



Guide to Obtaining No Migration Variances for CERCLA Remedial Actions

Office of Emergency and Remedial Response
Hazardous Site Control Division OS-220W

Quick Reference Fact Sheet

On-site CERCLA remedial response actions must comply with (or justify a waiver of the substantive requirements of the Resource Conservation and Recovery Act (RCRA) when they are determined to be applicable or relevant and appropriate requirements (ARARs). RCRA requirements are applicable for CERCLA responses involving the treatment, storage, or disposal of RCRA wastes (or when treatment, storage, or disposal of the waste being addressed under CERCLA occurred after November 19, 1980). A No Migration Variance may be sought to dispose of untreated hazardous wastes that are otherwise subject to treatment standards under the RCRA land disposal restrictions (LDRs). Regulatory provisions under 40 CFR 268.6 specify the conditions that must be met in order to qualify for obtaining a No Migration Variance for a RCRA hazardous waste unit to allow disposal of restricted hazardous waste without treatment. The petition procedures in the RCRA regulations do not apply to on-site CERCLA actions. Instead, this guide outlines procedures for obtaining a No Migration Variance for RCRA hazardous wastes as part of a CERCLA response when the LDRs are ARAR. This guide is based on the most current Office of Solid Waste (OSW) information ("No Migration" Variances to the Hazardous Waste Land Disposal Prohibitions: A Guidance Manual for Petitioners, Draft, Office of Solid Waste, March 1990). Currently, EPA is developing a proposed rulemaking for obtaining No Migration Variances.

WHEN TO CONSIDER A NO MIGRATION VARIANCE

A "No Migration" Variance allows land disposal of restricted wastes not meeting the LDR treatment standards in a specific unit (or engineered subunit within an area of contamination (AOC)). To obtain a No Migration Variance, site managers must demonstrate "to a reasonable degree of certainty that there will be no migration of hazardous constituents from the disposal unit or injection zone [for Class I wells] for as long as the waste remains hazardous" (40 CFR 268.6). This demonstration requires that actual or predicted concentrations of hazardous constituents or emission rates at the edge or boundary of the unit do not exceed health-based levels or environmentally protective levels for ground water, surface water, soil, and air for as long as the waste remains hazardous. Site managers also must ensure that monitoring of all environmental media, including ground water, surface water, soil, and air (e.g., compliance with 40 CFR 264 Subpart F, ground-water monitoring) is or will be in place to demonstrate compliance.

Generally, no migration petitions will be only for on-site treatment and/or disposal actions. (For example, in a limited number of cases, the disposal may occur at an off-site, non-commercial facility.) The Office of Solid Waste (OSW) has identified several scenarios (see Hazardous Waste Management System; LDRs Final Rule, 51 FR 40572, November 7, 1986) under which a No Migration Variance may be appropriate. These scenarios include:

- Placement of compatible non-volatile wastes in a massive and stable geologic formation, such as a salt dome.
- Placement of a waste consisting of fairly immobile constituents in a monofill (i.e., a waste unit that contains only one hazardous waste) located in an arid area that has no ground-water recharge.
- Placement of a hazardous waste in a land-treatment facility that through active chemical, physical, biological, or other processes renders it nonhazardous.
- Temporary storage of a hazardous waste in a totally enclosed indoor waste pile with a floor or bottom liner for a purpose other than to accumulate sufficient quantities of the waste to allow for proper recovery, treatment, or disposal.

No Migration Variances also may be appropriate in conjunction with CERCLA actions involving the injection of hazardous wastes into Class I injection wells. (The EPA Office of Drinking Water has granted variances for several industrial Class I wells, although not for any involving disposal of Superfund wastes. For a Class I variance, petitioners must demonstrate that wastes do not migrate from the "injection zone.") Site managers may want to consider this type of No Migration Variance when, for example, a large volume of restricted RCRA waste requires disposal and it is feasible, based on the nine selection of remedy criteria, to dispose of the wastes in an on-site underground injection well.

In all cases, however, site managers should carefully consider whether or not to obtain such a variance, considering the extensive demonstrations (described below) that are required.

NECESSARY FINDINGS

For on-site variance requests (i.e., where waste disposal will occur in an on-site unit), only substantive requirements of 40 CFR 268.6 must be met (the opportunity for public comment is provided through the proposed plan and Record of Decision (ROD) development process); the variance may be granted as part of the ROD for the site. For off-site responses, both administrative and substantive requirements must be met. The formal No Migration Variance petition process (including EPA Headquarters review, publication of a notice in the Federal Register, and an opportunity for public comment) must be followed when seeking a No Migration Variance for wastes or waste residuals to be disposed of off site. (The variance is granted by OSW and a notice of the granted variance is published in the Federal Register.) Specific data needs required to obtain a No Migration Variance follow. The specific justification required to obtain a No Migration Variance may differ from site to site, based on the wastes present and conditions found at the site.

Health-Based Levels

In reviewing the request for a variance, the calculated concentrations of hazardous constituents will be compared with health and environmental criteria. The Agency would generally compare the concentrations of each constituent in leachate, ground water, and surface water to the non-zero Maximum Contaminant Level Goals/Maximum Contaminant Levels (MCLGs/MCLs), Ambient Water Quality Criteria (AWQC), or State Water Quality Standards (WQS), if they exist, and in air to promulgated emission standards or reference doses (RfDs) and risk specific doses (RSDs) based on inhalation.

Per the NCP (55 FR 8745 and 8754-55), if a non-zero MCLG/MCL, AWQC, or State WQS is not available for a constituent, the appropriate health-based levels would be the RSD for carcinogens and the RfD for noncarcinogens (using appropriate exposure assumptions for each medium). The health-based criteria would be calculated by assuming chronic (lifetime) exposure by ingestion or inhalation of contaminated media. For carcinogens, the maximum residual risk level is set at 1×10^{-6} for all constituents. (More information on these health-based numbers is available in the Risk Assessment Guidance for Superfund: Human Health Evaluation Manual, EPA/540/1-89/002, December 1989, the Integrated Risk Information System (IRIS), U.S. EPA, 1989, and the RCRA Facility Investigation Document.)

If health-based criteria do not exist for a constituent, site managers may propose their own health-based levels using the toxicity testing guidelines contained in 40 CFR Parts 797 and 798, and Agency guidelines for assessing health risks (51 FR 33992, 34006, 34014, and 34028). If no health-based level can be determined for a constituent, the concentration of a constituent generally must not exceed analytical detection limits for the purpose of the No Migration demonstration. (Use of analytical detection

limits should be based on methodology prescribed in "Test Methods for Solid Waste, Physical/Chemical Methods," U.S. EPA Publication No. SW-846, with the lowest possible detection level indicated therein for each hazardous constituent.) If health-based levels are below analytical detection limits for a constituent, site managers must demonstrate, through the use of modeling (see below), that the health-based levels will not be exceeded at the unit boundary. However, for the purpose of compliance monitoring in situations where health-based levels are below detection limits, attaining levels of detection limits usually will constitute compliance.

Models

Existing guidance from OSW (i.e., "No Migration" Variances to the Hazardous Waste Land Disposal Prohibitions: A Guidance Manual for Petitioners, Draft, Office of Solid Waste, March 1990) does not specify the specific types of models that are required to obtain a No Migration Variance. Therefore, site managers may select those models that are appropriate to predict that health-based levels will not be exceeded beyond the unit boundary. Several of the available models are recommended for use by EPA. The Vadose Interactive Processes (VIP) model, for example, predicts the degradation and mobility of organics in soil; the Industrial Source Complex (ISC) Long Term or Short Term model calculates waste dispersion rates into the air at the unit boundary; and the Chemdat 6 model predicts the emission rates of wastes into the air (more information on these models may be obtained from OSW's Waste Management Division). EPA discourages the use of proprietary models, because all models, the assumptions underlying them, and their relevance for use at a site seeking a No Migration Variance must be explained, and descriptions of their calculations and codes must be available for review. Models, input data, and relevant documentation should be included in the detailed justification for a No Migration Variance.

DEMONSTRATING COMPLIANCE

The demonstration that there will be no migration of the wastes for "as long as the wastes remain hazardous" is a waste- and site-specific determination. For example, if hazardous waste is to be placed in a salt dome under a No Migration Variance, the site manager must consider the degradation and transformation potential of the waste as well as the containment properties of the salt dome (e.g., geologic stability, depth, thickness, and permeability of the formation, and the properties of the salt as an encapsulating medium).

For some waste types that degrade naturally to health-based and/or environmentally protective levels in a relatively short time period, site managers may only have to demonstrate that such degradation occurs and show that "no migration" from the unit of the waste or any toxic byproducts occurs during or after the degradation period.

After a variance has been granted, all environmental media must be monitored to confirm that no migration of hazardous constituents occurs beyond the unit boundary. For air, a one-time confirmatory ambient monitoring should also be performed to confirm modeling estimates. The emission and air monitoring

should be conducted during a period representative of worst-case emission/dispersion conditions. After that, regular waste sampling/monitoring must be performed to confirm modeling inputs (e.g., routine waste sampling, weekly soil moisture, annual soil sampling (for organics)). Site managers should provide sufficient information to justify the design of the monitoring program and to demonstrate that monitoring stations will be located to detect migration from the unit at the earliest practical time. (See Air Pathway Assessment Methodology for "No-Migration" Demonstrations, Interim Final, July 1989 for more information.)

If migration is detected during the monitoring period, the site manager, in conjunction with the Office of Regional Counsel, must decide whether to issue an Explanation of Significant Differences (ESD) or ROD Amendment announcing termination of waste acceptance at the unit, termination of the variance, or changes in the conditions of the variance. (Conditions of the variance that are

likely to be changed will cease migration. The variance must still be maintained.) Where the receiving unit is not located on site (and a petition has been filed under RCRA), if migration is detected, site managers should contact the Permits and State Programs Division.

DOCUMENTING A NO MIGRATION VARIANCE FOR REMEDIAL ACTIONS

RI/FS Report

The substantive requirements for demonstrating no migration of the restricted RCRA hazardous waste should be documented in the RI/FS Report. In the Detailed Analysis of Alternatives chapter of the FS Report, a general discussion of why a No Migration Variance is attempted should be included in the description of each alternative for which a variance is contemplated. (The more specific and detailed information, such as relevant waste analysis

Highlight 1 - DOCUMENTATION RECOMMENDED IN RI/FS REPORT FOR NO MIGRATION VARIANCES (DEVELOPMENT OF ALTERNATIVES SECTION)

ON-SITE:

- Waste Descriptions
 - EPA Hazardous Waste Number(s) (if appropriate)
 - Estimated quantity of waste to be placed in unit
 - Physical and chemical characteristics
 - Waste incompatibilities (if any)
 - Waste transformation and immobilization mechanisms (e.g., biodegradation, photodegradation, hydrolysis, oxidation/reduction, volatilization)
 - Relevant sampling and testing information¹ (e.g., TCLP test results)
- Site Characterization (e.g., climatology, meteorology, geology, hydrology)
- Monitoring Plans (e.g., type of monitoring for all media, frequency, location, equipment, reporting procedures)
- Waste Mobility Modeling
 - Leachate and gas generations
 - Barrier integrity over time
 - Potential for air emission of wastes
 - Physical properties of site soils affecting flow (e.g., water content, pressure potential, permeability, degree of water saturation)
 - Description of calculations and assumptions
 - Demonstration of appropriate QA/QC procedures
- Assessment of Environmental Impacts (e.g., species diversity, fishery and habitat impacts)
- Prediction of Infrequent Events (e.g., earthquakes, floods)
- QA/QC of all data and information

OFF-SITE:

For off-site No Migration Variances, the documentation requirements listed for on-site actions should be extracted from the RI/FS report and combined with the following information found below. The information should be incorporated with the on-site information into a formal petition under 40 CFR 268.6 and a copy of the petition should be referenced and attached to the RI/FS report.

- Petitioner's name and address
- Identification of on-site contact person, if different from above
- Description and location of site
- Statement of the petitioner's interest in the proposed action

Source: "No Migration" Variances to the Hazardous Waste Land Disposal Prohibitions: A Guidance Manual for Petitioners, Draft, Office of Solid Waste, March 1990.

¹ Appropriate sampling information may be contained in the Superfund Quality Assurance Project Plan (QAPP) and, therefore, not specifically repeated in the RI/FS Report.

data from sampling, should be placed in an appendix to the report.) Under the "Compliance with ARARs Criterion," site managers should identify those wastes or waste residuals to be granted a No Migration Variance, and state that those wastes or waste residuals would achieve compliance with the LDRs through the No Migration Variance.

The specific information that should be included in an RI/FS report for on-site and off-site CERCLA remedial actions is presented in **Highlight 1**.

Proposed Plan

The intent to seek a No Migration Variance should be stated clearly in the Description of Alternatives section of the Proposed Plan. Because the Proposed Plan solicits public comment on all of the remedial alternatives, the intent to seek a No Migration Variance should be identified for all alternatives for which such an action is contemplated. This opportunity for public comment on the Proposed Plan fulfills the requirements for public notice and comment on No Migration Variances required under 40 CFR 260.20 when wastes are transported off-site. **Highlight 2** provides sample language for the Proposed Plan.

Highlight 2 - SAMPLE LANGUAGE FOR THE PROPOSED PLAN

Description of Alternatives section:

Under this alternative, compliance with RCRA land disposal restrictions would be achieved by obtaining a No Migration Variance under which hazardous wastes would not be allowed to migrate from the unit above health-based levels.

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

A No Migration Variance would be granted for [Enter number] of [Enter total number of alternatives] to comply with the RCRA land disposal restrictions.

Community's Role in Selection Process section:

The Proposed Plan also seeks comment on granting a No Migration Variance for each alternative for which a No Migration Variance is proposed, [Alternatives #1, #2, etc.].

Record of Decision (ROD)

The documentation provided in the ROD for a No Migration Variance should be a brief synopsis of the information provided in the FS report. In the Description of Alternatives section, as part of the discussion of major ARARs associated with each remedial alternative, site managers should include a statement that explains why a No Migration Variance is justified. Sample language for the Description of Alternatives section of the ROD is presented in **Highlight 3**.

In the Statutory Determination section, under "Compliance with ARARs," site managers should indicate that wastes receiving a No Migration Variance will achieve compliance with the LDRs through a No Migration Variance.

Highlight 3 - SAMPLE LANGUAGE FOR THE RECORD OF DECISION

Description of Alternatives section:

Because existing and available data demonstrate that there will be no migration of hazardous constituents from the unit as long as the waste remains hazardous, a No Migration Variance has accordingly been granted as part of this ROD. Accordingly, the residuals placed in this unit do not have to meet the RCRA LDR treatment standards. The [landfill/clean] closure requirements will, however, be met.

NOTICE: The policies set out in this memorandum are intended solely as guidance. They are not intended, nor can they be relied upon, to create any rights enforceable by any party in litigation with the United States. EPA officials may decide to follow the guidance provided in this memorandum, or to act at variance with the guidance, based on an analysis of specific site circumstances. The Agency also reserves the right to change this guidance any time without public notice.