensing of the Dow Midland Plant, the MDEQ

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intends to continue to regulate the operation, maintenance, and monitoring of the RGIS under both the corrective action and environmental monitoring portions of the state license, since Michigan has received authorization for the corrective action portion of the hazardous waste program.

22. COMMENT

Several commenters stated that a treatability variance, according to the guidance documents, does not appear to relieve the company from the burden of treating the waste, and that no treatment does not appear to be the intent of the variance.

RESPONSE

Region 5 believes that it would not be logical to require "treatment for treatment's sake" for a contaminated soil that already meets the alternate treatment standard contained in Superfund Guidance Document 6A. Guidance Document 6A states that:

"A Treatability Variance does not remove the requirement to treat restricted soil and debris wastes. Rather, under a Treatability Variance, alternate treatment levels based on data from actual treatment of soil, or best management practices for debris, become the treatment standards that must be met."

This excerpt is followed by a table of contaminant groups and alternate treatability levels, a portion of which is reproduced below:

Excerpt From Highlight 2: ALTERNATE TREATABILITY VARIANCE LEVELS AND TECHNOLOGIES FOR STRUCTURAL/FUNCTIONAL GROUPS

Structural Functional Groups	Concentration Range (ppm)	Threshold Concentration (ppm)	Percent Reduction Range	Technologies that achieved recommended effluent concentration guidance
Dioxins	0.00001-0.05	0.5	90-99.9	Dechlorination, Soil Washing, Thermal Destruction

The guidance states that the concentration of the constituent must be compared to the Threshold Concentration listed in Highlight 2. The Threshold Concentration for dioxins is 500 ppb. Dow has petitioned for a variance for

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soils with dioxin levels greater than 1 ppb, but less than 50 ppb. Since these values are below the Threshold Concentration, the soils would need to be within the range of .01 and 50 ppb prior to land disposal. Since Dow has petitioned for a variance for soils with dioxin levels greater than 1 ppb, but less than 50 ppb, it is already within the range the Agency has determined is acceptable for soils to be land disposed. It is Region 5's understanding that Dow should be able to directly landfill its contaminated soils without additional treatment. The Region believes that the first sentence in the above excerpt must be read *in conjunction* with the second sentence, "Rather, under a Treatability Variance, alternate treatment levels based on data from actual treatment of soil, or best management practices for debris, become the treatment standards that must be met." All soils that will be directly disposed of in Salzburg Landfill will meet the alternate treatment levels. Region 5 believes that it would not be logical to require treatment for treatment's sake for a contaminated soil that already meets the alternate treatment standard.

23. COMMENT

Several commenters stated that 40 CFR 268.44(h) states:

"Where the treatment standard is expressed as a concentration in a waste or waste extract and a waste generated under conditions specific to only one site cannot be treated to the specified level, or where the treatment technology is not appropriate to the waste, the generator or treatment facility may apply to the Administrator, or his delegated representative, for a site-specific variance from a treatment standard. The applicant for a site-specific variance must demonstrate that because the physical or chemical properties of the waste differs significantly from the waste analyzed in developing the treatment standard, the waste cannot be treated to specified levels or by the specified methods."

The commenters go on to argue that Dow has already treated waste from the RGIS upgrade proving it is both possible to treat the waste to the specified level, and that the treatment technology is appropriate to the waste stream, and that Dow has failed to demonstrate that its waste is different from the waste analyzed in developing the treatment standard, or that the waste cannot be treated to

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specified levels or by the specified methods, or that the treatment technology is inappropriate to its waste. The commenters state therefore, a treatability variance should not be available in this circumstance.

**RESPONSE**

The U.S. EPA, Region 5 finds that it is not appropriate within the meaning of 40 CFR 268.44(a) and (h) to require treatment of RGIS soils to levels based on the performance of combustion technologies (the technologies on which the LDR treatment standards for F039 nonwastewaters are based) and that a treatability variance is, therefore, warranted.

Federal Register (FR) preamble language has stated that persons seeking a treatability variance from LDR treatment standards for contaminated soils under 268.44(h) generally do not need to demonstrate on a case-by-case basis that BDAT standards for prohibited hazardous wastes are inappropriate or not achievable. As an alternative, persons may meet the appropriate levels or percentage reductions in the Superfund LDR Guidance #6A. 55 FR 8760-8762 / March 8, 1990, states:

"...EPA has determined that, until specific standards for soils and debris are developed, current BDAT standards are generally inappropriate or unachievable for soil and debris from CERCLA response actions and RCRA corrective actions and closures. Instead, EPA presumes that, because contaminated soil and debris is significantly different from the wastes evaluated in establishing the PDAT standards, it cannot be treated in accordance with those standards and thus qualifies for a treatability variance from those standards under 40 CFR 268.44.

Accordingly, persons seeking a treatability variance from LDR treatment standards for contaminated soil and debris do not need to demonstrate on a case-by-case basis that BDAT standards for prohibited hazardous wastes are inappropriate or not achievable. As an alternative, persons seeking a treatability variance for soil and debris may meet the appropriate levels or percentage reductions in the currently available guidance (Superfund LDR Guidance #6A, "Obtaining a Soil and Debris Treatability Variance for Remedial Actions", EPA OSWER Directive 9347.3-06FS, July 1989)."

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"The Agency's experience also supports this conclusion of general inappropriateness or infeasibility of current BDAT standards for soil and debris. For example, as indicated above, EPA has developed alternative treatment levels for soil and debris in the Superfund #6A guidance which are based on the application of the specific treatment technologies to soil and debris, rather than industrial process wastes. Thus, these alternative levels, which are better tailored to the treatability of the complex soil and debris mixtures found at Superfund sites, reflect Agency experience concerning the inappropriateness or infeasibility of current BDAT for soil and debris."

"The numerous comments and Agency experience supporting a presumption that the BDAT standards are inappropriate or not achievable is clearly warranted at this time because the criteria in 40 CFR 268.44 for treatability variances are generally met for soil and debris. As a result, under EPA's established treatability variance procedures (40 CFR 268.44), variance applications for contaminated soil and debris do not need to demonstrate that the physical and chemical properties differ significantly from wastes analyzed in developing the treatment standard and that, therefore, the waste cannot be treated to specified levels or by the specified methods. Petitions need only focus on justifying the proposed alternative levels of performance, using existing interim guidance containing suggested treatment levels for soil and debris (Superfund LDR Guidance #6A, "Obtaining a Soil and Debris Treatability Variance for Remedial Actions", EPA OSWER Directive 9347.3-06FS, July 1989) as a benchmark."

59 FR 47986 / September 19, 1994, states:

"The Agency has stated a presumption, however, that the treatment standards for as-generated wastes are generally inappropriate or unachievable for soils contaminated with hazardous wastes, within the meaning of 40 CFR 268.44(a) (see 55 FR 8759-60, March 8, 1990). It has been the Agency's experience that contaminated soils are significantly different in their treatability characteristics from the wastes that have been evaluated in establishing the BDAT standards, and thus, will generally qualify for a treatability variance under 40 CFR 268.44."



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"Until LDR standards specific to soils are promulgated, EPA believes that treatability variances will generally be appropriate when hazardous soils are managed as part of site remediation activities."

Despite the fact that preamble language states that "... persons seeking a treatability variance from LDR treatment standards for contaminated soil and debris do not need to demonstrate on a case-by-case basis that BDAT standards for prohibited hazardous wastes are inappropriate or not achievable," it is possible to make such a demonstration.

The contaminated soil that is the subject of this variance petition can be demonstrated to be significantly different from the waste analyzed in developing the treatment standard as discussed in the response to comment 20. However, as the commenters above have stated, Dow has successfully treated this waste in the past by incineration, and has thus demonstrated that this waste can be treated by that technology. Therefore, Region 5 has examined whether the BDAT standard is "appropriate" to the waste.

U.S. EPA's interpretation is that a treatment standard based on the performance of BDAT can be inappropriate when it leads to environmentally counterproductive results, in particular, where it may impede site remediation or corrective action at a facility. This is the situation at Dow where the replacement of a corrective measure is impeded by LDRs. Thus, in promulgating the National Contingency Plan under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), in 55 FR 8666-8762 / March 8, 1990, EPA stated:

"EPA's experience under CERCLA has been that treatment of large quantities of soil and debris containing relatively low levels of contamination using LDR "best demonstrated available technology" (BDAT) is often inappropriate. . . Experience with the CERCLA program has shown that many sites will have large quantities--in some cases, many thousands of cubic meters--of soils that are contaminated with relatively low concentrations of hazardous wastes. . . These soils often should be treated, but treatment with the types of technologies that would meet the standard of BDAT may yield little if any environmental benefit over other treatment based remedial options. . . .Based on EPA's experience to date and the virtually unanimous comments supporting this conclusion, EPA has determined

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that. . .current BDAT standards are generally inappropriate or unachievable for soil and debris from CERCLA response actions and RCRA corrective actions and closures.

Accordingly, persons seeking a treatability variance from LDR treatment standards for contaminated soil and debris do not need to demonstrate on a case-by-case basis that BDAT standards for prohibited hazardous wastes are inappropriate or not achievable. As an alternative, persons seeking a treatability variance for soil and debris may meet the appropriate levels or percentage reductions in the currently available guidance (Superfund LDR Guidance #6A, "Obtaining a Soil and Debris Treatability Variance for Remedial Actions", EPA OSWER Directive 9347.3-06FS, July 1989)."

The U.S. EPA reiterated this interpretation most recently in the proposed Hazardous Waste Identification Rule for contaminated media by stating that "[i]n other cases, the generic treatment standard will be inappropriate because use of an alternative treatment standard would result in a net environmental benefit." 61 FR 18780, 18811 (April 29, 1996). See also 53 FR at 31200 (August 17, 1988) ("On a site-specific basis, it may be possible to determine that BDAT treatment is inappropriate for a particular waste stream. For example, incineration of large volumes of contaminated soil under certain site-specific conditions may be found to be inappropriate treatment.")

The U.S. EPA's interpretation reflects a reasonable policy choice. In the remediation context, site decision makers are often faced with the choice of either capping or treating wastes in place (thereby avoiding application of LDRs) or excavating and triggering BDAT treatment standards. In such cases, the most cost effective choice is often to leave waste in place if the only alternative is BDAT treatment. 54 FR 15566, 15568 (October 10, 1989); 55 FR at 8760-62; 61 FR at 18812. This creates an incentive to favor remediation options that minimize LDR applicability (e.g., by leaving waste in place), a result obviously not contemplated by Congress in enacting the LDRs. 54 FR 41566-41569, October 10, 1989.

It is entirely rational to view as "inappropriate" imposition of a treatment technology that results in (or reasonably could result in) an environmentally detrimental result. Indeed, there is a legitimate question whether a

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technology whose use results in foregoing other, substantial environmental benefits can be considered to be a "best" technology. Portland Cement Association v. Ruckelshaus, 486 F. 2d 375, 385-86 at n. 42 (D.C. Cir. 1973); Essex Chemical Corp. v. Ruckelshaus, 486 F. 2d 427, 439 (D.C. Cir. 1973). See also Chemical Waste Management v. EPA, 976 F. 2d 2, 16 (D.C. Cir. 1992), cert. denied 113 S.Ct. 1961 (1993). (treatment sufficient to satisfy section 3004(m) need not be based on performance of best demonstrated available technology); and, the legislative history of section 3004(m), 130 Cong. Rec. S. 9178 (daily ed. July 25, 1984). (The intent of 3004(m) is to require utilization of available technology in lieu of continued land disposal without prior treatment, not that every waste receive repetitive or ultimate treatment.)

The U.S. EPA, Region 5 finds that it is not appropriate within the meaning of Sections 269.44(a) and (h) to require treatment of RGIS soils to levels based on the performance of combustion technologies (the technologies on which the LDR treatment standards for F039 nonwastewaters are based) and that a treatability variance is, therefore, warranted. In Dow's specific circumstance, U.S. EPA, Region 5 finds that requiring use of BDAT technologies would significantly delay the replacement of the RGIS system by encouraging Dow to pursue remedial options that would minimize LDR applicability. For example, one option would be to perform the RGIS replacement by backfilling some portions of the excavated trench with the RGIS soils rather than filter stone that meets the gradation and porosity specifications. This would minimize the applicability of LDRs, but would result in a less reliable and shorter-lived RGIS system. Debate over these remedial alternatives would, at a minimum, further delay the replacement of the RGIS and could result in additional releases of contaminated groundwater to the Tittabawassee River.

This treatability variance will expedite the replacement of the RGIS and assure protection of the Tittabawassee River from releases of contaminated groundwater. The contaminated soils generated as a result of the RGIS replacement that meet the alternate treatment levels will be disposed of in Dow's Subtitle C landfill. U.S. EPA, Region 5 views this result as environmentally preferable to other remedial options that Dow could legally pursue (i.e., choosing remedial options that minimize the applicability of LDRs), given that debate over these options would, at a minimum, significantly delay completion of the RGIS replacement.

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U.S. EPA, Region 5 believes the benefits of expediting the replacement of the RGIS, that is, protection of the Tittabawassee River from releases of contaminated ground water, are superior to applying the treatment standard, because doing so would likely further delay the RGIS replacement and possibly result in additional releases of contaminated groundwater to the Tittabawassee River. Consequently, U.S. EPA, Region 5 finds that requiring treatment based on the performance of BDAT is not appropriate to F039 nonwastewaters generated by Dow's RGIS replacement because, in Dow's specific circumstance, it would most likely result in net environmental detriment.

The U.S. EPA, Region 5 also finds that under the circumstances presented here, threats posed by the direct land disposal of RGIS soils into a Subtitle C landfill--including current and potential threats posed by delaying the RGIS replacement--are minimized (within the meaning of Section 3004(m)) by the combination of expediting the replacement of the RGIS and secure disposal of RGIS soils that meet the alternate treatment level in Dow's Subtitle C landfill.

In further support of these determinations, the U.S. EPA, Region 5 notes:

- The soils generated by the RGIS replacement that will be directly landfilled under this variance will meet the alternate treatment levels contained within Superfund LDR Guidance #6A.
- The RGIS soils were in part contaminated by the operation of a corrective measure that was installed to protect the Tittabawassee River. Application of BDAT treatment levels could potentially serve as a disincentive to install similar corrective measures.
- The variance applies only to soils generated as a result of the RGIS replacement. Other newly-generated F039 wastes thus have to be treated in compliance with the existing treatment standards before they can be land disposed. As the U.S. EPA has repeatedly discussed, treatability variances are often warranted for wastes generated in the context of remediation.
- The Dow RGIS replacement project was approved by the Michigan Department of Environmental Quality. The MDEQ is authorized by the U.S. EPA to administer the Federal

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RCRA program for corrective action, which the RGIS replacement project is considered. While U.S. EPA approval or concurrence is not required for individual actions in authorized states, U.S. EPA staff in Region 5 monitor the performance of authorized states, including Michigan, and agree with the strategy of the RGIS replacement project.

- Replacement of the RGIS will generate large volumes of soil. Dow estimates that potentially 100,000 cubic yards of soil will be generated during the replacement of the 2.5 mile long RGIS. While Region 5 is not approving Dow's treatability variance based on the volume of soil, the economies of scale associated with this volume of waste supports the Region's finding that, if BDAT treatment is required, Dow could potentially pursue remedial options that minimize LDR applicability and further delay the RGIS replacement.

#### 24. COMMENT

Several commenters argued that Dow's proposal to place waste containing up to 50 ppb dioxins in a landfill without treatment contradicts EPA's guidance that requires facilities to attempt to meet the lower bound of the alternative treatment range--in this case, 10 parts per trillion--by treating the waste. The commenters state that guide #6A establishes an alternative treatment range for dioxins of 10 parts per trillion to 50 ppb. The commenters argue however, according to the Guide:

A Treatability Variance does not remove the requirement to treat restricted soil and debris wastes. Rather, under a Treatability Variance, alternate treatment levels based on data from actual treatment of soil...become the treatment standard that must be met...Because of the variable and uncertain characteristics associated with unexcavated wastes, from which only sampling data are available, treatment systems generally should be designed to achieve the more stringent end of the treatment range.

The commenters state that Dow's variance proposal for the RGIS soils containing between 1 and 50 ppb dioxins fails to meet the U.S. EPA guidance on two counts: it proposes no treatment, and it does not reduce the dioxin levels to the lower end of the treatment range. The commenters argue that

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based on this inconsistency with U.S. EPA guidance, the petition should be denied.

**RESPONSE**

The "no treatment" issue is addressed in the above response. The U.S. EPA, Region 5 believes that the last sentence in the above excerpt is intended to be a conservative approach to achieving the applicable concentration range for a waste. It does not require a treatment system to achieve the lower end of a concentration range, rather it suggests that a treatment system be designed to achieve the lower end of a concentration range in order to insure that the waste falls within the range after treatment.

**25. COMMENT**

Several commenters asked why the U.S. EPA has not required Dow to demonstrate how its approach is more protective of the public health in light of present levels of contamination and the state of its wastewater treatment system?

**RESPONSE**

The U.S. EPA, Region 5 believes that Dow's proposed management of the RGIS' soils under the Treatability Variance will be protective of public health. The management controls that will be in place during the replacement of the RGIS, and the design of the Salzburg Landfill, will prevent releases to the environment. The U.S. EPA, Region 5's rationale on this issue is detailed in the responses to comments 34-47.

Also, as discussed in previous responses, the MDEQ has been working with Dow to ensure the implementation of corrective measures on a prioritized basis that are necessary to clean up existing contamination (e.g., Dow RGIS Consent Order, Tertiary Pond solids management projects agreement).

**26. COMMENT**

Several commenters expressed concern that the granting of this Treatability Variance would establish a precedent for other companies.

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**RESPONSE**

The decision to approve a treatability variance for F039 nonwastewaters generated by the RGIS replacement is specific to Dow's circumstances and will not apply to any other sites or wastes. Approving the treatability variance will expedite the replacement of the RGIS which provides protection to the Tittabawassee River from releases of contaminated groundwater. Denying the variance may lead to a prolonged debate on alternatives that minimize the applicability of LDRs and could result in additional releases of contaminated groundwater to the Tittabawassee River.

**C. COMMENTS ON DURATION OF TREATABILITY VARIANCE**

**27. COMMENT**

Several commenters argued that since under the federal regulation variances must be specific to the site and the circumstances documented by the petitioner, a variance granted for this project-specific situation thus would have no relevance to future projects.

The commenters argued that therefore, Dow's variance cannot be effective throughout the active life of the RGIS. The commenters stated that it can only apply to the soils excavated to repair the RGIS system. One commenter further stated that this would give little incentive for Dow to pursue other treatment alternatives.

**RESPONSE**

This variance is specific to the site and the circumstances documented by Dow. The variance will apply only to soils generated as a result of the RGIS replacement and will have no relevance to other projects. In addition, to further clarify that the variance will apply only to the current RGIS replacement, the Notice of Approval has been modified to include an expiration date of 10 years from the date of signature. This time period represents a reasonable interval in which to complete the RGIS replacement project.

The following section has been added to the Notice of Approval:

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**"Expiration Date:**

Approval of the petition will expire 10 years from the date, indicated below, on which this Notification of Approval was signed by the Regional Administrator."

Region 5 does not believe that this treatability variance will remove the incentive for Dow to pursue other treatment alternatives, since all newly-generated F039 wastes from sources other than the RGIS upgrade, must still be treated in compliance with existing treatment standards before they can be land disposed.

**D. COMMENTS ON THE REVETMENT GROUNDWATER INTERCEPTOR SYSTEM**

**28. COMMENT**

A number of commenters expressed the opinion that Dow Chemical has installed an inadequate perimeter groundwater collection system with inadequate tile, inappropriate fill, and poor maintenance, and is responsible for its current failure.

**RESPONSE**

On June 27, 1996, as part of its formal comments during the public comment period, the MDEQ, WMD submitted the following response to this comment:

"The RGIS was historically installed by Dow about 15 years ago as part of a site-wide groundwater containment program prior to the time that the RCRA corrective action program requirements were enacted in 1984 and, in fact, just shortly after Michigan's State hazardous waste program was enacted. Although MDEQ staff were not involved in the review of the design of the RGIS, WMD staff believe that the basic concept was founded on good engineering practices. Increased inspection, maintenance, and monitoring of the RGIS and a phased upgrading program have been implemented by Dow as part of enforcement follow-up activities related to documented failures of the RGIS to provide adequate hydraulic gradient reversal. The 1994 RGIS upgrade design was basically similar to the original design, with changes such as: 1) larger diameter groundwater collection piping (eight inches vs. six inches) was installed to increase the factor of safety for groundwater collection; 2) high density polyethylene



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**PHASE I REPORT**

**Love Canal Bagged Wastes  
Occidental Chemical Corporation**

**PHASE I REPORT**

**Love Canal Bagged Wastes  
Occidental Chemical Corporation**

**MAY 1997**

**REF. NO. 7438-RPT-1**

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**TREATEK-CRA COMPANY**

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## 1.0 EXECUTIVE SUMMARY

This report has been prepared by Occidental Chemical Corporation (OxyChem) to describe the Phase I activities performed in support of the characterization of the Love Canal Bagged Wastes currently stored at OxyChem's Niagara Plant in Niagara Falls, New York. The Phase I sampling and analysis program was originally described in the United States Environmental Protection Agency (USEPA)/New York State Department of Environmental Conservation (NYSDEC) approved "Sampling and Analysis Plan (SAP), Love Canal Wastes," dated June 3, 1996.

OxyChem has completed Phase I of the SAP. In accordance with the SAP, the data have been used to eliminate analytical categories which do not exceed the F039 land disposal restriction (LDR) limits for the materials. The Phase I program has identified the analytical parameters and number of samples for Phase II sampling.

A review of the analytical results from Phase I demonstrates that no samples exceeded the LDR limits for volatile organic compounds (VOCs), herbicides, cyanide, or methanol. These parameters will be deleted from any Phase II analyses.

Two samples marginally exceeded the LDR limit for leachable lead. All remaining LDR exceedances were either semi-volatile organic compounds (SVOCs), pesticides/PCBs, or dioxins/furans. The majority of exceedances for SVOCs and pesticides/PCBs were in the creek debris category.

The Phase I results showed that most of the bagged material either met or marginally exceeded the F039 LDR limits. The Phase I results showed that several groups of bags within the categories are candidates for direct landfill disposal, pending acceptable Phase II results. The data showed that the samples from the creek debris category was consistently above the LDR levels, and this group will be incinerated and will not be included in the Phase II sampling. A third category of bag groups were consistently marginally above the 1 ppb level for total dioxins/furans. OxyChem believes that the presence of



low levels of dioxins/furans in these groups does not justify incineration, and requests a variance from the LDRs.

The Phase I results were used to provide the basic characterization data needed to apply the statistical equation in SW-846, Third Edition, Chapter Nine. These equations were established by the EPA to provide a statistical sampling basis for determining how many samples are needed to provide data for compliance with disposal regulations. The method is based on using available characteristic data for a waste (Phase I), and then calculating the number of samples needed to verify compliance with LDRs. The number of samples to be analyzed in Phase II has been determined using these equations with the following exceptions:

- The number of samples required for the haul roads category has been adjusted to eliminate the impact of one outlying data point.
- No Phase II sampling will be conducted for the creek debris category.

The Phase II sampling program will provide the data which will be used by OxyChem and the receiving disposal facilities to determine which groups of bags can be directly landfilled, which groups of bags require incineration, and which groups may be subject to a variance request to allow direct landfill. Presently, 3,811 of the 14,612 bags will be designated for incineration. Sampling in Phase II should determine whether 4,884 bags meet present LDR criteria to be landfilled under the LDRs and whether another 5,117 bags can be landfilled under a variance to the LDRs.

The proposed regulatory variances are outlined in Section 7.0.

## 2.0 INTRODUCTION

This report has been prepared by OxyChem to describe the Phase I activities performed in support of the characterization of the Love Canal Bagged Wastes currently stored at OxyChem's Niagara Plant in Niagara Falls, New York. The Phase I sampling and analysis program was originally described in the United States Environmental Protection Agency (USEPA)/New York State Department of Environmental Conservation (NYSDEC) approved "Sampling and Analysis Plan (SAP), Love Canal Wastes," dated June 3, 1996.

The original Love Canal Partial Consent Decree, signed by Judge Curtin in 1989, provided that OxyChem would dispose of the Love Canal remediation wastes by incineration at a thermal destruction unit to be constructed at the Niagara Plant or at alternative thermal destruction facilities approved in advance by the USEPA and NYSDEC. The decree was subsequently modified in 1997 to allow landfilling of certain remediation wastes where chemical levels in the wastes were shown to be less than the LDRs for F039 waste materials using the SW-846 statistical test.

Phase I of the SAP consisted of an initial comprehensive characterization of approximately one percent of the bagged materials. The bags were separated into five categories (creek sediment 1, creek sediment 2, haul roads, creek debris, facility cleanup). Each bag chosen for sampling was analyzed for complete F039 LDR list testing. A summary of the bagged waste identification and Phase I sampling requirements specified in the SAP is presented in Table 2.0.

The Phase I characterization was designed to provide the data needed to determine whether additional statistically based sampling and analysis (Phase II) was needed to determine treatment and disposal in accordance with the LDRs. If all of the samples from a category of waste were below the LDR limits, then the waste could be directly landfilled and no additional sampling and analyses would be needed. If only a metal constituent was above the LDR, then the waste could be stabilized and landfilled. If the mean value of any constituent was above the LDR or if the mean value plus two standard deviations for a constituent was above the LDR, then additional

sampling and analyses (Phase II) would be needed to determine which waste material required incineration or a variance from the F039 LDR regulations, and which waste material could be landfilled. Pages five (5) and six (6) of the SAP present the criteria for the determination of Phase II sampling and analyses requirements.

## 2.1 PHASE I OBJECTIVES

The Phase I data have been used to define the following:

- i) the preliminary characterization of bags within each category for treatment and/or disposal;
- ii) the number of samples to be collected in Phase II; and
- iii) the parameters to be analyzed for Phase II sampling and analysis.

### 3.0 SAMPLING PROGRAM

One hundred fifty-four samples (including six field duplicates) were collected and submitted for analysis for the Phase I program. All sampling was performed in accordance with the June 1996 SAP. Sample collection began on September 10, 1996, and concluded on November 15, 1996.

#### 3.1 SAMPLE COLLECTION

A sample collection and analysis summary is provided in Appendix A. A sample from one representative bag was collected in each 100 bag series except for the 11601 to 11700 and 13901 to 14000 bag series in the creek debris category. These bag series could not be located during sample collection and are believed to be buried within the piles. As will be discussed below, the entire creek debris category has been scheduled to be incinerated.

#### 3.2 SAMPLING PROCEDURE

Pursuant to the approved SAP, the bags were divided into sample groups of 100 bags per waste category according to the bag numbers. One bag within each group of 100 was located for sampling.

Approximately 25 percent of the Love Canal bags were exposed on the surface of the two storage piles in Buildings T-28 and T-29. This 25 percent represents a random selection of the groups and categories which were sampled. Due to accessibility, sample collection started on the lowest tier of bags and proceeded around the outer circumference of the piles. Sampling proceeded to the second tier of bags and continued until enough bags from each group within each category of material were located and sampled.

Grab samples were collected from the bags by opening the bag, inserting a clean polystyrene scoop at least six inches below the surface of the material, and collecting a grab sample. The samples were placed directly into clean sample jars and sealed with teflon-lined caps, and the bags were resealed.

A sample log was used to record pertinent information as samples were collected. The log included the following information: sample date, bag number, sample location in the bag houses, and photoionization detector (PID) reading.

### 3.3 CHAIN OF CUSTODY FORMS

Chain of custody forms were used to track all samples from the time of sampling to the arrival of samples at the laboratory.

Each shipping container sent to the laboratory contained a chain of custody form. The chain of custody form consisted of four copies which were distributed to the sampler, to the shipper, to the contract laboratory and to the office file. The sampler and shipper maintained their copies while the other two copies were enclosed in a waterproof enclosure within the sample container. The laboratory, upon receiving the samples, completed the remaining copies. The laboratory maintained one copy for their records. The executed original was returned with the data deliverables packages.

Copies of the executed chain of custody forms are located in the quality assurance/quality control (QA/QC) review of the data (see Appendix C).

### 3.4 SAMPLE CONTAINERS AND HANDLING

All samples were placed in appropriate sample containers, labeled, and properly sealed. The sample labels included bag sample number, place of collection, date and time of collection, and analyses to be performed. Samples were cushioned within the shipping coolers by the use of bubble pack. Samples were kept cool by the use of plastic bags of ice or cooler packs, as required. Samples were shipped priority overnight by commercial courier on a daily basis to the project laboratory.

Two seals comprised of chain of custody tape were placed over the lid on the front and back of each shipping cooler prior to shipment to secure the lid and provide evidence that the samples had not been tampered with during transportation to the laboratory. Clear tape was placed over the seals to ensure that they were not accidentally broken during shipment.

Upon receipt of the coolers at the laboratory, the coolers were inspected. The condition of the coolers and seals were noted on the chain of custody forms. The laboratory documented the date and time of receipt of the coolers and signed the chain of custody forms.

The laboratory checked the contents of the cooler with those samples listed on the chain of custody forms. If damage or discrepancies were noticed, they were recorded in the remarks column of the chain of custody form, dated and signed. The laboratory project manager then reported the information in the report narrative

## 4.0 ANALYTICAL PROGRAM

All samples submitted were analyzed for the complete F039 LDR list of parameters. Site specific matrix spike/matrix spike duplicate (MS/MSD) analyses were performed at a minimum frequency of one in twenty samples. All analyses were performed in accordance with the June 1996 SAP.

### 4.1 LABORATORY ANALYSES

An analytical results summary is provided in Appendix B. All laboratory results were validated and any required sample qualifications have been included in the table. A full discussion of the QA/QC Review can be found in the validation report, located in Appendix C of this report.

All data were judged to be usable with the exception of 41 sample kepone results for the pesticides/PCBs analyses and three sample phenolic compounds results for the SVOCs analyses. These results were originally non-detect, but were rejected (denoted by "R" in the results table) due to poor laboratory MS/MSD and/or surrogate spike recoveries. No samples collected in Phase I exceeded the LDR limits for kepone or any SVOC phenolic compounds, so the impact of the rejected data on the program is considered negligible.

### 4.2 SAMPLE RE-ANALYSIS

Upon a review of the data, two samples were identified as possible outliers based on the results of other samples within the category. The dioxins/furans results for haul roads sample HR-10241 were a magnitude greater than any other haul roads sample, and the sample was collected again on January 30, 1997, and submitted for dioxins/furans analysis. The dioxins/furans results for creek sediment 1 sample CS-07226 were also significantly greater than any other creek sediment 1 sample within similar bag ranges, and this sample was collected again on February 3, 1997, and submitted for dioxins/furans analysis.

The laboratory results for these samples confirmed the data originally reported, and no further evaluation of the laboratory report was performed.



## 5.0 DISCUSSION OF RESULTS

A review of the analytical results demonstrates that no samples exceeded the LDR limits for VOCs, herbicides, cyanide, or methanol. These parameters have been deleted from any Phase II analyses. All samples met the LDR limits for toxicity characteristic leaching procedure (TCLP) metals except for two creek sediment 1 samples, which had TCLP lead results marginally above the LDR limit of 0.37 milligrams per liter.

All remaining LDR exceedances were either SVOCs, pesticides/PCBs, or dioxins/furans. A discussion of each individual category follows. Field duplicate results are not included in this discussion. None of the five categories of material met the standard of having a mean value plus two standard deviations below the LDR treatment standards, and, therefore, all categories require further testing in Phase II, must be scheduled for incineration, or must receive a variance from the LDRs, as outlined in Page 6 of the SAP.

### 5.1 CREEK SEDIMENT 1 (7,232 BAGS)

A summary of the LDR exceedances is presented in Table 5.1. Samples CS-06145 and CS-06471 also exceeded the LDR limit for TCLP lead.

Twenty-eight of the 74 samples collected did not exceed the LDR limits. The majority of the remaining samples exceeded the dioxins/furans LDR limits. All exceedances were minor except for samples CS-00897 and CS-00996, which had elevated total dioxins/furans levels. The category mean value for total tetra-chlorinated dibenzo-p-dioxins (TCDDs) marginally exceeded the LDR limit.

The bag series 1 to 600, 4301 to 5300, and 6401 to 7200 have either no or only one marginal sample LDR exceedance (see Table 5.1). These bag series represent the creek sediment 1 candidates for direct landfill without further treatment, pending acceptable Phase II results. The remaining bag series

are candidates for landfill with a regulatory variance or require treatment prior to disposal.

## 5.2 CREEK SEDIMENT 2 (1,512 BAGS)

A summary of the LDR exceedances is presented in Table 5.2

Twelve of the 16 samples collected did not exceed the LDR limits. All exceedances for the remaining samples were minor. No category mean value exceeded an LDR limit.

The bag series 8401 to 9495 has no sample LDR exceedances (see Table 5.2). This bag series represents the creek sediment 2 candidates for direct landfill without further treatment, pending acceptable Phase II results. The remaining bag series are candidates for landfill with a regulatory variance or require treatment prior to disposal.

## 5.3 HAUL ROADS (1,450 BAGS)

A summary of the LDR exceedances is presented in Table 5.3

Eight of the 14 samples collected did not exceed the LDR limits. All exceedances for the remaining samples were minor except for sample HR-10241, which had elevated aldrin and total dioxins/furans levels. No category mean value exceeded an LDR limit.

The bag series 9496 to 10200 had only two minor sample LDR exceedances (see Table 5.3), and represents the haul roads candidates for direct landfill without further treatment, pending acceptable Phase II results. The remaining bag series are candidates for landfill with a regulatory variance or require treatment prior to disposal.

#### 5.4 FACILITY CLEANUP (607 BAGS)

A summary of the LDR exceedances is presented in Table 5.4.

Two of the seven samples did not exceed the LDR limits. All exceedances for the remaining samples were minor. The category mean value for total TCDDs marginally exceeded the LDR limit.

The bag series 14817 to 15000 has no LDR exceedances (see Table 5.4), and represents the facility cleanup candidates with a high probability for direct landfill without further treatment, pending acceptable Phase II results.

The remaining bag series are candidates for landfill with a regulatory variance or require treatment prior to disposal.

#### 5.5 CREEK DEBRIS (3,811 BAGS)

A summary of the LDR exceedances is presented in Table 5.5.

The mean value of this category exceeded the LDR limits for all three regulated total dioxins. The creek debris category exceeded the LDR limits for these dioxin congeners plus various chlorinated benzenes. This waste category was substantially different in that the chemicals present were more diverse and generally higher in concentration than in the other four categories. Based on the differences in analyte LDR exceedances and concentration levels, the creek debris category has been excluded from any proposed regulatory variances and will be incinerated prior to landfill disposal.

## 6.0 PHASE II SAMPLING

### 6.1 INTRODUCTION

It is the generator's responsibility under the LDRs to properly classify waste materials and to issue a Land Disposal Certification with waste shipments, showing that the waste meets the LDRs if destined for landfill. The EPA has established a statistical sampling basis for determining how many samples are needed to provide data for compliance with the LDRs. This method is detailed in SW-846, Third Edition, Chapter Nine. The method uses available characteristic data for a waste, and then calculates the number of samples needed to verify compliance with LDRs. The Phase I SAP was designed to provide the basic characterization data needed to apply the equations in SW-846, Third Edition, Chapter Nine, and to determine the sampling frequency needed to verify shipments. The number of samples to be analyzed in Phase II (described below) has been determined using these equations, and the results of the Phase II data will be used to determine which waste material meets the LDRs and can be landfilled. This data will also be used to determine which wastes may be above the LDRs but can be landfilled if a variance from the LDRs is obtained, and which wastes have constituent levels above the LDR or the variance level and therefore require incineration.

In addition to the responsibility of the generator to properly classify the waste for LDR purposes, the receiving landfill also has a responsibility to verify that the material being received meets the LDRs prior to landfilling. The established Waste Analysis Plan (WAP) for the landfill determines the frequency of sampling and analysis required. This frequency will vary by facility and state. The frequency of sampling required can vary from a minimum of once per year per waste stream up to a maximum of one sample for every twenty loads received. In all these cases, the WAPs are based on the assumption that the waste is an on-going process waste stream that may change or vary with time. In the case of this project, however, all of the waste has been bagged and readied for shipment. Further, the initial data shows that the waste does not vary greatly from bag to bag. There is precedent in most states to allow for a special sampling requirement for projects of this type. In most cases the special plans call for following a statistical sampling, similar to the Phase II

program described here. Therefore, it is expected that the data from the Phase II sampling and analysis will be used by both the generator and the receiving landfill to verify LDR compliance, since all of the sampling and analysis will be in accordance with approved SW-846 methods. This combined program approach will expedite the project and eliminate redundant sampling requirements on both ends of the shipments.

## 6.2 SAMPLING METHOD

All of the Phase II sampling will consist of field composites. The initial sampling was based on the standard LDR grab samples in order to provide basic characterization data. LDR verification data (as generally written into landfill and incineration WAPs) are based on a composite sample taken from several locations in a bulk bin, so that a representative value for the bulk shipment can be obtained. Each sample will consist of grab samples from four individual bags chosen at random from groups within the category. A group will represent a proportion of bags within the category based on the number of Phase II samples required in each category. The individual samples will be field composited into one sample, and the sample will be submitted for analysis. Field compositing can be used in the Phase II sampling because VOCs are no longer part of the analytical program (none were found above the LDRs in any waste samples).

Phase II bag selection will be consistent with the procedures detailed in the SAP (see Section 3.2) and used in the Phase I sampling program. The waste will be divided into the four categories, two from the creek remediation, one from the haul roads, and one from the facility cleanup waste. The Phase I data showed that these categories worked quite well, and segmented the waste as expected in accordance with the way the waste was excavated and bagged. The bags (all have unique numbers) will be divided into Phase II sampling groups by taking the total number of bags and dividing by the number of samples needed for each category of waste. Each of the bags will then be assigned to a Phase II sampling group. No bags sampled in Phase I will be used in Phase II. Four bags will be selected from each Phase II sampling group. The selected bags will be on the edge or surface of the pile. The selected bags will be

opened and a sample obtained. The bags will then be resealed. The four samples from each Phase II sampling group will then be composited into one sample for analysis. Samples will be collected and composited using the procedures outlined in the SAP, including the use of appropriate sampling equipment and chain of custody forms. The samples will be submitted to the laboratory for the required analysis.

The SAP discusses that Phase II sampling will be accomplished after the bags are staged into shipping groups. OxyChem proposes that Phase II sampling be performed in the same fashion as the Phase I sampling for four reasons. First, the incineration of Durez bagged waste has proceeded more slowly than expected. There is no space reasonably available to accomplish the staging originally contemplated by the SAP and this lack of space will unnecessarily delay Phase II sampling. Second, the Phase I sampling program was very successful in providing data and information regarding the characteristics of the materials in the bags. Third, Phase II sampling now will facilitate review of the LDR variance petition which OxyChem intends to file. Fourth, the movement of the 2½ ton bags contemplated by the SAP is a major engineering project that, by its very nature and under the best safety plans and practices, places workers at risk of injury and could lead to spills or breaks in the bags. OxyChem has also considered whether removing Durez bagged waste and creek debris bags for incineration would open up more bags in the four categories for sampling. It appears only 25 bags would become available, so this option does not seem to be feasible.

An inspection of the bag houses shows that the most of the Phase II samples required for each category can be obtained without moving many bags from the piles. In some cases, the number of bags exposed on the edge of the piles is large compared to the number of Phase II samples required.

### 6.3 CALCULATIONS

The statistical calculation used to determine Phase II sampling frequency was equation (8) of Table 9-1 of SW-846 Third Edition, Volume II, November 1986. The mean, variance, and standard deviation were

calculated as specified in equations (2a), (3a), and (4) of Table 9-1. A summary of the statistical sampling data from the Phase I analytical results is presented in Table 6.3. Field duplicates were not included in the calculations

#### 6.4 DISCUSSION

A summary of the proposed Phase II sampling program is presented in Table 6.4. The program uses the Phase I statistical data from Table 6.3 with the following exceptions:

- Using Phase I data, the number of samples for the haul roads category showed a requirement of 314 samples, which would mean sampling 1,256 individual bags out of a total of 1,450 bags. This very high sample number, as shown in Table 5.1, is due to one sample (HR-10241), which had a high level of one isomer of dioxin. This high value, compared to all the other data, resulted in an elevated mean and variance for the category. Upon further inspection of the data, it was apparent that this one bag and its sample were not similar to any of the other 13 samples collected and it is considered to be a statistical outlier. If this data point is eliminated from the calculation, the revised statistics showed that 5 samples are required as compared to 314. Overall review of the data with respect to the consistency of the results and applying reasonable scientific judgment would show that the use of 14 samples (from 56 individual bags) is an appropriate number of samples to characterize this category for disposal.
- The creek debris category had a high number of samples over the LDR limits and a high variability. This showed a large number of samples would be needed to segment the category and most of the waste would require incineration. Therefore, as stated previously in this report and as outlined in the SAP, no Phase II sampling will be conducted for the creek debris category. Based on the Phase I results, the 3,811 bags in this category are not candidates for landfill disposal without further treatment, and therefore all of the waste in this category will be incinerated prior to landfill disposal.

## 6.5 ANALYTICAL PROGRAM

Table 6.4 shows the analytical testing which will be performed for each of the waste categories. As outlined in the SAP, constituents for the Phase II analytical program are to be based on those constituents found during the Phase I testing. The analyses shown in Table 6.4 reflect the constituents or groups of constituents that had a mean value or a mean value plus two standard deviations above the LDR limit for that constituent. The main constituents requiring analyses are the polychlorinated dibenzo-p-dioxins and the polychlorinated dibenzo-furans. In the case of the creek sediment 1 category, lead was found in two samples which caused the mean value plus two standard deviations to be just above the LDR limit. Therefore lead will be tested for the creek sediment 1 category. The haul roads and the facility cleanup categories both showed some positive results for certain pesticide compounds. Based on the Phase I data, aldrin will be tested for the haul road category, and BHCs will be analyzed for samples from the facility cleanup category.

All analytical data for Phase II testing will be done using the RCRA SW-846 analytical methods with specified QA/QC as stated in the SAP. The RCRA methods are the methods specified in the regulations for determining compliance with the LDRs. Dioxin/furan analysis will be performed using Method 8280 (LRMS) or 8290 (HRMS). The lead analysis will be performed on a TCLP extract (Method 1311) using Method 6010. The pesticides analysis for aldrin and BHCs will be performed using Method 8080. The laboratory performing the analytical work will be an EPA Contract Lab (CLP) and will be certified in several states, including Utah.

## 6.6 STATUS OF PHASE I BAGS SAMPLED

Based on the Phase I results, 50 of the bags sampled from the creek sediment 1, creek sediment 2, haul roads, and facility cleanup categories did not exceed the LDR limits and can be directly landfilled. Of the remaining bags sampled in these categories, 58 samples have marginal LDR exceedances. These bags will be candidates for landfilling if the LDR variance discussed in



Section 7.0 is granted. All 3,811 creek debris bags will be incinerated, as will two bags from the creek sediment category and one bag from the haul roads category.

## 7.0 REGULATORY VARIANCE

### 7.1 PROPOSED VARIANCE

OxyChem intends to apply for an LDR treatability variance, pursuant to 40 CFR 268.44, for the creek sediment 1, creek sediment 2, haul roads, and facility cleanup categories. The proposed variance would establish alternative treatment standards for dioxins/furans of 10 ppb (see Table 7.1). Materials meeting the alternative standard would be disposed of in a RCRA Subtitle C permitted landfill.

### 7.2 BASIS AND REASON FOR VARIANCE

The LDR regulations provide that a treatability variance is appropriate when either (1) the waste cannot be treated to the specified level or (2) the treatment technology is not appropriate to the waste (40 C.F.R. § 268.44). The Love Canal bagged waste materials qualify under either criteria. First, the bagged material consists of soil and environmental media, wastes which the Agency has previously stated qualify for a treatability variance. Second, the use of incineration is not appropriate for large volumes of soil and sediment that contain concentrations of organic constituents only marginally above the treatment standard.

#### A. The EPA Has Created A Presumption That The LDR Treatment Standards Are Not Achievable For These Waste Types.

The EPA's numerical treatment standards are based on the application of Best Demonstrated Available Technology (BDAT) to process wastes. For organic constituents, BDAT is generally incineration. However, the EPA has never determined the numerical treatment standards that would be obtained by applying BDAT to environmental media. Rather, the Agency has determined that:

until specific standards for soils and debris are developed, current BDAT standards are generally inappropriate or unachievable for soil and debris

from CERCLA response actions and RCRA corrective actions and closures. Rather, the EPA presumes that, *because contaminated soil and debris is significantly different from the wastes evaluated in establishing the BDAT standards, it cannot be treated in accordance with those standards, and thus qualifies for a treatability variance from those standards under 40 CFR 268.44. Accordingly, persons seeking a treatability variance from LDR treatment standards for contaminated soil and debris do not need to demonstrate on a case-by-case basis that BDAT standards for prohibited hazardous wastes are inappropriate or not achievable.*

55 Fed. Reg. 8760, 8761 (March 8, 1990) (emphasis added).

The EPA has elaborated on this principle in guidance. "Obtaining a Soil and Debris Treatability Variance for Remedial Actions," OSWER Doc. 9347.3-06FS (Sept. 1990). That guidance provides that for soils containing initial dioxin concentrations less than 500 ppb, alternative treatment standards should be established in the range of .01 to 50 ppb. (Since publication of that guidance, the universal treatment standard for dioxin has been established at 1 ppb.) The Agency has granted a treatability variance for dioxin-containing wastes of 5 ppb at the Vertac Superfund site and has proposed a variance of 50 ppb at Dow Chemical's Midland, Michigan site. (At the Vertac site, the variance was granted in part because of the EPA's finding that the 1 ppb standard could not be met with incineration.) The standard of 10 ppb proposed by OxyChem is well within the range the EPA has indicated is appropriate.

The proposed variance would apply to four waste categories - creek sediment 1, creek sediment 2, haul roads, and facility cleanup. These wastes are similar in both the identity and concentrations of constituents found in the wastes. These wastes are also similar in physical characteristics, being either creek sediment and soil-like material, or soil and debris from the construction activity.

Analyses of samples from these four waste categories showed that much of the waste already meets the LDR treatment standard, while the rest of the waste is only marginally above the limit, specifically, in the range of 1 to 5 ppb. Consistent with the EPA's presumption that contaminated

environmental media should qualify for a treatability variance, these waste categories should be granted a variance.

B. Incineration Is Not Appropriate For These Wastes.

The EPA also has determined that a treatability variance should be granted when use of the treatment technology needed to achieve numerical treatment standards is not appropriate for the waste, even if the numerical standards are technically achievable. 62 Fed. Reg. 26041, 26058-26060 (May 12, 1997). One specific example of a situation where a treatability variance should be granted under this rationale is where "the treatment standard would result in combustion of large amounts of soil or wastewater." *Id.* at 26059. More generally, a treatability variance should be granted where "imposition of BDAT treatment would lead to environmentally counterproductive results." *Id.*

Both of these rationales apply in this case. Holding the Love Canal bagged wastes to the 1 ppb treatment standard for dioxin would require the combustion of massive amounts of soil for the destruction of minuscule amounts of dioxin. Moreover, given the pollutants generated in the incineration process itself, and the minimal (if any) reduction in the risk posed by the wastes, incineration of this material is clearly not appropriate.

The placement of soil materials containing up to 10 ppb of dioxins/furans in a carefully monitored Subtitle C landfill clearly minimizes or eliminates any risk that this small amount of material may have to the environment. In addition, the material has been stabilized, which will tend to render the remaining low level constituents immobile. The EPA itself has recognized that dioxins bind tightly to soils and that soils contaminated with low levels of dioxin pose little risk when properly managed. In the preamble to its proposed rule imposing the LDRs on dioxin wastes, the Agency stated that "Investigations have documented the extreme immobility of TCDD in most soils and its low solubility in water. . . . the other CDDs and CDFs are expected to be immobile in soils and water insoluble." 51 Fed. Reg. 1602, 1731 (Jan. 14, 1986). The Agency stated further that "CDDs and CDFs are not expected to leach into groundwater and percolate through soils if proper precautions are taken to prevent co-disposal with solubilizing agents." *Id.* The Agency has thus

recognized that low concentrations of soil-bound dioxins can be safely managed in an appropriate landfill.

The landfill currently proposed to receive this waste is Laidlaw's Grassy Mountain Landfill in Utah. This landfill is a new facility and is designed to meet or exceed all Subtitle C requirements. The landfill is located in an area with little or no groundwater (semi-arid region) and is isolated from contact with the general population. This facility provides an extremely secure and protective location for the disposal of these waste materials. There is virtually no possibility that the materials in this waste will leach in any significant quantity and even less chance that any leached material would reach the environment. Therefore, given the nature of the waste and the very low levels of constituents, the stabilization treatment achieved, and the design of the landfill cells, land disposal of material with up to 10 ppb dioxins/furans is the appropriate treatment and disposal technology for this waste.

The proposed variance would eliminate the need to incinerate large quantities of materials to destroy minute quantities of dioxins/furans. The incineration of material with virtually no significant organic content will consume a large amount of fuel. The burning of this fuel will generate greenhouse gases such as carbon dioxide, and also increased levels of NOx. Evaluation of multi-media impacts would show that granting this variance would result in a net reduction in total pollutants entering the environment. Because dioxins/furans are relatively immobile in soils, incineration has no net environmental benefit compared to placement of these wastes in a RCRA permitted landfill, and therefore these wastes should be granted a treatability variance.

Moreover, incineration of this material will not significantly reduce the volume of material ultimately landfilled. This is due to the composition of the soils, which generally consist of less than 10 percent organic matter. In fact, when the material is burned with other waste materials in the incinerator, the resulting volume can actually increase if the "mixed residue" (soil and other wastes burned together) requires stabilization prior to being placed in the landfill. In addition, the particulate matter removed in the incinerator gas cleaning train generally is light and fluffy, resulting in a larger

volume than the original soil and debris. Thus, the granting of this variance will result in no significant decrease in the volume of material landfilled and may actually slightly increase the overall volume of waste requiring land disposal.

The proposed variance will have a significant impact on the schedule for completion of this project. Currently, the capacity at the receiving incinerators is the rate limiting step for completion of this project. At the current rate of disposal by incineration, the project will take approximately 4 years to complete. The variance would reduce the amount of material requiring incineration, therefore reducing the total time for project completion by approximately two years. This shorter project schedule would result in material being stored for a shorter period of time at the Niagara Falls location and more timely completion of the total project.

## 8.0 CONCLUSION

OxyChem has completed Phase I sampling as required by the SAP for the Love Canal Bagged Wastes. In accordance with the SAP, the Phase I data have been used to develop the sampling frequency and analyte list for Phase II of the program.

It is anticipated that the analytical results from the Phase II sampling will provide OxyChem with disposal options similar to the Phase I data for each waste category. A summary of the projected disposal quantities is presented in Table 8.0. Projections for each waste category are in the following sections. In accordance with the Phase I program, each Phase I bag sampled has been used to represent approximately 100 bags. All projections are estimated based on the Phase I data. Actual disposal quantities will be based on the Phase II sample data.

### 8.1 CREEK SEDIMENT 1 (7,232 BAGS)

Based on the Phase I data and using F039 LDR limits, 2,700 bags are candidates that presently may qualify for direct landfill disposal. If a variance is granted and stabilizing for metals is performed, 7,032 bags are candidates for landfill disposal.

### 8.2 CREEK SEDIMENT 2 (1,512 BAGS)

Based on the Phase I data and using the F039 LDR limits, 1,195 bags are candidates that presently may qualify for direct landfill disposal. If the variance is granted, 1,412 bags would be candidates to qualify for direct landfill disposal.

### 8.3 HAUL ROADS (1,450 BAGS)

Based on the Phase I data and using the F039 LDR limits, 805 bags are candidates that presently may qualify for direct landfill disposal. If the variance is granted, 1,050 bags are candidates to qualify for direct landfill disposal.

### 8.4 FACILITY CLEANUP (607 BAGS)

Based on the Phase I data and using the F039 LDR limits, 184 bags are candidates that presently may qualify for direct landfill disposal. If the variance is granted, 507 bags would be candidates to qualify for direct landfill disposal.

### 8.5 CREEK DEBRIS (3,811 BAGS)

Based on the Phase I data, this category does not qualify for direct landfill disposal. This category is clearly different from all other categories in regard to the level and type of chemical presence, and will be incinerated to meet the F039 LDR limits.



TABLES

**TABLE 2.0**  
**BAGGED WASTE IDENTIFICATION AND PHASE I SAMPLING REQUIREMENTS**  
**LOVE CANAL BAGGED WASTES**  
**PHASE I REPORT**  
**OCCIDENTAL CHEMICAL CORPORATION**  
**NIAGARA FALLS, NEW YORK**

<i>Waste</i>	<i>Date Bagged</i>	<i>Category</i>	<i>Number of Bags</i>	<i>From Bag Number</i>	<i>Total Bag Numbers</i>
Creek Sediment	8/1 - 9/11	B-1	7,232	0	7,232
Sewer Sediment	9/12 - 9/14	S	751	7,233	7,983
Creek Sediment	9/15 - 9/25	B-2	1,512	7,984	9,495
Haul Road	9/25 - 10/3	HR	1,450	9,496	10,945
Small Debris	10/5 - 10/31	B-3	1,593	10,946	12,538
Carbon	11/8 - 11/9	C	60	12,539	12,598
Small Debris	11/9 - 11/30	B-3	1,284	12,599	13,882
Debris	12/1 - 12/13	B-3	934	13,883	14,816
Facility Cleanup	6/90 - 7/90	F	607	14,817	15,423

*Summary of Waste to be Sampled*

<i>Waste</i>	<i>Code</i>	<i>Number of Bags</i>	<i>Color Code</i>	<i>Samples</i>
Creek (1)	B-1	7,232	None	72
Creek (2)	B-2	1,512	None	15
Creek Debris	B-3	3,811	Yellow or Blue Sides	38
Haul Roads	HR	1,450	Orange Top, Yellow or Orange Side	15
Facility Closure	F	607	None Listed	6
<b>Total</b>		<b>14,612</b>		<b>146</b>

Notes:

- (1) Creek sediment 1.
- (2) Creek sediment 2.

**TABLE 5.1**  
**LDR EXCEEDANCE SUMMARY AND DISPOSAL OPTIONS - CREEK SEDIMENT 1**  
**LOVE CANAL BAGGED WASTES**  
**PHASE I REPORT**  
**OCCIDENTAL CHEMICAL CORPORATION**  
**NIAGARA FALLS, NEW YORK**

<i>Bag Range</i>	<i>Bag Number</i>	<i>Total PCDDs/PCDFs (µg/Kg)</i>	<i>Total SVOCs (mg/Kg)</i>	<i>Total Pesticides/PCBs (mg/Kg)</i>
0-100	CS-00061	-	-	-
101-200	CS-00116	-	-	-
201-300	CS-00273	-	-	-
301-400	CS-00336	-	-	-
401-500	CS-00478	-	-	-
501-600	CS-00501	-	-	-
601-700	CS-00631	2.7	-	-
701-800	CS-00774	3.1	-	-
801-900	CS-00897	25	-	-
901-1000	CS-00996	22	-	0.12
1001-1100	CS-01089	1.8	-	-
1101-1200	CS-01144	7.1	-	-
1201-1300	CS-01250	9.6	-	-
1301-1400	CS-01397	8.0	-	-
1401-1500	CS-01428	7.3	-	-
1501-1600	CS-01506	5.4	-	-
1601-1700	CS-01692	7.3	-	-
1701-1800	CS-01768	4.8	-	-
1801-1900	CS-01859	7.6	-	-
1901-2000	CS-01935	1.5	-	-
2001-2100	CS-02070	3.8	-	-
2101-2200	CS-02192	3.1	-	-
2201-2300	CS-02222	1.3	-	-
2301-2400	CS-02383	1.4	-	-
2401-2500	CS-02425	2.0	-	-
2501-2600	CS-02568	1.9	-	-
2601-2700	CS-02622	4.1	-	-
2701-2800	CS-02785	-	-	-
2801-2900	CS-02868	-	-	-
2901-3000	CS-02936	1.7	-	-
3001-3100	CS-03069	4.1	-	-
3101-3200	CS-03180	4.7	-	-
3201-3300	CS-03254	3.3	14	-
3301-3400	CS-03365	2.3	-	-
3401-3500	CS-03478	1.7	-	-
3501-3600	CS-03526	-	-	-
3601-3700	CS-03693	1.3	-	-
3701-3800	CS-03737	1.1	-	-
3801-3900	CS-03814	-	-	-
3901-4000	CS-03907	-	-	-
4001-4100	CS-04072	1.1	-	-

**TABLE 5.1**  
**LDR EXCEEDANCE SUMMARY AND DISPOSAL OPTIONS - CREEK SEDIMENT 1**  
**LOVE CANAL BAGGED WASTES**  
**PHASE I REPORT**  
**OCCIDENTAL CHEMICAL CORPORATION**  
**NIAGARA FALLS, NEW YORK**

<i>Bag Range</i>	<i>Bag Number</i>	<i>Total PCDDs/PCDFs (µg/Kg)</i>	<i>Total SVOCs (mg/Kg)</i>	<i>Total Pesticides/PCBs (mg/Kg)</i>
4101-4200	CS-04169	1.2	-	-
4201-4300	CS-04222	1.2	-	-
4301-4400	CS-04305	-	-	-
4401-4500	CS-04460	-	-	-
4501-4600	CS-04585	-	-	-
4601-4700	CS-04612	-	-	-
4701-4800	CS-04759	-	-	-
4801-4900	CS-04836	1.1	-	-
4901-5000	CS-04902	-	-	-
5001-5100	CS-05085	-	-	-
5001-5100	CS-05087	-	-	-
5101-5200	CS-05183	-	-	-
5201-5300	CS-05261	-	-	-
5301-5400	CS-05381	3.1	-	-
5401-5500	CS-05460	5.7	-	-
5501-5600	CS-05576	1.8	-	-
5601-5700	CS-05673	1.5	-	-
5701-5800	CS-05780	3.8	-	-
5801-5900	CS-05863	1.4	-	-
5901-6000	CS-05935	2.7	-	-
6001-6100	CS-06037	1.3	-	-
6101-6200	CS-06145	1.8	-	-
6201-6300	CS-06226	1.3	-	-
6301-6400	CS-06387	2.1	-	-
6401-6500	CS-06471	-	-	-
6501-6600	CS-06592	3.0	-	-
6601-6700	CS-06670	-	-	-
6701-6800	CS-06722	-	-	-
6801-6900	CS-06801	-	-	-
6901-7000	CS-06910	-	-	-
7001-7100	CS-07078	-	-	-
7101-7200	CS-07109	-	-	-
7201-7232	CS-07226	10	-	-

## Notes:

- No values detected above LDR regulatory limits for this parameter.
- LDR Land Disposal Restriction.
- PCBs Polychlorinated Biphenyls.
- PCDDs Polychlorinated Dibenzop-dioxins.
- PCDFs Polychlorinated Dibenzofurans.
- SVOCs Semi-Volatile Organic Compounds.

**TABLE 5.2**  
**LDR EXCEEDANCE SUMMARY AND DISPOSAL OPTIONS - CREEK SEDIMENT 2**  
**LOVE CANAL BAGGED WASTES**  
**PHASE I REPORT**  
**OCCIDENTAL CHEMICAL CORPORATION**  
**NIAGARA FALLS, NEW YORK**

<i>Bag Range</i>	<i>Bag Number</i>	<i>Total PCDDs/PCDFs (µg/Kg)</i>	<i>Total SVOCs (mg/Kg)</i>	<i>Total Pesticides/PCBs (mg/Kg)</i>
7984-8000	CS2-07985	1.1	-	-
8001-8100	CS2-08011	1.4	-	-
8101-8200	CS2-08199	-	-	-
8201-8300	CS2-08221	3.8	-	-
8301-8400	CS2-08338	-	-	-
8401-8500	CS2-08432	-	-	0.076
8501-8600	CS2-08529	-	-	-
8601-8700	CS2-08602	-	-	-
8701-8800	CS2-08761	-	-	-
8801-8900	CS2-08885	-	-	-
8901-9000	CS-08993	-	-	-
9001-9100	CS2-09048	-	-	-
9101-9200	CS2-09110	-	-	-
9201-9300	CS2-09230	-	-	-
9301-9400	CS2-09329	-	-	-
9401-9495	CS-09471	-	-	-

Notes:

- No values detected above LDR regulatory limits for this parameter.
- LDR Land Disposal Restriction.
- PCBs Polychlorinated Biphenyls.
- PCDDs Polychlorinated Dibenzo-p-dioxins.
- PCDFs Polychlorinated Dibenzofurans.
- SVOCs Semi-Volatile Organic Compounds.

**TABLE 5.3**  
**LDR EXCEEDANCE SUMMARY AND DISPOSAL OPTIONS - HAUL ROADS**  
**LOVE CANAL BAGGED WASTES**  
**PHASE I REPORT**  
**OCCIDENTAL CHEMICAL CORPORATION**  
**NIAGARA FALLS, NEW YORK**

<i>Bag Range</i>	<i>Bag Number</i>	<i>Total PCDDs/PCDFs (µg/Kg)</i>	<i>Total SVOCs (mg/Kg)</i>	<i>Total Pesticides/PCBs (mg/Kg)</i>
9496-9600	HR-09581	-	-	-
9601-9700	HR-09670	-	3.6	-
9701-9800	HR-09705	-	-	-
9801-9900	HR-09838	-	-	0.081
9901-10000	HR-09904	-	-	-
10001-10100	HR-10059	-	-	-
10100-10200	HR-10125	-	-	-
10201-10300	HR-10241	21	-	-
10301-10400	HR-10392	-	-	0.13
10401-10500	HR-10425	-	-	-
10501-10600	HR-10535	1.9	-	-
10601-10700	HR-10678	1.1	-	0.068
10701-10800	HR-10712	-	-	-
10801-10945	HR-10860	1.3	-	-

**Notes:**

- No values detected above LDR regulatory limits for this parameter.
- LDR Land Disposal Restriction.
- PCBs Polychlorinated Biphenyls.
- PCDDs Polychlorinated Dibenzo-p-dioxins.
- PCDFs Polychlorinated Dibenzofurans.
- SVOCs Semi-Volatile Organic Compounds.

**TABLE 5.4**  
**LDR EXCEEDANCE SUMMARY AND DISPOSAL OPTIONS - FACILITY CLEANUP**  
**LOVE CANAL BAGGED WASTES**  
**PHASE I REPORT**  
**OCCIDENTAL CHEMICAL CORPORATION**  
**NIAGARA FALLS, NEW YORK**

<i>Bag Range</i>	<i>Bag Number</i>	<i>Total PCDDs/PCDFs (µg/Kg)</i>	<i>Total SVOCs (mg/Kg)</i>	<i>Total Pesticides/PCBs (mg/Kg)</i>
14817-14900	FC-14858	-	-	-
14901-15000	FC-14949	-	-	-
15001-15100	FC-15085	1.7	-	-
15101-15200	FC-15171	3.4	-	-
15201-15300	FC-15278	1.6	-	0.10
15301-15400	FC-15319	1.6	-	-
15401-15423	FC-15421	4.9	-	-

Notes:

- No values detected above LDR regulatory limits for this parameter.

- LDR Land Disposal Restriction.
- PCBs Polychlorinated Biphenyls.
- PCDDs Polychlorinated Dibenzo-p-dioxins.
- PCDFs Polychlorinated Dibenzofurans.
- SVOCs Semi-Volatile Organic Compounds.

**TABLE 5.5**  
**LDR EXCEEDANCE SUMMARY AND DISPOSAL OPTIONS - CREEK DEBRIS**  
**LOVE CANAL BAGGED WASTES**  
**PHASE I REPORT**  
**OCCIDENTAL CHEMICAL CORPORATION**  
**NIAGARA FALLS, NEW YORK**

<i>Bag Range</i>	<i>Bag Number</i>	<i>Total PCDDs/PCDFs (mg/Kg)</i>	<i>Total SVOCs (mg/Kg)</i>	<i>Total Pesticides/PCBs (mg/Kg)</i>
10946-11000	CD-10984	1.3	-	-
11001-11100	CD-11081	3.3	-	-
11101-11200	CD-11120	-	-	-
11201-11300	CD-11248	5.0	-	-
11301-11400	CD-11372	3.1	-	-
11401-11500	CD-11466	3.3	-	0.095
11501-11600	CD-11569	1.3	-	-
11701-11800	CD-11741	4.3	-	0.19
11801-11900	CD-11889	3.1	-	0.21
11901-12000	CD-11912	5.8	3.8	-
12001-12100	CD-12055	9.0	-	-
12101-12200	CD-12112	3.2	-	0.098
12201-12300	CD-12211	4.4	-	0.068
12301-12400	CD-12367	6.6	-	-
12401-12500	CD-12488	1.3	-	-
12501-12538	CD-12533	2.8	-	-
12599-12700	CD-12695	1.6	-	-
12701-12800	CD-12708	2.1	29	-
12801-12900	CD-12880	3.0	-	-
12901-13000	CD-12921	2.2	-	-
13001-13100	CD-13020	37	20	0.098
13101-13200	CD-13120	34	51	-
13201-13300	CD-13282	15	-	-
13301-13400	CD-13395	3.4	109	0.19
13401-13500	CD-13429	13	71	0.23
13501-13600	CD-13528	5.2	-	0.11
13601-13700	CD-13645	4.6	47	0.11
13701-13800	CD-13780	12	67	0.57
13801-13900	CD-13874	19	-	-
14001-14100	CD-14073	7.8	-	0.18
14101-14200	CD-14157	1.3	25	0.13
14201-14300	CD-14247	7.0	-	0.096
14301-14400	CD-14391	5.3	-	0.10
14401-14500	CD-14445	11	26	0.18
14501-14600	CD-14522	6.7	23	0.11
14601-14700	CD-14674	54	18	0.23
14701-14816	CD-14739	4.0	-	0.13

Notes:

- (1) The creek debris category has been designated for incineration prior to disposal.
- No values detected above LDR regulatory limits for this parameter.
- LDR Land Disposal Restriction.
- PCBs Polychlorinated Biphenyls.
- PCDDs Polychlorinated Dibenzo-p-dioxins.
- PCDFs Polychlorinated Dibenzofurans.
- SVOCs Semi-Volatile Organic Compounds.



TABLE 6.3  
 STATISTICAL SAMPLING DATA  
 LOVE CANAL BAGGED WASTES  
 PHASE I REPORT  
 OCCIDENTAL CHEMICAL CORPORATION  
 NIAGARA FALLS, NEW YORK

			<i>Creek Sediment 1</i> (Calculations based on data from 74 of 74 total samples)						
<i>LDR TCLP Metals</i>	<i>Units</i>	<i>LDR Regulatory Limits</i>	<i>Mean</i>	<i># Samples</i>	<i>Std. Dev. (s)</i>	<i>Variance (s2)</i>	<i>T.20</i>	<i>UCL</i>	<i>n</i>
Lead	mg/L	0.37	0.054	74	0.162	0.026	1.294	0.378	1
<i>Total PCDDs and PCDFs</i>									
Total TCDD	µg/Kg	1.0	2.722	74	4.103	16.836	1.294	10.928	10
Total HxCDD	µg/Kg	1.0	0.139	74	0.801	0.642	1.294	1.742	1
			<i>Creek Sediment 2</i> (Calculations based on data from 16 of 16 total samples)						
<i>Total PCDDs and PCDFs</i>			<i>Mean</i>	<i># Samples</i>	<i>Std. Dev. (s)</i>	<i>Variance (s2)</i>	<i>T.20</i>	<i>UCL</i>	<i>n</i>
Total TCDD	µg/Kg	1.0	0.656	16	0.519	0.269	1.341	1.694	4
			<i>Haul Roads</i> (Calculations based on data from 14 of 14 total samples)						
<i>LDR Chlorinated Pesticides/PCBs</i>			<i>Mean</i>	<i># Samples</i>	<i>Std. Dev. (s)</i>	<i>Variance (s2)</i>	<i>T.20</i>	<i>UCL</i>	<i>n</i>
Aldrin	mg/Kg	0.066	0.013	14	0.037	0.001	1.350	0.087	1
<i>Total PCDDs and PCDFs</i>									
Total TCDD	µg/Kg	1.0	0.907	14	1.219	1.485	1.350	3.345	314
Total PeCDD	µg/Kg	1.0	0.357	14	1.104	1.218	1.350	2.564	5
Total HxCDD	µg/Kg	1.0	0.586	14	2.107	4.438	1.350	4.799	47
Total PeCDF	µg/Kg	1.0	0.157	14	0.588	0.346	1.350	1.333	1

**TABLE 6.3**  
**STATISTICAL SAMPLING DATA**  
**LOVE CANAL BAGGED WASTES**  
**PHASE I REPORT**  
**OCCIDENTAL CHEMICAL CORPORATION**  
**NIAGARA FALLS, NEW YORK**

			<i>Creek Debris</i> (Calculations based on data from 37 of 37 total samples)						
<i>LDR Semi-Volatile Organics</i>	<i>Units</i>	<i>LDR Regulatory Limits</i>	<i>Mean</i>	<i># Samples</i>	<i>Std. Dev. (s)</i>	<i>Variance (s2)</i>	<i>T.20</i>	<i>UCL</i>	<i>n</i>
1,4-Dichlorobenzene	mg/Kg	6.0	1.841	37	2.963	8.779	1.306	7.766	1
Pentachlorobenzene	mg/Kg	10	5.249	37	5.390	29.048	1.306	16.028	2
1,2,4-Trichlorobenzene	mg/Kg	19	12.084	37	15.181	230.459	1.306	42.445	8
<i>LDR Chlorinated Pesticides/PCBs</i>									
Aldrin	mg/Kg	0.066	0.022	37	0.051	0.003	1.306	0.124	1
delta-BHC	mg/Kg	0.066	0.019	37	0.046	0.002	1.306	0.110	2
gamma-BHC (Lindane)	mg/Kg	0.066	0.051	37	0.071	0.005	1.306	0.193	38
<i>Total PCDDs and PCDFs</i>									
Total TCDD	µg/Kg	1.0	3.216	37	2.662	7.085	1.306	8.540	2
Total PeCDD	µg/Kg	1.0	1.397	37	2.484	6.169	1.306	6.365	67
Total HxCDD	µg/Kg	1.0	2.294	37	4.008	16.064	1.306	10.310	16
Total TCDF	µg/Kg	1.0	0.170	37	0.433	0.188	1.306	1.037	0
Total PeCDF	µg/Kg	1.0	0.908	37	1.943	3.777	1.306	4.796	763
Total HxCDF	µg/Kg	1.0	0.689	37	1.884	3.550	1.306	4.457	63
			<i>Facility Cleanup</i> (Calculations based on data from 7 of 7 total samples)						
<i>LDR Chlorinated Pesticides/PCBs</i>			<i>Mean</i>	<i># Samples</i>	<i>Std. Dev. (s)</i>	<i>Variance (s2)</i>	<i>T.20</i>	<i>UCL</i>	<i>n</i>
delta-BHC	mg/Kg	0.066	0.031	7	0.037	0.001	1.440	0.106	2
gamma-BHC (Lindane)	mg/Kg	0.066	0.026	7	0.023	0.001	1.440	0.072	1
<i>Total PCDDs and PCDFs</i>									
Total TCDD	µg/Kg	1.0	1.357	7	0.709	0.503	1.440	2.775	8
Total PeCDD	µg/Kg	1.0	0.357	7	0.611	0.373	1.440	1.578	2
Total HxCDD	µg/Kg	1.0	0.643	7	0.766	0.586	1.440	2.174	10

Calculations:  $n = (t_{2.20} * s^2) / \Delta^2$

$\Delta$  = Regulatory Threshold - Mean

n = Number of samples required in Phase II

**TABLE 6.4**  
**PHASE II SAMPLING PROGRAM**  
**LOVE CANAL BAGGED WASTES**  
**OCCIDENTAL CHEMICAL CORPORATION**  
**NIAGARA FALLS, NEW YORK**

<i>Category</i>	<i>Total Number of Samples in Phase I</i>	<i>Total Number of Samples (1)</i>	<i>Analyses</i>
Creek Sediment 1	74	10 1	PCDDs/PCDFs TCLP Lead
Creek Sediment 2	16	4	PCDDs/PCDFs
Haul Roads (2)	14	14 1	PCDDs/PCDFs Aldrin
Facility Cleanup	7	10 2	PCDDs/PCDFs BHCs
Creek Debris (3)	37	763 38 8	PCDDs/PCDFs Aldrin/BHCs SVOCs

Notes:

- (1) Sample numbers based on Phase I results using equation (8) in Table 9-1 of SW-846 Third Edition, Volume II, November 1986.
  - (2) Due to a statistical outlier, Phase I statistics have not been used to determine Phase II sampling frequency (see Section 6.4).
  - (3) This category has been excluded from any Phase II sampling program.
- BHCs Benzene Hexachlorocyclohexanes.  
PCDDs Polychlorinated Dibenzo-p-dioxins.  
PCDFs Polychlorinated Dibenzofurans.  
SVOCs Semi-Volatile Organic Compounds.  
TCLP Toxicity Characteristic Leaching Procedure.

**TABLE 7.1**  
**PROPOSED VARIANCE LIMITS**  
**LOVE CANAL BAGGED WASTES**  
**PHASE I REPORT**  
**OCCIDENTAL CHEMICAL CORPORATION**  
**NIAGARA FALLS, NEW YORK**

<i>Parameter</i>	<i>F039 LDR Limit (mg/Kg)</i>	<i>Proposed Variance Limit (mg/Kg)</i>
Total TCDD	0.001	0.010
Total PeCDD	0.001	0.010
Total HxCDD	0.001	0.010
Total TCDF	0.001	0.010
Total PeCDF	0.001	0.010
Total HxCDF	0.001	0.010

**TABLE 8.0**  
**PROJECTED DISPOSAL QUANTITIES**  
**LOVE CANAL BAGGED WASTES**  
**PHASE I REPORT**  
**OCCIDENTAL CHEMICAL CORPORATION**  
**NIAGARA FALLS, NEW YORK**

	<i>Without Variances</i>		<i>With Variances</i>	
	<i>Total Number of Bags for Landfill</i>	<i>Incineration</i>	<i>Total Number of Bags for Landfill</i>	<i>Incineration</i>
Creek Sediment 1 (7,232 Bags)	2,700	4,532	7,032	200
Creek Sediment 2 (1,512 Bags)	1,195	317	1,412	100
Haul Roads (1,450 Bags)	805	645	1,050	400
Facility Cleanup (607 Bags)	184	423	507	100
Creek Debris (3,811 Bags)	0	3,811	0 (1)	3,811
<b>TOTAL</b>	<b>4,884</b>	<b>9,728</b>	<b>10,001</b>	<b>4,611</b>

Notes:

(1) The creek debris category has been designated for incineration prior to landfill disposal.

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UNITED STATES ENVIRONMENTAL PROTECTION AGENCY  
WASHINGTON, D.C. 20460

JAN 8 1997

OFFICE OF  
SOLID WASTE AND EMERGENCY  
RESPONSE

MEMORANDUM

SUBJECT: Use of Site-Specific Land Disposal Restriction Treatability Variances Under 40 CFR 268.44(h) During Cleanups

FROM: Michael Shapiro, Director *Michael Shapiro*  
Office of Solid Waste

Steve Luftig, Director *Steve Luftig*  
Office of Emergency and Remedial Response

TO: RCRA/CERCLA Senior Policy Managers  
Regions I - X

This memorandum encourages appropriate use of site-specific land disposal restriction (LDR) treatability variances under 40 CFR § 268.44(h) for contaminated soils and other materials managed during cleanups. In particular, this memorandum clarifies the minimum requirements for alternative treatment standards and outlines treatability variance procedures. It builds on Superfund LDR Guides 6A and 6B, "Obtaining a Soil and Debris Treatability Variance for Remedial Actions and Obtaining a Soil and Debris Treatability Variance for Removal Action," publication numbers 9347.3-O67S and 9347.3-OB67S, September 1990 and the quick reference fact sheet "Regional Guide: Issuing Site-Specific Treatability Variances for Contaminated Soils and Debris from Land Disposal Restrictions," publication number 9380.3-08FS, January 1992.

**LDR Applicability**

The Hazardous and Solid Waste Amendments (HSWA), enacted November 8, 1984, largely prohibit land disposal of hazardous wastes. After a waste is prohibited from land disposal the statute provides two options: comply with a specified treatment standard designed to minimize threats to human health and the environment prior to land disposal or dispose of the



waste in a "no migration" unit.<sup>1</sup> Land disposal includes any placement of hazardous waste into a landfill, surface impoundment, waste pile, injection well, land treatment facility, salt dome formation, salt bed formation, or underground mine or cave. See, RCRA Section 3004(k).

Since 1984, EPA has developed LDR treatment standards for all hazardous wastes listed or identified at the time HSWA was enacted and many hazardous wastes that have been subsequently listed or identified (e.g., the new toxicity characteristic (TC) wastes). The Agency recognizes, however, that in some cases these generally applicable LDR treatment standards will be unachievable or inappropriate. When a generally applicable LDR treatment standard is unachievable or inappropriate, a site-specific LDR treatability variance offers an opportunity to comply with LDRs through development of an alternative standard based on site- and waste-specific characteristics. The Agency's longstanding policy is that site-specific treatability variances are generally appropriate for contaminated soils; they also may be appropriate for other wastes encountered during site cleanups. See, e.g., 55 FR 8666, 8760-8761 (March 8, 1990); 58 FR 48092, 48125 (September 14, 1993); 61 FR 18805-18808, 18810-18812 (April 29, 1996); 61 FR 55717 (October 28, 1996).

It is important to note that the land disposal restrictions apply only to hazardous wastes placed after the effective date of the applicable land disposal prohibition. Not all materials managed during a cleanup action are hazardous wastes and not all activities conducted during a cleanup action constitute placement. For example, EPA has interpreted placement to include putting hazardous waste into a land-disposal unit, moving hazardous wastes from one land-disposal unit to another, and removing hazardous waste from the land, managing it in a separate unit, and re-placing it in the same or a different land-disposal unit. Placement does not occur when hazardous waste is consolidated within a land-disposal unit, when it is treated *in situ*, or when left in place (e.g., capped). See, e.g., 55 FR 8758-8760, (March 8, 1990).

### When To Use Site-Specific Variances

Site-specific LDR treatability variances generally do not require rulemaking for approval; they are approved on a case-by-case basis in consideration of site- and waste-specific circumstances and conditions. A site-specific variance may be approved when the properties of the waste at issue are physically or chemically different from the properties of the wastes evaluated in establishing the generally applicable treatment standard and, as a result, the generally applicable standard cannot be achieved. A site-specific variance may also be approved when the generally applicable treatment standard is based on a Best Demonstrated Available Technology (BDAT) that is inappropriate for the waste in question. See, 268.44(h) and 61 FR 55717 (October 28, 1996).

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<sup>1</sup> A no migration unit is a unit from which there will be no migration of hazardous constituents for as long as the waste placed in the unit remains hazardous. See, RCRA Sections 3004(d), (e), (g)(5).

Common cleanup situations which may prompt consideration of a site-specific treatability variance include:

- *Cleanup of contaminated soils where the generally applicable land disposal treatment standards are based on combustion.* For large quantities of contaminated soils with relatively low concentrations of hazardous constituents, EPA generally considers treatment standards based on combustion inappropriate.
- *Cleanups where bench or pilot scale studies indicate that the generally applicable land disposal treatment standard cannot be achieved.*
- *Cleanup of old sludges initially placed prior to the effective date of land disposal prohibitions.* In some cases the physical or chemical composition of sludges become significantly altered upon prolonged exposure to: natural sunlight, acidic rainfall, weather cycles (such as freeze-thaw) and intrusion, commingling, or chemical reaction with rainfall, soil, windblown dirt and/or other co-disposed wastes. These types of exposure can result in changes in composition through: evaporation or migration of volatiles, sunlight induced polymerization of organics, lime stabilization (i.e., self-cementation), photodegradation, natural biodegradation, hydrolysis, and even electrolytic oxidation/reduction reactions. As a result, weathered sludges often no longer have the physical or chemical composition of newly generated sludges and a treatability variance may be warranted.
- *Cleanups where, due to site-specific circumstances, compliance with the generally applicable land disposal treatment standard would result in a net environmental detriment, for example, by discouraging cleanup.* In some situations, legal and protective cleanup alternatives involve the choice between remedies that require compliance with LDR treatment standards developed for as-generated wastes and remedies that do not (i.e., remedies that rely on containment). When application of the generally applicable treatment standard provides an incentive for remedies that, while permitted under applicable law, are less aggressive (and, potentially, less protective over the long term) than alternatives, the generally applicable standard may be considered inappropriate. Note, many of these remedies will include some form of treatment; however, it might not be the treatment prescribed for as-generated wastes. See, e.g., 61 FR 55717 (October 28, 1996) where EPA approved alternative treatment standards, in part, because imposing the otherwise applicable standards would have resulted in a net environmental detriment.

## Alternative Treatment Standards

All alternative LDR treatment standards must satisfy the statutory requirement of RCRA 3004(m) by minimizing threats to human health and the environment. In many situations, protective, risk-based, site-specific cleanup standards established in the context of an Agency-overseen cleanup will meet this "minimize threat" standard and may be used as alternative treatment standards. In other situations, alternative treatment standards may be established on a technology basis.<sup>2</sup>

Risk-based alternative treatment standards established in the context of an Agency-overseen cleanup should consider EPA guidance on risk-based cleanup standards. EPA has interpreted protective cleanup standards to include risk-based media cleanup standards that are within the  $10^{-4}$  to  $10^{-6}$  risk range for carcinogens and result in a hazard index of one or less for constituents with non-carcinogenic effects. Protective, risk-based, site-specific cleanup standards can be based on generally available constituent concentration standards (e.g., MCLs and many state cleanup standards) or they may be developed for an individual site (e.g., through a site-specific risk assessment). Alternative treatment standards established on a technology basis are most often based on site-specific treatability data or on a "substantial treatment" standard. For example, 90 per cent reduction in constituent concentrations is generally considered substantial treatment.

For contaminated soils, the Superfund LDR Guides 6A and 6B, "Obtaining a Soil and Debris Treatability Variance for Remedial Actions and Obtaining a Soil and Debris Treatability Variance for Removal Action," publication numbers 9347.3-O67S and 9347.3-OB67S, September 1990 provide suggested constituent concentration ranges and per cent reduction targets that may be used as guidance when establishing alternative LDR treatment standards for contaminated soils.<sup>3</sup> When using the constituent concentration ranges or per cent reduction targets from the 6A/6B guidance, the Agency should be prepared to support application of these standards on a site-specific basis. As with application of any Agency guidance, application of the constituent concentration ranges or per cent reduction targets from the 6A/6B guidance could be questioned by facility owners/operators or by the public; the Agency must be prepared to respond to these comments and justify application of any guidance to site- and waste-specific

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<sup>2</sup> The ability to, as appropriate, use site-specific, risk-based cleanup levels as alternative LDR treatment standards does not affect the Agency's other remedial expectations, for example, that treatment will be used to address the principal threats posed by a site whenever practicable.

<sup>3</sup> Note that protective, risk-based cleanup standards that are developed based on site-specific conditions may be either higher or lower than the constituent concentration ranges or per-cent reduction targets from the 6A/6B guidance. In addition, while debris are still eligible for site-specific treatability variance, such variances are no longer presumed to be appropriate. LDR treatment standards specific to debris were promulgated August 18, 1992 (57 FR 37194).

circumstances.

### Constituents Subject to Treatment

Unless the generally applicable LDR treatment standard will be met, alternative treatment standards must be set for each constituent subject to treatment. Constituents subject to treatment are, for listed wastes, the constituents for which treatment standards are specified in 40 CFR 268.40 and, for characteristic wastes, the characteristic constituent and any underlying hazardous constituents present at concentrations greater than the Universal Treatment Standards (UTS) specified in 40 CFR 268.48. For example, a waste that fails the toxicity characteristic leaching test for benzene but also contains other organic hazardous constituents such as toluene, ethyl benzene, and xylene must meet treatment standards for both the benzene and the other hazardous constituents.<sup>4</sup> Note that, when testing characteristic waste to determine constituents subject to treatment, individuals do not necessarily have to test for every constituent with a universal treatment standard; they may limit testing to constituents that are reasonably expected to be present.

### Multiple Contaminants

It is not automatically necessary to treat all constituents subject to treatment in order to satisfy RCRA Section 3004(m). Just as some industrial wastes are generated with concentrations of constituents subject to treatment that are below the applicable land disposal treatment standards, some wastes generated during cleanup may contain concentrations of hazardous constituents that are below land disposal treatment standards established in a site-specific treatability variance. It is common for cleanup wastes to contain mixtures of many different kinds of hazardous constituents at widely varying concentrations. Often, these combinations of constituents or constituent concentrations are different from the constituents combinations and concentrations typically found in as-generated wastes that carry the same waste code or exhibit the same hazardous characteristic and treatment of all constituents subject to treatment may not be required to satisfy RCRA Section 3004(m).

In some of these cases, a treatability variance might establish alternative treatment standards for some constituents subject to treatment, but not others (i.e., compliance with the otherwise applicable treatment standard might be required for some constituents). In other cases, a treatability variance might require treatment to meet alternative LDR treatment standards for some constituents subject to treatment while for others it might be determined that no treatment is necessary to comply with LDRs. For example, a waste might be characteristic for benzene and

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<sup>4</sup> Note, extending the obligation to treat for underlying hazardous constituents to TC metal waste was discussed in 60 FR 43654, August 22, 1995. The proposal has not been finalized.

contain low levels of toluene, ethyl benzene, or xylene. Depending on the concentrations of the individual constituents, treatment might be required for the benzene, and protective, risk-based alternative treatment standards for the minor contaminants might be established such that treatment to comply with LDR standards was not required (i.e., where the initial constituent concentrations are at or below the risk-based standard). Similarly, a cleanup waste might fail the toxicity characteristic leaching test for a metal contaminant and also contain low levels of organic contaminants. Treatment to the generally applicable LDR treatment standards might be required for the TC metal, but protective, risk-based alternative LDR treatment standards for the organics might be established at or above the initial constituent concentrations, making treatment of the organics unnecessary.<sup>5</sup>

### Variance Procedures

In states authorized to issue site-specific LDR treatability variances, applications should be submitted to the state hazardous waste program director, or other official designated by the state. In states that are not authorized to issue these variances, applications should be submitted to the EPA Regional Administrator or to the appropriate delegated official within the Region. All applications should include information required by 40 CFR 260.20(b)(1) - (4) and information documenting compliance with the waste analysis requirements of 40 CFR 268.7.

Applications for site-specific LDR treatability variances will likely require less detail and rigorous analysis than applications for generically applicable variance (e.g., rulemaking variances under 268.44(a)); however, if necessary EPA can use 40 CFR 268.44(j) to request additional information to support a given application. All approvals should emphasize that the variances are site- and waste-specific in nature and do not apply to any other site or waste.

Whenever possible, the decision to approve a site-specific LDR treatability variance should be integrated into other cleanup decision documents (e.g., RCRA Statement of Basis, CERCLA Record of Decision, state corrective action order). As a matter of Agency policy, site-specific LDR treatability variances should undergo public notice and opportunity for comment before approval. See, 53 FR at 31200 (August 17, 1988). Similar to the decision to approve a variance, whenever possible, public notice and opportunity for comment for site-specific LDR treatability variances should be combined with other public notice and opportunity for comment activities that occur during Agency-overseen cleanups (e.g., the public notice and opportunity for comment associated with a CERCLA proposed plan or approval of a corrective action remedy). In the limited circumstances where it is not possible to combine public notice for site-specific LDR treatability variances with other public notice opportunities, public notice and opportunity for comment should be provided consistent with the program goals of full, fair and equitable

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<sup>5</sup> See footnote 4.

public participation. While a variance application is pending the applicant must comply with all applicable land disposal restrictions and requirements (40 CFR 268.44(1)).

As discussed in the National Contingency Plan (55 FR 8760-8762) and the Superfund LDR 6A and 6B guides, EPA presumes that site-specific LDR treatability variances may be granted for contaminated soils; therefore, applications for a site-specific LDR treatability variance for soil do not have to document that the generally applicable LDR treatment standards are unachievable or inappropriate.<sup>6</sup> However, applicants should include information documenting the basis for their application supporting application of the soil presumption to their site- and waste-specific circumstances. Applications for site-specific LDR treatability variances that address cleanup wastes other than soil should include information documenting that either (1) the waste at issue is significantly different from the waste evaluated for the generally applicable treatment standard and, as a result, the regulated constituents cannot be treated to the specified levels or (2) the generally applicable standard is based is not appropriate. Applications should include a statement, signed by the applicant, certifying that the information in the application is true and correct.

#### Delegation

The authority to approve site-specific LDR treatability variances for contaminated soils was delegated to Regional Administrators in Delegation 8-45-B. For CERCLA removal actions and actions under the solid waste disposal act (which includes RCRA), the authority can be further delegated to regional Division Directors. The authority to approve site-specific LDR treatability variances for one-time only cleanup wastes (non-soil or debris wastes, i.e., sludges managed as part of a cleanup) is under consideration for delegation to Regional Administrators. (See proposed delegation 8-45-C.)

While the authority to approve site-specific LDR treatability variances will rest with the Regions and states, we encourage you to work together and with EPA Headquarters to maintain a national dialogue on variance issues. In particular, we request that Regions (and authorized states) share information on critical or precedent setting variances so we can all benefit from your experiences and so we can assure that issues of national scope or consistency are equitably resolved. This information could be shared at national and regional meetings or through other networking opportunities.

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<sup>6</sup> Of course, if a commenter on any given site-specific treatability variance challenges the presumption, the Agency must address these comments on a site-specific basis, for example, by articulating the site-specific conditions that support the presumption, in response.

## State Authorization

EPA has recently clarified its policy on state authorization for site-specific LDR treatability variances and is actively encouraging states to seek authorization for and integrate appropriate use of these variances in their cleanup programs. See, 61 FR18828 (April 29, 1996). Additional information on state-authorization will be provided in an upcoming update to the State Program Advisory.

## Disclaimer

This document provides guidance to EPA and State personnel on how to best implement RCRA and EPA's regulations on site-specific treatability variances to facilitate appropriate use of these variances, especially as part of Agency-overseen cleanups. It also provides guidance to the public and the regulated community on how EPA intends to exercise its discretion in implementing these regulations. This document does not, however, substitute for EPA's regulations, nor is it a regulation itself. Thus, it cannot impose legally binding requirements on EPA, States, or the regulated community, and may not apply to a particular situation based on specific circumstances. EPA may change this guidance in the future, as appropriate.

## Summary/Additional Information

Site-specific LDR treatability variances are an important tool to ensure compliance with appropriate LDR treatment standards. They can be especially useful where application of the generally applicable standard can serve as a disincentive towards aggressive cleanup. We encourage you to continue to integrate site-specific LDR treatability variances into your cleanup activities and to support the use of these variances into state programs. For additional information, please contact Elizabeth McManus or Shaun McGarvey at (703) 308-8657 and (703) 308-8603, respectively.

cc: Jim Berlow, OSW  
Susan Bromm, OSRE  
Elizabeth Cotsworth, OSW  
Mathew Hale, OSW  
Peter Neves, OSRE  
David Nielsen, OER  
Bruce Means, OERR  
Dawn Messier, OGC  
Larry Reed, OERR  
Steve Silverman, OGC  
Larry Starfield, OGC

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U.S. ENVIRONMENTAL PROTECTION AGENCY, 1997

IN THE UNITED STATES DISTRICT COURT OF THE DISTRICT OF COLUMBIA  
FOR THE DISTRICT OF COLUMBIA

No. 97-1078

LOUISIANA ENVIRONMENTAL ACTION NEITHER, et al.

Plaintiffs,

v.

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY,

Respondent.

---

ON PETITION FOR REVIEW OF A FINAL RULE PROMULGATED  
BY THE UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

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BRIEF FOR RESPONDENT

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LOIS J. SCHEFFER  
Assistant Attorney General  
Environment and Natural Resources  
Division

MARY F. EDGAR, Attorney  
U.S. Department of Justice  
Environmental Defense Section  
P.O. Box 28986  
Washington, D.C. 20025-3986  
(202) 514-2741

STEVEN SILVERMAN, Attorney  
Office of General Counsel  
U.S. Environmental Protection Agency  
401 M Street, S.W.  
Washington, D.C. 20460  
(202) 250-7715

Dated: July 16, 1997

advances a more plausible reading of the regulations than that offered by the agency, it is 'the agency's choice [that] receives substantial deference.'" General Elec. Co. v. EPA, 53 F.3d at 1327 (quoting Rollins Env'tl. Servs. v. EPA, 937 F.2d 649, 652 (D.C. Cir. 1991)).

#### ARGUMENT

I. EPA REASONABLY DETERMINED THAT APPLICATION OF ESTABLISHED TREATMENT STANDARDS IS "NOT APPROPRIATE" WHEN IT COULD REASONABLY RESULT IN LEAVING 375,000 TONS OF UNTREATED HAZARDOUS WASTE SLUDGE IN AN UNLINED SURFACE IMPOUNDMENT.

EPA's interpretation of 40 C.F.R. § 268.44(a) to authorize a variance from Land Disposal Restrictions treatment standards when compliance with those standards is technically feasible but otherwise "not appropriate" is reasonable, and therefore must be upheld. LEAN cannot show that EPA's reading of its own regulation to authorize a variance when compliance with the established standard would result in a net environmental detriment is either plainly erroneous or inconsistent with RCRA's command to ensure that threats posed by land disposal are minimized. Accordingly, EPA's grant of a treatability variance to CITGO should be upheld.<sup>16</sup>

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<sup>16</sup> To avoid any possible future confusion in the regulated community concerning how EPA interprets its authority to issue treatability variances, and to make clear that EPA has authority (continued...)

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A. EPA Has Reasonably And Consistently Interpreted Its Own Regulation To Authorize A Variance When Compliance With The Established Treatment Standard Is Technically Feasible But Otherwise Not Appropriate.

EPA interprets 40 C.F.R. § 268.44(a) to authorize a variance from Land Disposal Restrictions treatment standards in two situations: (1) "[w]here . . . a waste cannot be treated to the specified level," or (2) "where the treatment technology is not appropriate to the waste." See 61 Fed. Reg. at 55,720 (JA xxx). The second clause, which is not otherwise elaborated upon in the rule,<sup>17</sup> is the one the Agency relied upon in granting the challenged CITGO variance. EPA has consistently read this portion of the rule to authorize a variance when circumstances

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<sup>16</sup>(...continued)  
to grant such variances for organic wastes resulting from remediation (for which combustion treatment is technically feasible), EPA has proposed to change the language of 40 C.F.R. § 268.44(a) to make the Agency's long-standing interpretation explicit. 62 Fed. Reg. 26,041, 26,058 (May 12, 1997). In that proposal, EPA also requested comment on whether the CITGO variance should be recodified under the clarified regulation (assuming EPA makes that portion of the proposal final). Id. at 26,061. EPA will promptly advise the Court of any developments in this rulemaking that are relevant to this case.

<sup>17</sup> In EPA's view, the Agency must also satisfy itself, as it did in this case, see infra at 35-43, that granting a variance under the "not appropriate" standard is consistent with the statutory obligation to ensure that threats to human health and the environment posed by land disposal of hazardous wastes are minimized. See 42 U.S.C. § 6924(m)(1).

make it inappropriate to require treatment to the level or by the method set out in the regulations even though such treatment is technically feasible. That the regulation links the two clauses with "or," rather than "and," indicates that the two clauses have separate meaning,<sup>18</sup> *i.e.*, that the rule authorizes a variance based on a finding that a treatment standard is "not appropriate" without any need for a finding that the waste "cannot be treated."

EPA's interpretation therefore is not "plainly erroneous or inconsistent with the regulation," and should be given "controlling weight." Thomas Jefferson Univ. v. Shalala, 512 U.S. at 512; see also supra at 24. "This broad deference is all the more warranted when, as here, the regulation concerns 'a complex and highly technical regulatory program,' in which the identification and classification of relevant 'criteria necessarily require significant expertise and entail the exercise of judgment grounded in policy concerns.'" Id. (quoting Pauley v. BethEnergy Mines, Inc., 501 U.S. 680, 697 (1991)). In

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<sup>18</sup> "Canons of construction ordinarily suggest that terms connected by a disjunctive be given separate meanings, unless the context dictates otherwise." Reiter v. Sonotone Corp., 442 U.S. 330, 339 (1979). The word "or" is "[n]ormally . . . to be accepted for its disjunctive connotation." Northwest Airlines, Inc. v. FAA, 14 F.3d 64, 69 (D.C. Cir. 1994) (quoting United States v. Moore, 613 F.2d 1029, 1049 (D.C. Cir. 1979)).

circumstances like these, when EPA is interpreting its own rule and considering a "highly technical question," this Court approaches review of the agency action with "extreme circumspection." See Chemical Waste Management v. EPA, 869 F.2d at 1538.

EPA's interpretation of the treatability variance rule is not only a permissible construction of the language, but also "serves a permissible regulatory function" - furthering optimal environmental remediation. See General Elec. Co. v. EPA, 53 F.3d at 1327 (quoting Rollins Env'tl. Servs., Inc. v. EPA, 937 F.2d 649, 652 (D.C. Cir. 1991)). In this case, for example, the Agency has made a finding, amply supported by the record, that failure to grant a variance would do more environmental harm than good by potentially thwarting the best means of closing the impoundment. 61 Fed. Reg. at 55,721 (JA xxx). EPA explained, "[i]t is entirely rational to view as 'inappropriate' imposition of a treatment technology that results in (or reasonably could result in) the environmentally detrimental result of no cleanup and no treatment." Id. The Agency also found that its action is the best means of minimizing the environmental threats posed by land

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disposal of the CITGO sludge,<sup>19</sup> a finding also supported by substantial evidence in the administrative record, and furthering the ultimate object of the Land Disposal Restriction requirements. See id.; 42 U.S.C. § 6924(m).

That EPA's interpretation of its standard for granting treatability variance is long-standing and has been consistently applied provides a further reason to uphold it. Udall v. Tallman, 380 U.S. at 17; Chemical Waste Management v. EPA, 869 F.2d at 1540 ("[W]hen we assess the reasonableness of EPA's interpretation of its own rule, the consistency with which that interpretation has been applied in the past weighs in favor of the agency."). EPA has often employed the "not appropriate" variance standard when treatment based on the performance of BDAT "leads to environmentally counterproductive results." 61 Fed. Reg. at 55,720 (JA xxx). In the preamble to the challenged variance, EPA set forth a history of its consistent interpretations of the "not appropriate" standard. See 61 Fed. Reg. at 55,720 (JA xxx). For example, in its 1990 notice accompanying promulgation of revisions to the National

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<sup>19</sup> The legal and factual validity of this finding is discussed in Section II of this Argument. See infra at 35-43.



Contingency Plan, EPA set forth the same interpretation of the variance standard<sup>20</sup> that it relies on here:

. . . EPA does not interpret its site specific variance procedures as invariably requiring applicants to demonstrate that they cannot meet applicable treatment levels or methods. The first sentence of 40 CFR 268.44(h) makes it clear that an applicant may make one of two demonstrations to qualify for a variance: he may show either that he cannot meet a treatment standard, or that a treatment method (or the method underlying the standard) is inappropriate for his waste. The final sentence of § 268.44(h), identifying the showing an applicant must include in his variance application, on its terms applies only to application submitted under the first criterion.

55 Fed. Reg. at 8762 n.22.<sup>21</sup>

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<sup>20</sup> As noted above, section 268.44(a) and 268.44(h) contain the same substantive standard. See supra note 4.

<sup>21</sup> See also 59 Fed. Reg. at 44,687 (proposing to grant CITGO variance, and stating that "[t]he treatment technology is not appropriate because . . . requiring those standards to be met could result in a net environmental detriment"); 61 Fed. Reg. at 18,811 (generic treatment standard may be "inappropriate because use of an alternative treatment standard would result in a net environmental benefit"); 53 Fed. Reg. at 31,200 (numeric Land Disposal Restrictions treatment standards may be inappropriate for treatment of contaminated media generated in cleanups). Neither LEAN nor any other party questioned EPA's authority to apply the "not appropriate" test to grant variances from numeric treatment standards -- notwithstanding all of these discussions in the Federal Register -- until this rulemaking.

LEAN erroneously maintains that the interpretation of the regulation that EPA relies on here is new, because when EPA has previously granted treatability variances under the "not appropriate" standard, the waste involved has been contaminated soil and debris from remediation actions, which differ significantly from the wastes EPA analyzed in developing the applicable treatment standards. LEAN Brief at 24. It is true that when inorganic hazardous constituents (like metals) are found in a matrix such as soil, the matrix can affect their treatability. Combustion can destroy organic hazardous constituents, however, regardless of the waste matrix in which they are found. 58 Fed. Reg. 48,092, 48,099 (Sept. 14, 1993) (incineration is a matrix-independent technology; i.e., it destroys organic hazardous constituents equally regardless of the matrix being incinerated). Thus, the issue remains whether it is appropriate to require combustion of soils contaminated with organic constituents. 55 Fed. Reg. at 8761 (noting that contaminated soil or contaminated wastewater can be destroyed through combustion but that this means of treatment may

nevertheless be "not appropriate" within the meaning of section 268.44).<sup>22</sup>

Because EPA's interpretation of 40 C.F.R. § 268.44(a) is a reasonable reading of the regulation, furthers the environmental policies behind the Land Disposal Restrictions, and has been consistently applied by EPA since its promulgation, EPA's interpretation should be upheld.

B. LEAN Cannot Show That EPA's Interpretation Of Its Own Regulation Is Plainly Erroneous.

LEAN "faces an uphill battle," and ultimately fails, in its effort to show that EPA has interpreted 40 C.F.R. § 268.44(a) impermissibly. See General Elec. Co. v. EPA, 53 F.3d at 1327. LEAN argues that the "not appropriate" clause of the regulation applies only when the Land Disposal Restrictions treatment

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<sup>22</sup> LEAN's interpretation of the variance regulation would call into question hundreds of site-specific treatability variances authorizing treatment by means other than combustion for organic hazardous constituents in contaminated soils. See National Elec. Mfrs. Ass'n v. EPA, 99 F.3d 1170, 1171 (D.C. Cir. 1996), where this Court observed, with apparent approval, that "[i]n the past, EPA recognized that RCRA waste treatment standards are often impracticable as applied to contaminated soils." See 55 Fed. Reg. at 8760. In particular, the Agency has recognized that combustion, although the most effective method for treating certain wastes, is a difficult and costly approach to treating large quantities of soil with low levels of contamination. Id. Accordingly, EPA has adopted a liberal policy of granting treatability variances for soil.

standard at issue specifies a method of treatment, rather than a numerical level. LEAN Brief at 23-24. EPA considered and reasonably rejected this argument in the preamble to the final variance rule. See 61 Fed. Reg. at 55,720-21 (JA xxx-xx). The Agency explained that it has never interpreted the regulation in this way. Id. at 55,720 (JA xxx). Nor does the language in question preclude in any way EPA's reading. The regulation simply does not define the circumstances under which a treatment technology may be inappropriate. Instead, the regulation leaves this question to the informed discretion of the Agency, bounded by the statutory obligation to ensure that threats to human health and the environment posed by land disposal are "minimized." See id. at 55,721 (JA xxx); 42 U.S.C. § 6924(m)(1).

In fact, as EPA also observed in this rulemaking, LEAN's construction makes no sense, because the Land Disposal Restrictions rules contain a separate provision addressing situations where EPA has specified a treatment method as the treatment standard. This provision authorizes petitions to use alternative treatment methods upon a showing of equivalent performance. Id. at 55,721; 40 C.F.R. § 268.42(b).<sup>23</sup>

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<sup>23</sup> EPA also noted that the legislative history of section 3004(m) likewise states that Congress did not necessarily  
(continued...)

Equally erroneous is LEAN's second argument that EPA can grant treatability variances only when a waste so differs physically or chemically from the waste EPA examined when it established the treatment standard that the waste "cannot be treated to specified levels or by the specified methods." LEAN reads the second sentence of the treatability variance rule to modify both of the tests set forth in the first sentence. LEAN Brief at 23. In fact, the requirement in the second sentence of 40 C.F.R. § 268.44(a) to show that the waste "cannot be treated to specified levels or by the specified methods" applies only to the first clause of the first sentence, under which the issue is whether the waste can be treated. 61 Fed. Reg. at 55,720-21, 55,724 (JA xxx, xxx); 55 Fed. Reg. at 8762 n.22.

The "not appropriate" clause of the treatability variance standard does not require a showing that it is physically impossible to treat a waste to a specific level or by a particular method. It is juxtaposed with the first clause, and provides a separate and additional reason for granting a variance. It covers those situations where such treatment is inappropriate, even though it may be physically possible -

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<sup>23</sup> (...continued)  
envision technology-forcing standards. Id. at 55,721 (JA xxx).

primarily where compliance with the Land Disposal Restrictions treatment standards may discourage optimal remediation. Id. In these situations, demonstrating that the waste "cannot be treated" is not the point. The wastes generally can be treated; any organic constituent can be destroyed through use of combustion. The issue nevertheless remains whether requiring treatment to the BDAT level is consistent with EPA's obligation to ensure protection of human health and the environment. EPA has consistently interpreted the "not appropriate" standard of 40 C.F.R. § 268.44(a) to be the vehicle for addressing these situations. Because LEAN has failed to show that EPA's interpretation is "plainly erroneous," Thomas Jefferson Univ. v. Shalala, 512 U.S. at 512, that interpretation must be sustained.

II. EPA REASONABLY CONSIDERED THE THREATS POSED BY CONTINUED RESIDENCE OF THE SLUDGE IN THE IMPOUNDMENT IN DETERMINING THAT GRANTING THE VARIANCE WOULD MINIMIZE THREATS TO HUMAN HEALTH AND THE ENVIRONMENT POSED BY LAND DISPOSAL.

In deciding to grant the CITGO variance, EPA made a finding that under the circumstances before it, "threats posed by land disposal of [the CITGO] sludge - including current and potential threats posed by sludge remaining in the [impoundment] - are minimized (within the meaning of § 3004(m)) by the combination of" removal of the remaining sludge, treatment to meet the alternative treatment standard established by the

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variance, and re-disposal in an off-site RCRA subtitle C landfill. 61 Fed. Reg. at 55,721 (JA xxx). LEAN challenges this finding by incorrectly characterizing<sup>24</sup> - and then attacking - its basis. LEAN Brief at 26. LEAN fails, however, to meet and address the true basis for EPA's finding.

The focus of LEAN's argument is a comparison of the treatment that will be required under the variance with the treatment that would be required under EPA's treatment standards for F037 and F038 wastes. See LEAN Brief at 27, 29. It is indisputable that the sludge would be treated to a greater degree if it were treated to meet the Land Disposal Restrictions standards. LEAN's myopic focus obscures the real issue here,

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<sup>24</sup> LEAN incorrectly characterizes EPA's decision as resting on a finding that threats from the land disposal of the CITGO sludge will be minimized because the waste will ultimately be disposed of in a subtitle C landfill. LEAN Brief at 31-33. EPA agrees that disposal in a subtitle C landfill alone does not minimize threats within the meaning of section 3004(m)(1). What EPA found here, however, was that the combination of assured treatment pursuant to the alternative treatment standard and secure disposal in a subtitle C landfill was environmentally preferable to, and posed a lesser total threat than, the continued land disposal of the untreated sludge in an unlined impoundment. Therefore, viewing circumstances in their totality and as explained further in this section of the Argument, EPA reasonably concluded that granting the variance would minimize threats posed by land disposal of the CITGO sludge. 61 Fed. Reg. at 55,721-22 (JA xxx-xx).

however, and ignores the real, and relevant threat that EPA properly considered - that absent the variance the sludge might well not be removed or treated at all.

EPA reasonably chose to consider the totality of the circumstances before it, and to weigh into the balance the threats posed by land disposal of the CITGO sludge with and without the variance. Unlike LEAN, the Agency did not just compare the threat from land disposal of the sludge after treatment to meet the established treatment standards for F037 and F038 wastes to the threat from land disposal of the CITGO sludge after treatment to meet the alternative standard set forth in the variance. Instead, the Agency also evaluated the reasonably foreseeable threats from land disposal of the CITGO sludge if the variance were denied -- i.e., the "current and potential threats posed by sludge remaining in the [impoundment]." 61 Fed. Reg. at 55,721 (JA xxx); see also Comment Response Document at 45 (JA xxx) ("the variance results in minimization of the threats posed by land disposal of the waste in its current setting, the impoundment"). In other words, EPA evaluated the threat posed by land disposal of the sludge that could reasonably flow from "the environmentally detrimental result of no cleanup and no treatment." Id. Based on the



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totality of the circumstances, EPA concluded that granting the variance was consistent with the command of section 3004(m)(1) that wastes subject to the Land Disposal Restrictions should be treated "so that short-term and long-term threats to human health and the environment are minimized." 42 U.S.C. § 6924(m)(1).

Nothing in the language of section 3004(m) even suggests - let alone commands - that EPA should ignore threats posed by existing land disposal of hazardous wastes when considering whether a variance from the Land Disposal Restrictions standards is necessary or appropriate to facilitate remediation of an old land disposal unit. Because Congress did not expressly address the issue, EPA's reasonable interpretation of section 3004(m) to allow it to consider these threats must be sustained. Chevron USA Inc. v. NRDC, 467 U.S. 837, 842-45 (1984). It is entirely rational for the Agency to examine all of the circumstances associated with land disposal of a waste, and not just blindly adhere to a treatment requirement that may actually lead to the environmentally counterproductive result of "no cleanup and no treatment." 61 Fed. Reg. at 55,721 (JA xxx); see also Portland Cement Ass'n v. Ruckelshaus, 486 F.2d 375, 385-86 (D.C. Cir. 1973), cert. denied, 417 U.S. 921 (1974) (if the use of a particular technology results in foregoing other,

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substantial environmental benefits, that technology need not be considered the "best" no matter how well it performs).

LEAN does not directly take issue with EPA's conclusions regarding the threats that may be posed by allowing the sludge to remain in an unlined surface impoundment immediately adjacent to a river. Instead, LEAN responds to EPA's finding in this regard by asserting that EPA has authority to force CITGO to remove all hazardous waste from the impoundment. LEAN Brief at 21-22. In the rulemaking, however, EPA examined this issue with care, and articulated in detail its reasons for concluding that, absent the variance, the sludge would definitely remain in the impoundment for a "protracted" period, and would possibly, and lawfully, remain there permanently. See 61 Fed. Reg. at 55,721, 55,723-24 (JA xxx, xxx-xx); Comment Response Document at 12-13 (JA xxx-xx).

EPA considered the regulatory requirements for closure of surface impoundments. See supra at 15-16. The RCRA rules allow closure of an impoundment with wastes left in place if the owner or operator controls, minimizes or eliminates the escape of waste from the impoundment through post-closure care (40 C.F.R. § 265.111(b)) and, among other things, eliminates free liquids and stabilizes remaining wastes sufficiently to support a final

cover. 40 C.F.R. § 265.228(a)(2). EPA also considered record evidence, in the form of engineering feasibility studies submitted by CITGO, that indicates that it is at least possible (though not certain) that CITGO will be able to satisfy these standards. See 61 Fed. Reg. at 55,721, 55,723-24 (JA xxx, xxx-xx); Comment Response Document at 12-13 (JA xxx-xx). EPA also found that at the very least, the process of determining whether CITGO could lawfully close the impoundment without removing the sludge would likely drag on for years, delaying or precluding the type of closure EPA, the State of Louisiana, CITGO and LEAN agree is the best way of remediating the impoundment. 61 Fed. Reg. at 55,724 (JA xxx); LEAN Brief at 22. In these circumstances, EPA reasonably decided to take the "bird in the hand": assured closure by removal followed by substantial treatment and secure disposal.<sup>25</sup> Thus, EPA had a reasonable factual basis for its

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<sup>25</sup> LEAN quotes out of context from an affidavit CITGO filed in this case to argue that the variance does not assure removal of the sludge. LEAN Brief at 33. This affidavit was not before EPA when it made its decision, and therefore should not be considered by the Court in reviewing the decision. Camp v. Pitts, 411 U.S. 138, 142 (1973) (per curiam). On its face, the affidavit addresses the options CITGO might pursue if LEAN's unsuccessful motion for a stay of the challenged variance were granted. Moreover, LEAN here directly contradicts the position set forth earlier in its Brief: "[T]he court can reasonably conclude that CITGO intends to utilize the variance it so doggedly sought . . . ." LEAN Brief at 17.

finding that granting the treatability variance will minimize threats posed by existing and continuing land disposal of the hazardous sludge in CITGO's surface impoundment.

Finally, EPA reasonably found that the level of treatment required by the variance was substantial enough to satisfy the requirements of section 3004(m)(1), when weighed in the balance with the elimination of the threats posed by the existing land disposal of the sludge. 61 Fed. Reg. at 55,721 (JA xxx); Comment Response Document at 45 (JA xxx). It is undisputed that benzene, toxic metals and cyanides in the sludge will be destroyed as effectively under the variance as under the nationally-applicable standard. See 61 Fed. Reg. at 55,721 (JA xxx); LEAN Brief at 27. It is also not disputed that benzene is the most environmentally significant hazardous constituent in the waste -- based on its toxicity and its concentration in the sludge -- so that the chief hazard posed by the waste is fully addressed by the alternative treatment standard. See 61 Fed. Reg. at 55,721 (JA xxx). Certain non-carcinogenic, less toxic volatile organics in the sludge would not be treated as substantially under the variance as by combustion technology, nor would the semi-volatile hazardous organics (such as the carcinogenic benzo-a-pyrene). Id. at 55,724 (JA xxx). Nevertheless, EPA found that these

constituents will be partially removed and destroyed, and the mobility of the semi-volatiles will be "much less" after waste stabilization. Id. Given that these constituents are present in relatively low concentrations, and so pose lower risk, id. at 55,724, EPA reasonably considered the extent of treatment to be substantial and to minimize threats under the totality of the circumstances before the Agency. Id.<sup>26</sup>

EPA's evaluation of the totality of the threats posed by land disposal of the CITGO sludge - with and without the variance - involves scientific judgment. EPA determined that the totality of those threats will be "minimized," i.e., "reduce[d] to the smallest possible amount, extent, or degree," under the variance. Hazardous Waste Treatment Council v. EPA, 886 F.2d at 361. "On such questions a reviewing court must be 'at its most deferential.'" American Iron & Steel Inst. v. EPA, No. 95-1348,

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<sup>26</sup> LEAN notes EPA's observation that CITGO's treatment process could be further optimized to remove and destroy the less toxic volatile constituents remaining in the waste after benzene is fully treated. LEAN Brief at 22. EPA reasonably concluded that "requiring additional treatment for these relatively low-risk constituents could seriously delay the completion of the [impoundment] remediation and could (through) this delay result in greater emissions of more toxic constituents from the pond to the air." 61 Fed. Reg. at 55,724 (JA xxx). This is the type of expert weighing of potential harms committed to EPA's judgment, and should not be second-guessed on review.

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1997 WL 297251, \*27, slip op. at 44 (D.C. Cir. Jun. 6, 1997)  
(quoting Baltimore Gas & Elec. Co. v. NRDC, 462 U.S. 87, 103  
(1983)). In view of EPA's detailed articulation of the reasons  
for its finding that the threats from land disposal of the CITGO  
sludge will be minimized under the variance, this finding must be  
upheld.<sup>27</sup>

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<sup>27</sup> LEAN offers the irrelevant observation that sufficient concentrations of benzo-a-pyrene and chrysene will remain in the sludge after treatment pursuant to the variance to justify listing the residue as a hazardous waste. See LEAN Brief at 28. There is, however, no requirement that treatment render a waste non-hazardous. The statute in fact contemplates that wastes resulting from treatment under section 3004(m)(1) will still be hazardous wastes. See 42 U.S.C. § 6924(m)(2) (after treatment, wastes may be disposed in a "facility which meets the requirements of this subchapter," i.e., a hazardous waste facility).

CONCLUSION

For the foregoing reasons, the petition for review should be denied.

Respectfully submitted,

LOIS J. SCHIFFER  
Assistant Attorney General

*Mary F. Edgar*

MARY F. EDGAR  
Environmental Defense Section  
U.S. Department of Justice  
P.O. Box 23986  
Washington D.C. 20026-3986  
(202) 514-2741

*Steven Silverman*

STEVEN SILVERMAN  
Office of General Counsel  
Environmental Protection Agency  
401 M Street, S.W.  
Washington, D.C. 20460  
(202) 260-7716

Dated: July 16, 1997

ALL-STATE® LEGAL 800-222-4510 ED11 RECYCLED







*Harbin*

LAW OFFICES  
WALD. HARKRADER & ROSS  
1300 NINETEENTH STREET, N. W.  
WASHINGTON, D. C. 20036-1697  
(202) 828-1200

1101 SAN JACINTO TOWER  
DALLAS, TEXAS 75201  
TELEPHONE (214) 754-0100

THOMAS H. TRUITT

January 5, 1984

24 UPPER BROOK STREET  
LONDON, W1Y 1PD  
TELEPHONE 629-1076

DIRECT DIAL  
(202) 828-1318

Norman H. Nosenchuck, P.E.  
Director, Division of Solid and  
Hazardous Waste  
New York State Department of  
Environmental Conservation  
50 Wolf Road  
Albany, New York 12233-0001

Re: United States of America, et al., v.  
Hooker Chemicals & Plastics Corp.,  
et al., Civil Action No. 79-990 (Love  
Canal Landfill); Love Canal Superfund  
Remedial Program; Malcolm Pirnie, Inc.  
October 1983 Environmental Information  
Document "Site Investigations and  
Remedial Action Alternatives - Love  
Canal"

Dear Mr. Nosenchuck:

We are enclosing herewith the evaluation prepared for us by Occidental Chemical Corporation employees and our technical consultants on the Malcolm Pirnie, Inc., October 1983 Environmental Information Document "Site Investigations and Remedial Action Alternatives - Love Canal" ("EID"). We are submitting their evaluation in the spirit of cooperation and not as any expression of culpability or responsibility. We would be pleased to meet with you and your staff to discuss the conclusions and underlying rationale of their report. Those conclusions are:

- A. Despite the extensive site investigation sampling program conducted, there are a number of areas where further data should be collected and/or reviewed prior to final determinations regarding remediation. In addition, the quality of the chemical analyses raises serious questions about the reported results. Further samplings, evaluations and analyses could be performed or resolved promptly, will not delay necessary remediation and are essential to a full evaluation of the proposed remedial actions.

Norman H. Nosenchuck, P.E.  
January 5, 1984  
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- B. In evaluating the data collected in the remedial investigation, the EID errs in two respects. First, the reporting and evaluation of chemical analyses includes artifactual data and, second, no public health or environmental risk analysis was performed. The reporting of artifactual data makes the report difficult to interpret and skews the contamination assessment matrix analyses of the analytical results. The failure to apply generally accepted techniques of public health and environmental risk analyses to chemicals found to be present means that the report recommendations have no rational base. The recommendations are engineering cleanup proposals only. Both of these errors should be cured prior to any final decisions on remediation.
- C. The EID proposes that over twelve miles of sewers be cleaned of chemical-containing sediments and that this be done with a closed, high pressure water cleaning process. This cleanup is nowhere justified on the basis of human health hazard. Moreover, the majority of sewer lines proposed for cleaning contain little, if any, "Love Canal" chemicals and their cleanup is in no way justifiable as part of any Love Canal remediation effort. Finally, the method of cleaning proposed by the EID threatens to breach the integrity of the storm and sanitary sewers, to disrupt the community and to damage homes and businesses. Taken as a whole, all of these factors lead to the conclusion that either no action should be undertaken or that a much more limited, non-disruptive type of sewer cleanup be employed in lieu of that which is now proposed.
- D. The EID recommended remediation calls for excavation of four feet of sediment from Black and Bergholtz Creeks and disposal of these sediments in a local hazardous waste disposal facility. Since no other chemicals were found in the creek sediments, the only justification for this remediation is on the basis of TCDD presence in the first foot of sediment. EID consideration was given to the disposition of the excavated sediments at the nearby 93rd Street School, but this alternative was ruled out because of (1) this site's proximity to Bergholtz Creek

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and (2) the subsequent need permanently to dedicate the site as a waste disposal facility. On the basis of the available data, the excavation of sediments to a depth of one foot and a reasonable safety factor of one-half foot is all that is justified. In addition, the EID wholly fails to consider the use of the nearby Love Canal landfill site as the disposal area for the excavated sediments. Love Canal is an obvious, more cost effective disposal site for these sediments.

- E. The EID recommends that the chemical-containing sediments off-shore from the 102nd Street landfill be temporarily stabilized by constructing a berm off-shore and around the effected area. First, there is no showing that the chemicals found came from Love Canal. Second, the remedial action proposed is unnecessary because the chemicals found in the sediments pose no immediate public health or environmental threat. In addition, the resolution of the 102nd Street landfill litigation should be reached within a reasonable amount of time. This litigation addresses these same sediments. Finally, the cost of the temporary remediation recommended by the EID is seriously understated and less costly but equally effective alternatives are available.

As stated at page 2-1 of the EID, the purpose of the "'Site Investigations and Remedial Alternatives - Love Canal' is to provide recommendations on the most cost-effective methods to deal with contamination either historically transported or actively in transport from the Love Canal." But this was its only purpose. On the same page, an assessment of the public health or environmental risks, if any, related to Love Canal associated chemical contamination is unequivocally disclaimed: "This study is not an assessment of human health impacts nor does it address the habitability of any portion of the Love Canal Declaration Area." (Emphasis in original.)

The EID was prepared pursuant to the Comprehensive Environmental Response, Compensation and Liability Act of 1980, 42 U.S.C. § 9601 et seq. ("Superfund"). Because it fails to consider the public health or environmental impacts of the site investigation findings and the proposed remedial alternatives, the document does not meet the requirements of

WALD, HARKRADER & ROSS

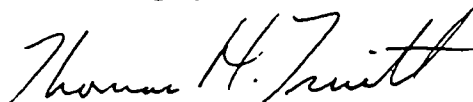
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January 5, 1984  
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the National Oil and Hazardous Substances Contingency Plan (40 C.F.R. Part 300; e.g., 42 C.F.R. § 300.68) or the National Environmental Policy Act (42 U.S.C. § 4332). Until this failure is remedied, the expenditure of Superfund monies to carry out remediation in any of the task areas investigated is inconsistent with the national contingency plan and therefore unlawful. 42 U.S.C. § 9604(a)(1). Moreover, funds expended inconsistently with the provisions of the national contingency plan may not be recovered from parties that may ultimately be deemed responsible. 42 U.S.C. § 9607(a)(4)(A). Of course, no funds may be expended under Superfund to remedy a situation which does not pose a "substantial danger to the public health or the environment." 42 U.S.C. § 9605(2). Finally, the major federal actions proposed cannot go forward until the requirements of the National Environmental Policy Act have been met.

In light of the fact that the subject EID is legally deficient under the national contingency plan and the National Environmental Policy Act, we request that the State of New York and the United States government assess the public health and environmental significance of the site investigation findings and remediation alternatives and publish their conclusions for public comment. In making the assessment required by law and in proposing remediation alternatives, we request that you give serious consideration to the enclosed report.

As stated at the outset, we are submitting this report in the spirit of cooperation and not as any expression of culpability or responsibility. We look forward to your early response and would be pleased to meet with you, your staff and your consultants with regard to the matters discussed in the report.

Sincerely yours,

  
Thomas H. Truitt  
Attorney for Occidental  
Chemical Corporation

Enclosure

cc: Albert M. Cohen, Esquire  
Eugene Martin-Leff, Esquire

EVALUATION OF SITE INVESTIGATIONS AND REMEDIAL  
ACTION ALTERNATIVES FOR LOVE CANAL -  
TASK AREAS II, III, IV, VI AND VII

PREPARED FOR:  
WALD, HARKRADER & ROSS

Jay A. Cull  
Technical Manager  
Special Environmental Programs  
Occidental Chemical Corporation  
Donald L. Eichler  
Technical Director  
Central Sciences  
Occidental Chemical Corporation  
Paul O. Nees, Ph.D.  
Director, Toxicology  
Environment, Health and Safety  
Occidental Chemical Corporation  
Frank S. Waller, P.E.  
Principal  
Woodward-Clyde Consultants

EVALUATION OF SITE INVESTIGATIONS AND REMEDIAL  
ACTION ALTERNATIVES FOR LOVE CANAL --  
TASK AREAS II, III, IV, VI AND VII

1.0 INTRODUCTION

These comments on the Malcolm Pirnie, Inc., October 1983 Environmental Information Document "Site Investigations and Remedial Action Alternatives Love Canal" ("EID") were prepared at the request of Wald, Harkrader & Ross, counsel for Occidental Chemical Corporation. The purposes of these comments are (1) to evaluate the technical, environmental and economic suitability of the site investigations and remedial action recommendations for Task Areas II, III, IV, VI and VII in light of existing site conditions, and (2) to set forth alternatives to some of the remedial actions proposed by the EID.

The site investigation data from which this report was prepared include data set forth in the EID and its Supporting Documents, the May 1982 Environmental Protection Agency ("EPA") Love Canal Report, the 1981 New York State Department of Environmental Conservation ("DEC")/Department of Health Report to the Governor and Legislature and other publicly available materials. The opinions and conclusions presented herein are subject to reassessment if additional site information becomes available which shows that the site environmental chemistry or other site conditions differ significantly from those upon which this evaluation is based.

2.0 ADEQUACY OF THE REMEDIAL INVESTIGATION

Despite the extensive site investigation sampling program conducted, there are a number of areas where further data should be collected and/or reviewed prior to final determinations regarding remediation. In addition, the quality of the chemical analyses raises serious questions about the reported results. Further samplings, evaluations and analyses could be performed or resolved promptly, will not delay necessary remediation and are essential to a full evaluation of the proposed remedial actions.

2.1 Integration Of Other Relevant Site Environmental Data

While the EID references the availability of the 1982 EPA Love Canal report, the data collected therein have not been integrated into the report itself. Similarly, some data collected by State of New York agencies is referred to but not integrated

into the report. This failure to integrate other relevant data is most apparent with regard to analyses of sediments from Black and Bergholtz Creeks where previously reported State and EPA findings are not included.

These comments consider site environmental data from publicly available materials. A concerted effort should be made by EPA, DEC and their contractors to assure that all relevant data are collected, reported and considered before any remedial work in Task Areas II, III, IV, VI and VII is effectuated.

## 2.2 Sewer Inverts

While the EID Supporting Documents contain some information concerning the depth of sewers from ground level, the sewer invert data is insufficiently detailed for a thorough analysis of potential pathways of chemical migration or a rigorous assessment of the impact on the sewers of the remedial alternatives proposed by the EID. The elevation of the sewer inverts will provide the basis for an evaluation of sewer cleanup alternatives and any possible interplay between the storm and sanitary sewers, as well as the potential environmental risk, if any, that the sediments found therein pose to the Niagara Falls community.

## 2.3 Black and Bergholtz Creek TCDD Sampling

The EID and its Supporting Documents indicate no significant chemical presence of a general nature in Black, Bergholtz or Cayuga Creeks. The EID does indicate, however, that 2, 3, 7, 8 tetrachlorodibenzodioxin ("TCDD") is present in an area in the vicinity of the confluence of Bergholtz and Black Creeks. TCDD present in this area is in the upper one foot of the sediment. No significant quantities of any chemicals were found in the creek water itself.

TCDD was found in 6 of 32 Black and Bergholtz Creek sediment samples analyzed for that substance. These findings are comparable to and consistent with prior analyses for TCDD in sediments performed by the State and the EPA. The area proposed by the EID for excavation of sediments is defined to



be the area of TCDD presence, with the unexplained exception of the area near the 93rd Steet storm sewer outfall where a TCDD positive sample of Creek sediment was obtained.

The limits of TCDD contamination should be better defined. To properly define these limits, further sampling upstream in Bergholtz and Black Creeks and downstream in Bergholtz Creek would be appropriate, particularly in light of the TCDD-containing 93rd Street storm sewer outfall sediment sample.

#### 2.4 TCDD Sampling Results

Interpretation of the EID reported sampling results for TCDD in sediments is difficult for values below 5 ppb because of the quality of the analytical chemistry. First, the ratio of 320/322 ions is poor. Second, the mass spectral signal for 257 ion (loss of COCl) is weak. Third, there is variability in retention time. Finally, other mass spectral characteristics are below generally accepted standards. This does not mean that these samples need to be reanalyzed, only that care should be taken to avoid these problems in any further TCDD analyses of sediments from Black and Bergholtz Creeks or otherwise.

In addition to the difficulty of interpretation with regard to samples found to contain less than 5 ppb TCDD, many of the analytical reporting sheets for TCDD samples bear the unexplained phrase "Missouri Sample." Efforts should be made to determine why this phrase appears on so many of the TCDD analytical reporting sheets.

Review of the TCDD Quality Control Reports raises serious questions about the TCDD analyses. First, the TCDD quality control documentation deals with only 10 of the 12 positive TCDD analyses reported in the EID, locations D-7-M (Task Area III) and F-8 (Task Area VI) are not documented. Second, the values reported for samples with Compuchem Nos. 4193, 4239 and 4235 are highly suspect because of at least two indeterminate findings in the blank, duplicate or spiked quality control samples. Moreover, similar analytical quality controls were applied to samples with Compuchem Nos. 4376, 4378, 4382 and 4383. The quality control appears deficient.

These samples were run over a ten day period (July 23 to August 4) and only one blank was run for that period. Also, it appears there was an unexplained change in the duplicate sample data used to qualify results generated over this time period.

## 2.5 Sanitary Sewers in Task Area II

As recommended in the EID, further data should be gathered with regard to sediments in the sanitary sewer running along 95th Street to Colvin Blvd.

## 2.6 Chemical Analyses

The results of chemical analysis reported in the EID are deficient in many respects, as disclosed by the quality assurance documentation in the Supporting Documents. Although the surrogate mean percent recoveries from spiked samples are within the stated EPA Advisory Committee control limits, results for individual samples frequently do not meet these limits. By using mean percent recoveries, the contractor tends to smooth the data and mask potentially erroneous results. Careful inspection of individual surrogate recovery results indicate many instances in which advisory committee control limits are exceeded for specific samples, particularly for the acid and base/neutral surrogates. When surrogate analyses fall outside control limits, it is a signal that analytical results are potentially incorrect. In this case, the contractor appears not to have taken any action to reject or otherwise deal with analyses which were indicated as potentially erroneous by the surrogate recovery data.

In the case of duplicate spikes and surrogates as well, average recovery values appear good or at least acceptable. But this is misleading. Wide variations exist upon inspection of individual recovery values. For example, 1,2,4-trichlorobenzene recoveries for duplicate spikes vary between 0 and 300%. Pentachlorophenol recoveries range from not detected to 170% recovery. For one isomer of BHC, duplicate spike recoveries vary from 24 to 230%. Again, no indications are given that the analyst took any action when the quality control indicators were outside of acceptable limits.

### 2.7 Water Table Data

No water table data is reported in the EID. Before any sanitary or storm sewer remediation is undertaken, the depths of the sewer inverts should be compared to the depth of the water table to assure that there is no potential for migration from the sewers to the water table. It is believed that the sewers in the Task Areas under discussion are below the water table but this important fact should be confirmed. The Geotrans cross-sectional groundwater model prepared July 23, 1983, does not satisfy this need.

### 2.8 Sewers and Paths of Migration in Task Areas II and IV

Further information should be collected and reviewed regarding utility lines and other potential paths of migration along Frontier Avenue and the LaSalle Expressway in the vicinity of 97th and 99th Street. If potential paths of migration are found, they should be evaluated and addressed.

### 3.0 EVALUATION OF DATA

In evaluating the data collected in the remedial investigation, the EID errs in two respects. First, the reporting and evaluation of chemical analyses includes artifactual data and, second, no public health or environmental risk analysis was performed. Indeed, the EID states at the outset (p. 2-1) that this "study is not an assessment of human health impacts." The reporting of artifactual data makes the EID difficult to interpret and skews the contamination assessment matrix analyses of the analytical results. The failure to apply generally accepted techniques of public health and environmental risk analysis to chemicals found to be present means that the report recommendations have no rational base. The recommendations are engineering cleanup proposals only. Both of these errors should be cured prior to any final decisions on remediation.

### 3.1 Reporting and Evaluation of Chemical Analyses

To the degree they may be relied upon, the chemical analyses performed by Compuchem are useful indicators of which samples should be considered for application of the contamination assessment procedure used in developing the EID. But the data are particularly limited in the identification of non-priority pollutant compounds and in their quantification. The EID recognized this and has applied the contamination assessment procedure to priority pollutant compounds and elements only. The remainder of compounds whose concentration is listed as "EC" (Estimated Concentration) are not included in the assessment and in many cases should not be considered for any purpose; examples of these are siloxanes, methyester of formic acid and pentafluorophenol.

Siloxanes were identified in several samples. The EID does not consider the possibility that this is likely an artifact of lab contamination. Silanized glassware is commonly used in these types of analytical procedures, notably in the preparation of chromatography columns and in injection port sleeves in the gas chromatograph/mass spectrometer.

The identification of the methyester of formic acid is a good example of the limitations of relying upon computer identification of mass spectra. First of all, each spectra presented in the report is "enhanced" -- which means that certain information was purged from the data before presentation. When the level of the signal left over is small, the spectrum obtained is unreliable. Compounding this situation is the fact that the spectrum identified as the methyester of formic acid has only one significant peak and although the computer "score" for the matchup is high, the identification is totally unreliable.

Pentafluorophenol is also frequently reported. Careful examination of the documents in the Supporting Documents reveals that Compuchem uses this compound as an internal standard. It is deliberately added to the sample. Compuchem claims, however, that another parameter used to confirm identification (retention time) does not match pentafluorophenol. This means that the analysis for the compound is totally in doubt. Either the mass spectral identification is incorrect or if it is correct, then other analysis parameters are out of control and the chemical found is simply the material they have added to the sample themselves.

In summarizing the results of each chemical analysis, the EID also includes both methylene chloride and phthalates. Methylene chloride is widely recognized as a laboratory contaminant from its use as an extraction solvent. The volatility and water solubility of methylene chloride are such that it would not be expected to be found in sediments standing in liquid environments. It is not a "Love Canal" chemical, and is found in raw, untreated Love Canal leachate only as a by-product and then only at a level of only about 100 ppb. The inclusion of methylene chloride in these reports of analyses is in error.

Phthalates are also reported in the summaries of analysis. But the Supporting Documents note that the phthalates are often found at the same concentrations as in blank control samples. Nonetheless, the phthalate sample levels are reported as if they are the actual levels in the material analyzed. The summaries of analyses fail to report the differences between the control blanks and the samples. These reports are simply wrong.

Both methylene chloride and phthalate are reported frequently in the summaries of analyses. Unlike siloxanes, methylester of formic acid, and pentafluorophenol, they are then assigned a score and included in the matrix and thus in the contamination assessment. Methylene chloride scores should be excised from the matrix and the phthalate scores adjusted as they have skewed the contamination assessment input to the remedial action decision.

### 3.2 Human Health Risk Assessment

The contamination assessment presented in the EID provides a reasonable approach for rank ordering of the various sampling sites on the basis of toxicity, persistence and presence of the chemical contaminants. But nowhere does the report quantify the potential public health or environmental risk, if any, posed by the presence of such chemicals. To properly evaluate the need for remedial action it is essential that the assessment of the remedial investigation results include potential human exposures and any attendant health risks.

A preliminary health risk assessment can be accomplished by utilizing available risk quantifications, such as the EPA's Water Quality Criteria, to define an acceptable daily intake (ADI) for various chemicals. By comparing each ADI to the amount of chemical reported in the sediments and adjusting for probable ingestion or absorption rates, potential human exposures can be estimated and attendant health risks assessed for various levels of contact or ingestion. These health assessments can then be used to determine whether any sites where chemicals are present pose an unreasonable human health risk requiring remediation. Because any ingestion or dermal exposure to sewer sediments is unlikely, the use of any direct exposure assessment represents a very conservative approach. Inhalation toxicity has not been evaluated because of the location of the sediments in sewers, the small amounts of chemicals found to be present and the tendency of the chemicals to bind to sediment. These factors rule out air as a source of human exposure. A typical health risk assessment exercise follows.

For this risk assessment exercise, all the criteria are based on EPA Water Quality Criteria or on calculated criteria levels using EPA guidelines for preparing criteria documents.<sup>(1)</sup> A risk level of  $10^{-5}$  was selected as appropriate for chemicals that are evaluated as carcinogens. This is the middle of the risk range used in the EPA's Advance Notice of Proposed Rulemaking for Volatile Synthetic Organic Chemicals in Drinking Water<sup>(3)</sup> and the New York State Department of Health publication "Organic Chemicals and Drinking Water."<sup>(2)</sup>

The use of this risk level is appropriate because:

- The EPA Water Quality Criteria document assumes a lifetime consumption of water (2 liters per day) and fish and shellfish products (6.5 grams per day) for a lifetime. The present situation involves sediments in storm and sanitary sewers and it is unlikely that any one would be exposed on a continuous basis for their lifetime. At most, exposures will be occasional and infrequent and even this is an unlikely prospect.

- The EPA Water Quality Criteria model assumes a linear response for the low dose cancer risk extrapolation. According to Hoel et al, (4) this may be true with respect to delivered dose at the cellular level (DNA adducts), but because of the kinetic processes, the response to administered dose may not be linear ("hockey-stick" curve). In such a case the use of a linear model for health risk assessments from administered dose would overestimate risk -- especially at the low dose end of the curve.

For those chemicals that do not have published EPA Water Quality Criteria, a criteria was developed applying the method defined by EPA<sup>(1)</sup> and incorporating a 1000 fold safety factor as prescribed for a non-carcinogenic compound on which significant subchronic data is available on 2 species.

To estimate the actual exposure of anyone that might come into contact with sewer sediments, several assumptions regarding the quantity of material involved and the rate of absorption of the chemicals from sediment must be made. An approach which has been applied in a similar evaluation (Times Beach, Missouri) of TCDD-containing soils was developed by Kimbrough, et al., and assumes exposure from 0.1 gram to 10 grams of soil and human ingestion or dermal absorption rates of 30% or 1% of exposure, respectively.<sup>(5)</sup> Utilizing these assumptions, the chemical dose for one day can be calculated and compared with the ADI derived from the EPA Water Quality Criteria. When making this comparison it must be remembered that the water quality criteria are based on daily intake over an entire lifetime while the potential environmental exposures under discussion here are very infrequent and at most involve a few weeks of the individual's life. For this reason a factor of 20 has been applied. This means exposure for very few days in any one year. This factor is based on conclusions reached by Kimbrough, et al., that a level of concern may not necessarily be reached unless levels are several fold or more above 1 ppb in evaluating health risk from TCDD containing soils at "commercial" sites where exposure is only occasional and for limited time periods.

Table 1 applies this approach to one of the most contaminated sewer sediment samples (Manhole No. 412, stormsewer at 100th Street and Frontier Avenue). The estimated dose from 1 gram of material compares favorably with the average daily intakes permitted under EPA's Water Quality Criteria. Of course, actual exposure from sewer sediment would be even more occasional and far less than a total lifetime. Thus, one can conservatively state that dermal or oral exposures to the chemicals present do not constitute even a minimal risk to persons entering the sewers, much less a risk to the general population of the community who do not come into direct contact with the sewers at all.

Furthermore, the total amount of inorganic chemicals (metals) present in the sediments is only about five pounds (Table 6). These values compare favorably with the levels reported to occur naturally in soil (Table 2).

#### 4.0 PROPOSED CLEANUP OF SEWERS IN TASK AREAS II, IV AND VI

The EID proposes that over twelve miles of sewers be cleaned of chemical-containing sediments and that this be done with a closed, high pressure water cleaning process. This cleanup is nowhere justified on the basis of human health hazard. Moreover, the majority of sewer lines proposed for cleaning contain little, if any, "Love Canal" chemicals and their cleanup is in no way justifiable as part of any Love Canal remediation effort. Finally, the method of cleaning proposed by the EID threatens to breach the integrity of the storm and sanitary sewers and to disrupt the community and damage homes and businesses. Taken as a whole, all of these factors lead to the conclusion that either no action should be undertaken or that a much more limited, non-disruptive type of cleanup be employed in lieu of that which is now proposed.

##### 4.1 The Need for Cleaning Storm and Sanitary Sewers

The EID fails to discuss the need for cleaning storm or sanitary sewers in the context of the risk to human health posed by chemicals found to be present in sewer sediments. Instead, the EID simply ranks the sediment samples by quality and quantity of chemicals contained therein and presents engineering proposals for their removal. As discussed in Section 3.2 of this report, failure to apply human health risk analysis is a defect that is pervasive throughout the EID.



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Furthermore, the total amount of inorganic chemicals (metals) present in the sediments is only about five pounds (Table 5). These values compare favorably with the levels reported to be natural in soil (Table 2).

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Applying the health risk criteria set forth in Section 3.2 to the results of analyses of sewer sediments reported in the EID disclose that there is no public health justification for the recommended cleaning. This is true even for those sewers where TCDD was found. According to the Kimbrough, et al., human health risk assessment document on TCDD levels in soil, a level of concern in a commercial area "may not necessarily be reached unless levels are several fold or more above 1 ppb." Inasmuch as we are here dealing with sewers which are essentially inaccessible to the public, it is clear that even cleaning of these sediments is not warranted under generally accepted criteria for health risk evaluation. Therefore, no cleaning of these sewers is justified.

#### 4.2 Length of Storm and Sanitary Sewer Lines Designated for Cleaning

The EID recommends that over 60,000 feet of sewer lines be cleaned. These recommendations are broken out by length for each Task Area in Table 3. However, close examination of the sewer sediment chemical analytical data discloses that much of the area designated for cleanup is justified by speculation alone.

As discussed in Section 4.1, no cleanup is justified by the presence of chemicals alone. The human health risk posed by those chemicals must be assessed. However, on the assumption, arguendo, that a "Love Canal" association is sufficient to require a cleanup, the scope of the EID recommended cleanup is not justified. Criteria must be developed so that a documented "Love Canal" association may be made. We have assumed that either of the following criteria results in such an association:

- The sewer line was directly connected to Love Canal.
- Evidence of the presence of "Love Canal" chemicals.

Applying either of these two criteria results in the cleaning of only about 20,000 feet of sewer lines -- 40,000 feet less than that proposed by the EID. A comparison of the lengths involved is set forth in Table 3 and displayed graphically in Maps I and II. The paucity of data to justify

cleaning the remaining 40,000 feet of sewer is highlighted in Tables 4A, B and C. In these tables, all available data for manholes that were sampled in the program, but which do not meet the criteria outlined above, have been summarized and tabulated. While some sewers are obviously in need of sediment removal by conventional means because of sediment buildup not related to Love Canal, none of these data technically support the cleaning efforts called for by the EID. For example, even where organic chemicals were detected in these sewers, no "Love Canal" type materials were present.

With respect to the sanitary sewer line from Lift Station #6 to its intersection over 1 mile away with an industrial sewer line, the EID recommends that this line be cleaned, even though no data exists as to its condition. Such a recommendation is not justified.

#### 4.3 Amount of Sediments and Chemicals to be Cleaned from Sewers

The EID reports the depths of sediment in the sewer channels at each manhole. These channels are generally designed so that the water within the sewer is not influenced by changes in velocity. It is therefore reasonable to assume that the depth of the sediment found in the channels closely approximates the depth of the sediment within the adjacent sewer lines. Using the channel sediment depths in relation to the various sewer lengths and diameters, the total quantity of solids present can be calculated. Applying this method of calculation to the sewer lines designated for cleaning under the criteria discussed in Section 4.2 and depicted in Maps I and II, the amount of solids and the concentration of chemicals associated with this cleanup can be determined and compared with that recommended by the EID. This information is summarized in Tables 3 and 5. Where no analytical results were reported in the EID, presumably because results were below detection limits, a nominal value of 10 ppm each for "Love Canal" organics, non-"Love Canal" organics (other than TCDD) and inorganic chemicals was assumed. Table 6 shows this would result in the removal of approximately five pounds of inorganic and fourteen pounds of organic chemicals.

#### 4.4 Method of Cleaning Sewers

The EID recommended sewer cleaning approach of closing off sections of the sewers and cleaning them out with water under high pressure (15,000 psi) is extremely unwise for the following reasons:

- As a practical matter, it is not possible to shut-off sanitary sewer flows for cleaning. Too many residential and commercial establishments would be adversely effected even for a short period of time. No consideration, for example, has been given to approximately 350 gal/day of sanitary sewage that originates from each house along the lines to be cleaned.
- With respect to storm drains, a similar situation exists and it is quite conceivable that even temporary blockage could result in basement flooding during a rain storm.
- There are serious questions whether high pressure cleaning of sewer pipes can be accomplished without extensive damage to the sewer systems or backups into homes.

With these disadvantages in mind, as well as its high projected costs (which appear to be seriously understated), any sewer cleaning deemed to be required should proceed along the following course:

- Using a vacuum truck with a carbon adsorption system on the exhaust air, remove sediments on the benches and in the channels at the manholes to the maximum amount possible.
- Construct a temporary sediment catch basin to trap sediments at a low point downstream in the sewers. The lift stations, which make ideal sediment catch basins in the sanitary sewers, should be used for this purpose.
- Starting at the highest sewer invert elevation, use fire hoses to flush the sediment downstream towards the catch basin.

- For sanitary sewers, allow the flush water, which will be essentially free of suspended solids, to continue down the sanitary sewers to the Niagara Falls POTW.
- With regard to the storm sewer systems, the cleaning water should be collected and pumped into a nearby sanitary sewer.
- All collected sediment should be taken to an appropriate disposal area (see Section 5.0).

The chemicals in the sediments, even the "Love Canal" chemicals, are not unique to the Niagara Falls POTW. The organic chemical loading which now reaches the POTW is described in the March 1983 Malcolm Pirnie, Inc., Report to the City of Niagara Falls at Tables S-2, S-3, S-4 and S-5. Even if all the organics present in the sewer sediments at issue were completely to dissolve in the flush water and make their way to the POTW all at once, the quantity of organic chemicals involved (approximately 15 lbs. as described in Table 6) would be insignificant compared to the present 400 lbs. average daily POTW load of priority pollutant type chemicals. The fact is, however, that well over 90% of the organic chemicals would remain within the suspended solids trapped in the sediment catch basins (see Section 6 for typical distribution coefficients between water and sediment) and that no measurable daily increase in the POTW loading would result.

#### 5.0 EXCAVATION AND DISPOSAL OF SEDIMENTS FROM BLACK AND BERGHOLTZ CREEKS

The EID recommended remediation calls for excavation of four feet of sediment from Black and Bergholtz Creeks and disposal of these sediments in a local hazardous waste disposal facility. Since no other chemicals were found in the creek sediments, the only justification for this remediation is on the basis of TCDD presence in the first foot of sediment. EID consideration was given to the disposition of the excavated sediments at the nearby 93rd Street School, but this alternative was ruled out because of (1) this site's proximity to Bergholtz Creek and (2) the subsequent need permanently to dedicate the site as a waste disposal facility.

On the basis of the available data, the excavation of sediments to a depth of one foot and a reasonable safety factor of one-half foot is all that is justified. In addition, the EID wholly fails to consider the use of the nearby Love Canal landfill site as the disposal area for the excavated sediments. As will appear below, Love Canal is an obvious, more cost effective disposal site for these sediments.

#### 5.1 Excavation of Sediments to a Depth of Four Feet

Review of the Creek sediment analytical data shows that no TCDD or "Love Canal" chemicals were found below the first one foot of sediment. Because none of these chemicals below one foot, excavation to a depth of four feet is wholly unjustified. Based on data currently available, no more than one and one-half feet of sediment should be excavated.

#### 5.2 Disposal of Creek Sediments at Love Canal

The Love Canal landfill is an existing disposal site containing hazardous waste. Even assuming that four feet of sediments must be excavated and that 6500 cubic yards of TCDD-containing sediments must therefore be disposed of at this site, such disposal would have a negligible impact on the chemical loading there. Indeed, assuming that TCDD is present throughout the sediments to be excavated at the same average levels found in sampling reported by the State of New York, the EPA and the EID, only .013 lbs. (5.9 grams) of TCDD would be deposited at a site which is alleged to contain substantial quantities of this material.

Although it is doubtful that TCDD would become unbound from deposited sediments, a perimeter leachate collection and treatment system is already in place for containing and treating chemicals of this nature. Moreover, an expanded cap is now scheduled to be placed over the entire landfill site to better seal the site and to further reduce the chemical loading to the on-site treatment facility. Also, monitoring at the Love Canal landfill site to assure the continued long term adequacy and integrity of the containment and

treatment system is scheduled to be undertaken. Thus, the Love Canal landfill site satisfies both EID objections given for use of the 93rd Street School as a creek sediment disposal site.

Moreover, if it is the case that TCDD reached the creek sediments by way of Love Canal, the contamination is simply being returned to its immediate source -- an environmentally sound procedure which has precedents. Trucking of the wastes to Love Canal need only pass along one city street (about one short block of Colvin Blvd.), as compared to travelling 3 to 10 miles on several heavily travelled thoroughfares to reach local hazardous waste landfill sites. Thus, use of Love Canal will substantially limit the exposure of the general public to transported wastes.

The cost for off-site disposal at a hazardous waste landfill is estimated by the EID to be \$651,500 (for 6515 cubic yards of sediment). The same volume of materials could be properly disposed of at Love Canal for less than \$200,000. Thus, a cost savings in excess of \$400,000 could be achieved by using the existing Love Canal landfill.

### 5.3 Location and Containment of Sediment Within the Love Canal Site

The location of the now demolished 99th Street School would be one suitable area within the Love Canal site for disposal of the excavated sediments from Black and Bergholtz Creeks. This area is scheduled to be filled in and capped under the current remediation program.

Disposal of the sediments at the 99th Street School location would require only one substantial change in the planned remediation program for the 99th Street School section of the Love Canal site. (Figure 1). This would be the installation of drain tiles connecting to the existing Love Canal perimeter drainage system. Another level of protection is provided by the groundwater flow which is well established to be toward the existing perimeter drainage system by reason of the hydraulic barrier created by the leachate collection system. Finally

this area is to be capped, inhibiting substantially any migration by reducing the water loading to the site. The new drain tiles, the cap and existing hydraulic barrier will thus preclude the migration of any creek sediment chemicals away from the Love Canal landfill.

Use of the Love Canal landfill as the creek sediment disposal site would have to be coordinated with the on-going Love Canal Task Area I remediation and closure (capping). The coordination of the two activities could be accomplished by either deferring the cap construction in the proposed disposal area or by later removing and replacing the landfill cover. Considering the very substantial cost savings to be achieved by disposal of the creek sediments at Love Canal and the fact that capping of that site will not even start until late Spring, the coordination of these two activities should be implemented.

#### 6.0 RIVER SEDIMENTS OFF OF THE 102nd STREET LANDFILL

The EID recommends that chemical-containing sediments off-shore from the 102nd Street landfill be temporarily stabilized by constructing a berm off-shore and around the effected area. First, there is no showing that the chemicals found in these sediments came from Love Canal. Second, the remedial action proposed is unnecessary because the chemicals found in the sediments pose no immediate public health or environmental threat. In addition, the resolution of the 102nd Street landfill litigation should be reached within a reasonable amount of time. This litigation addresses these same sediments. Finally, the cost of the temporary remediation recommended by the EID is seriously understated and less costly but equally effective alternatives are available.

Table 7 indicates the maximum chemical concentrations observed in any sediment sampled off-shore the 102nd Street landfill. These concentrations were found at location E-9 in the upper foot of river sediments. By applying generally accepted methods for estimating the equilibrium concentration in water for chemicals found in the sediments (Table 7) and making assumptions with respect to dilution of the river, it is then possible to compare in Table 8 potential downstream water concentrations with Water Quality Criteria Guidelines. The results of this comparison show that even under these



worst case conditions, none of the chemicals found off-shore are expected to dissolve to the extent that water quality criteria in the East Branch of the nearby Niagara River would be exceeded. Thus the need for any remedial actions in Area VI is questionable from a risk analysis standpoint.

Even if remedial actions are deemed to be required in the long run, however, there has been no demonstrated need in the EID for any "temporary" remedial actions to be undertaken prior to the overall remediation of the 102nd Street site. Therefore, any actions at this time are unnecessary and premature.

Moreover, should a temporary berm be deemed appropriate, a simple crushed rock and stone berm would be wholly adequate and substantially less costly. Crushed rock could be dumped essentially along the same lines proposed by the EID. Two feet of shot rock would be applied to the river side to protect against erosion. A twenty foot wide exposed top two feet above water level would be adequate and the entire project could be accomplished for less than \$400,000. This would be substantially less costly than the berm now proposed by the EID because the project costs are seriously understated by the EID.