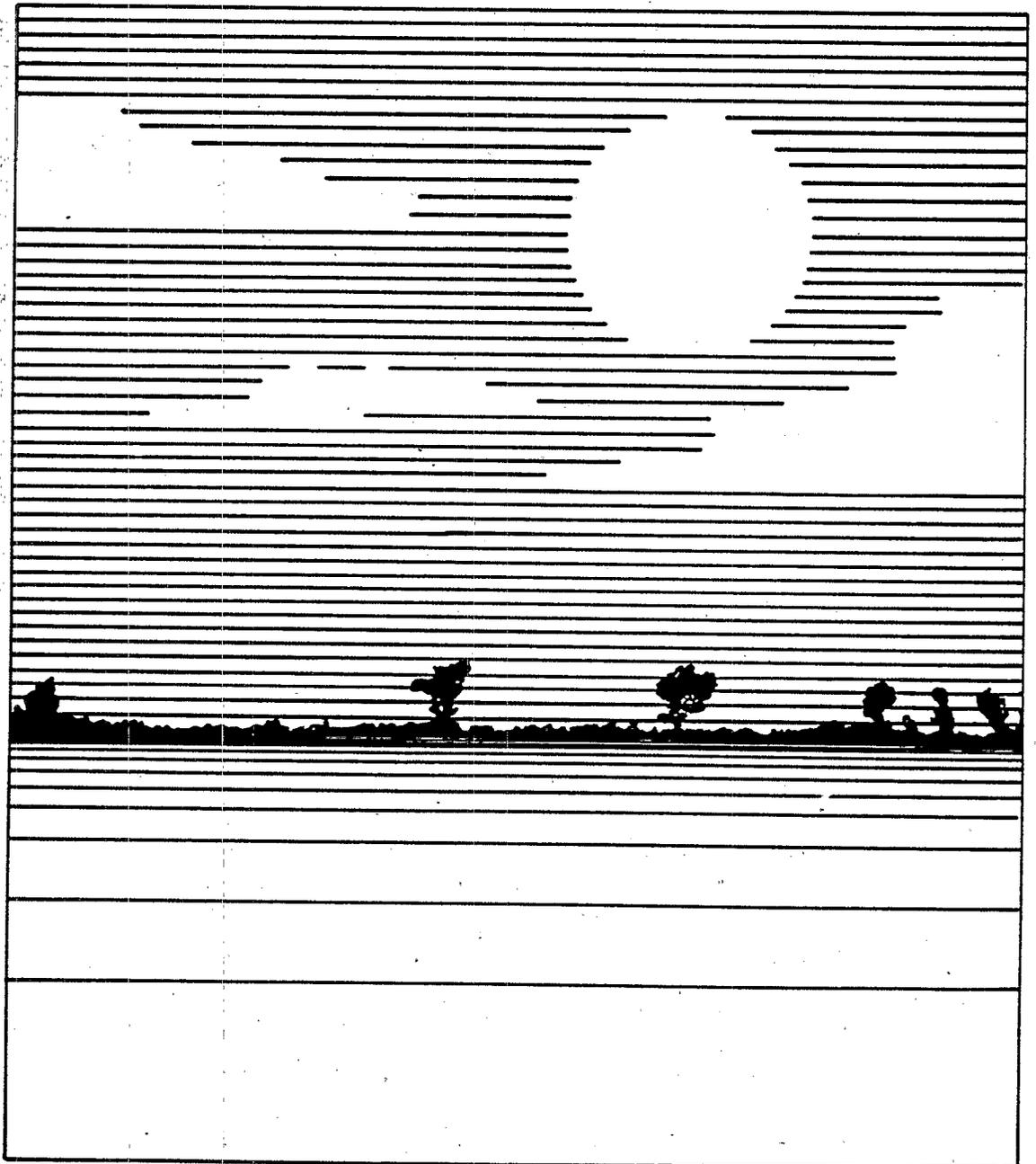


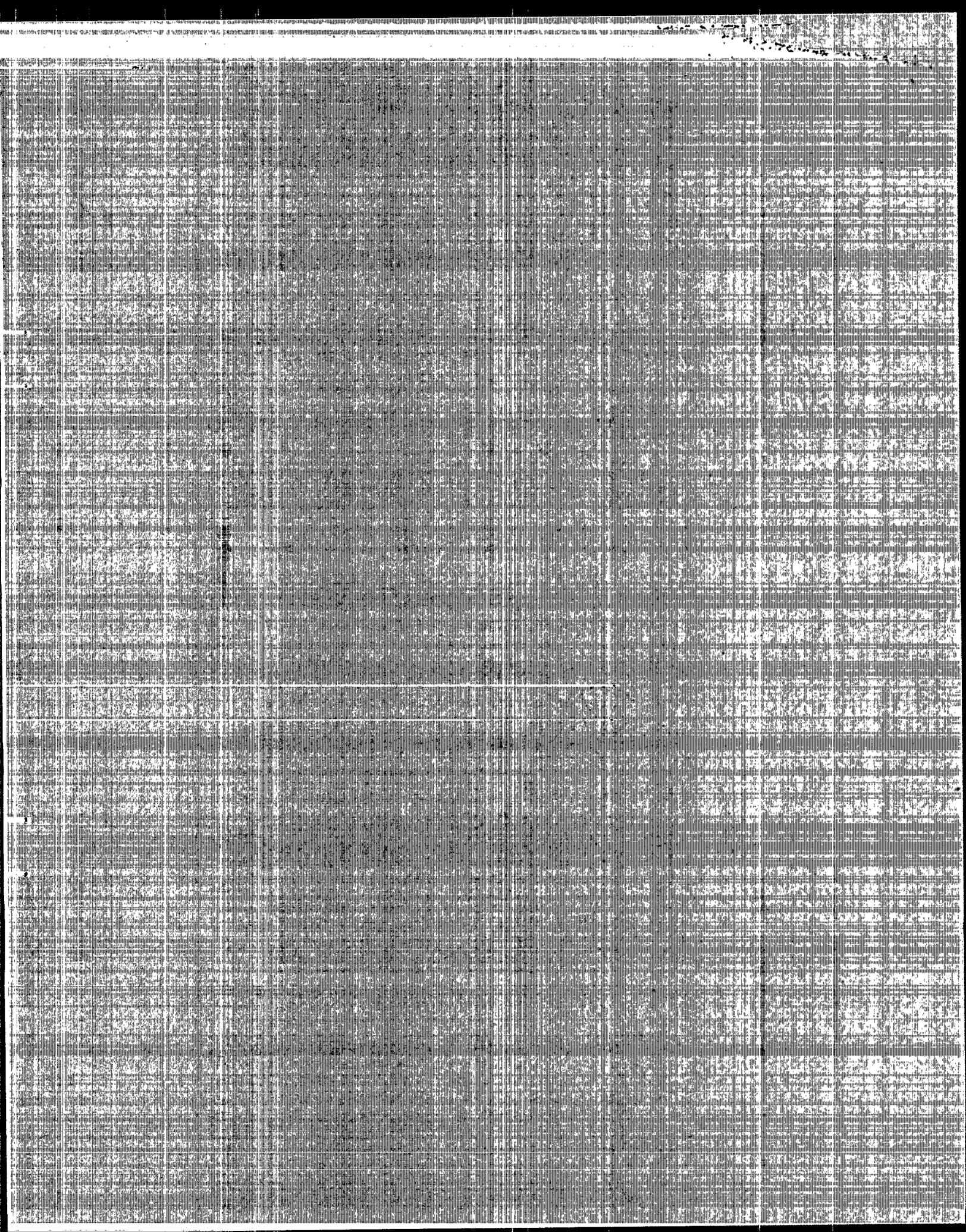


# Land Disposal Restrictions Summary

## Volume I

## Solvents and Dioxins





**LAND DISPOSAL RESTRICTIONS SUMMARY**

**VOLUME 1**

**SOLVENTS AND DIOXINS**

**Submitted to:**

**Office of Solid Waste  
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## 1. INTRODUCTION

The Hazardous and Solid Waste Amendments (HSWA) to the Resource Conservation and Recovery Act (RCRA) were enacted on November 8, 1984. Among other things, these far-reaching amendments require EPA to evaluate all hazardous wastes according to a strict schedule to determine whether land disposal of these wastes is protective of human health and the environment. For wastes that are restricted from land disposal, the amendments require EPA to set levels or methods of treatment which substantially diminish a waste's toxicity or reduce the likelihood that a waste's hazardous constituents will migrate. Beyond specified dates, restricted wastes which do not meet the treatment standards (or are otherwise exempt as discussed in this booklet) are prohibited from land disposal (see Table 1). According to HSWA, if EPA fails to set treatment standards for a particular waste by specified deadlines, that waste is automatically prohibited from land disposal. These so-called "hammer provisions" provide the impetus for EPA to keep to the strict schedule.

On November 7, 1986, EPA promulgated the first phase of the land disposal restrictions. In the November 7, 1986 final rule, EPA established the framework for implementing the land disposal restrictions program. EPA also established specific treatment standards and effective dates for the first category of wastes subject to the restrictions, F001-F005 spent solvent wastes, and F020-F023 and F026-F028 dioxin-containing wastes. This booklet summarizes the November 7, 1986 rulemaking and describes the key regulatory requirements pertaining to treatment standards, variances, and extensions. The booklet also outlines the new responsibilities of generators, treatment facilities, and disposal facilities under the rule. Finally, it provides an overview of the specific treatment standards

TABLE 1

## SCHEDULE FOR LAND DISPOSAL PROHIBITIONS

November 8, 1986	Dioxin-containing wastes (F020, F021, F022, F023, F026, F027, F028)  Spent solvents (F001, F002, F003, F004, F005)
July 8, 1987	California list wastes (Liquid hazardous wastes containing: free cyanides, PCBs, and certain metals at or above specified concentration levels, and those liquid hazardous wastes having a pH of less than or equal to 2.0. Also, both liquid and non-liquid hazardous wastes containing halogenated organic compounds at or above specified concentration levels.)
August 8, 1988	At least one-third of all listed hazardous wastes  Wastes disposed of in injection wells
November 8, 1988	Contaminated soil and debris from CERCLA Section 104 or 106 response actions and RCRA corrective actions
June 8, 1989	At least two-thirds of all listed hazardous wastes
May 8, 1990	All remaining listed hazardous wastes  All characteristic hazardous wastes
Within 6 months of listing or identification (these wastes are not subject to the automatic land disposal prohibition)	Newly listed wastes

for solvent- and dioxin-containing wastes, the first wastes that EPA has evaluated for the land disposal restrictions. The booklet is geared to individuals who are familiar with EPA's hazardous waste regulatory program. While it presents a summary of the land disposal restrictions program, it is not intended to be a comprehensive review of all regulatory issues associated with the November 7 rulemaking. For further information, contact the RCRA/Superfund Hotline at (800) 424-9346 (toll free) or (202) 382-3000 in the Washington, D.C. metropolitan area.

In the final rule, EPA defined land disposal to include, but not be limited to, any placement of hazardous waste in:

- Landfills.
- Surface impoundments.
- Waste piles.
- Injection wells.
- Land treatment facilities.
- Salt domes or salt bed formations.
- Underground mines or caves.
- Concrete vaults or bunkers.

The land disposal restrictions rule covers hazardous wastes placed in land disposal units after the effective dates of the prohibitions. Wastes disposed of before November 7, 1986 do not have to be removed from land disposal for treatment. However, if wastes are removed from land disposal, the wastes must meet the applicable treatment standards before subsequent new placement in or on the land, or they must be the subject of a variance or extension as discussed in this booklet. Contaminated soil and debris from CERCLA Section 104 and 106 response actions and RCRA corrective actions are not subject to

the land disposal restrictions rule until November 8, 1988. In addition, wastes disposed of in underground injection wells are not subject to the land disposal restrictions until August 8, 1988.

Wastes which are placed into storage prior to the effective date are not subject to the restrictions on storage. However, once taken out of storage, these wastes must meet the applicable treatment standards prior to land disposal, or they must be the subject of a variance or extension as discussed in this booklet.

Wastes may be treated in surface impoundments that meet minimum technological requirements provided that (among other things discussed in this booklet) treatment residuals which do not meet the treatment standards are removed within one year of placement of the waste in the impoundment.

Both interim status and permitted facilities are subject to the land disposal restrictions rule (these restrictions supersede 40 CFR 270.4(a) which currently provides that compliance with a RCRA permit constitutes compliance with Subtitle C). However, small quantity generators of less than 100 kg/month of hazardous waste (or less than 1 kg/month of acute hazardous waste) are not subject to the restrictions.

The November 7, 1986, final rule outlines the Agency's approach to implementing the congressionally mandated restrictions on land disposal of hazardous waste. The rule includes:

- Procedures for setting treatment standards.
- Procedures for obtaining variances from the treatment standards.

- Procedures for granting nationwide variances from the effective dates of the land disposal restrictions due to insufficient alternative treatment capacity.
- Procedures for obtaining extensions to the effective dates of the land disposal restrictions on a case-by-case basis.
- Procedures for petitioning to obtain a variance from the land disposal restrictions based on a finding that there will be no migration of hazardous constituents from the disposal unit or injection zone for as long as the wastes remain hazardous.
- Provisions for allowing restricted wastes to be treated in surface impoundments.
- Provisions for prohibiting dilution as a substitute for adequate treatment to achieve the treatment standards.
- Provisions for prohibiting the storage of restricted hazardous wastes.
- Provisions for modifying permits.
- Requirements for testing and recordkeeping.
- Specific treatment standards for certain dioxin- and spent solvent-containing wastes.



## 2. TREATMENT STANDARDS (SECTION 268.40)

HSWA prohibits land disposal of restricted wastes unless EPA determines that continued land disposal is protective of human health and the environment, or unless the applicable treatment standards have been met. HSWA requires EPA to set levels or methods of treatment which substantially diminish the toxicity of a waste or substantially reduce the likelihood that hazardous constituents will migrate from a waste. These levels or methods, referred to as treatment standards, must minimize short- and long-term threats to human health and the environment. After the effective dates of the prohibitions, hazardous wastes that do not comply with the treatment standards are prohibited from being placed in land disposal units unless:

- EPA has approved a petition demonstrating that hazardous constituents will not migrate from the land disposal unit for as long as the wastes remain hazardous.
- EPA has granted an extension to the effective date of the prohibition.

### How Are the Treatment Standards Established?

To establish treatment standards, EPA identifies wastes with similar characteristics (i.e., similar physical and chemical properties). EPA then categorizes these similar wastes into broad "waste treatability groups" and subgroups. The treatability groups take into account differences in the types and effectiveness of treatment for those particular wastes. Treatability groups may be formed by grouping wastes by industries or manufacturing processes which generate wastes with similar treatability characteristics. EPA then evaluates identified technologies used to treat the wastes to determine the best demonstrated available technology (BDAT) for each waste treatability group.

## What Is the Best Demonstrated Available Technology (BDAT)?

BDAT is the best available method of treatment demonstrated to be achievable for each waste treatability group. To establish BDAT for a particular waste treatability group, EPA first collects and analyzes data on existing treatment technologies for that waste group that are demonstrated by full-scale operation. EPA will not consider pilot- and bench-scale operations in identifying "demonstrated" treatment technologies.

Once EPA has identified "demonstrated" technologies, the Agency then determines whether these technologies may be considered "available," as based on three criteria:

- The technology must be commercially available.
- The technology must present less risk to human health and the environment than land disposal of the untreated waste.
- The technology must provide substantial treatment.

Technologies considered in setting BDAT must be found to be commercially available (i.e., either the technology itself, or the services of the technology, may be purchased). A proprietary or patented treatment technology must be able to be purchased from the proprietor. If it cannot be purchased, the technology is considered unavailable and the treatment standard will be based on the next best technology that is available.

EPA then compares the risks to human health and the environment associated with treatment of the wastes by the demonstrated technologies to the risks associated with the land disposal of untreated wastes. Based on this comparative risk assessment, those treatment technologies that present greater risks than land disposal of the untreated wastes will be

considered unavailable, and will be excluded as a basis for establishing treatment standards.

If all demonstrated treatment technologies present greater risks than land disposal for a particular waste, EPA will not set a treatment standard for that waste. Therefore, the restricted waste will be prohibited from land disposal (unless it is the subject of an approved "no migration" petition) until a new or improved technology emerges that does not pose a greater risk than land disposal.

EPA will not consider treatment technologies that are prohibited under RCRA Section 3004(n) because of the potential for air emissions of hazardous constituents as available for purposes of establishing treatment standards.

Also, to be considered an available technology, the technology must provide substantial treatment, that is, it must substantially diminish the toxicity of the waste or reduce the likelihood of migration of the waste's hazardous constituents. This excludes technologies that would provide treatment only for the sake of treatment without providing substantial reduction in risk to human health and the environment.

Once the demonstrated available treatment technologies are identified, EPA then evaluates performance data on these technologies to determine if the data are representative of well-designed and well-operated systems. Only data from well-designed and well-operated systems will be considered in setting BDAT. These performance data are then analyzed to determine the best demonstrated available technology.

When treatment data are available for several different technologies, EPA is using a statistical method known as analysis of variance to determine the level of performance that

represents BDAT. EPA is also using a process variability factor in setting BDAT which takes into account normal variability in well-designed and well-operated treatment processes.

### Setting the Treatment Standards

Once BDAT is identified, EPA then establishes the treatment standards as either a specific technology (or group of technologies) or as a performance level (i.e., the concentration level of hazardous constituents in a waste or extract of the waste that is representative of treatment by BDAT; for the November 7, 1986 rule covering solvents and dioxins, this is expressed as a concentration level of hazardous constituents in an extract of the waste developed by using the Toxicity Characteristic Leaching Procedure [TCLP]). Wherever possible, EPA will attempt to set concentration-based performance standards since they will provide the most flexibility to the regulated community. Treatment technologies that are not used in setting treatment standards may still be used to comply with treatment standards expressed as performance levels.

### What Is the TCLP?

The TCLP is an analytical method used to determine whether the concentrations of hazardous constituents in a waste extract or an extract of the treatment residual meet the applicable treatment standards. EPA promulgated the TCLP for use only in the solvents and dioxins final rule, and only when treatment standards are expressed as concentration levels of hazardous constituents in an extract. EPA may revise the TCLP at some future date based on public comments received on the June 13, 1986 Organic Toxicity Characteristic proposed rule (51 FR 21648).

### 3. VARIANCES AND EXTENSIONS

Under certain conditions, EPA may grant a variance from the treatment standard, an extension to the effective date of the land disposal prohibition, or an exemption from the prohibition for a specific waste at a specific site. In the November 7, 1986 rulemaking, EPA established four types of variances and extensions:

- Variance from the treatment standard.
- Two-year national capacity variance.
- Case-by-case extension.
- "No migration" petition.

#### Variance from the Treatment Standard (Section 268.44)

EPA established the variance from the treatment standard to account for wastes that are significantly different from the wastes evaluated by EPA in setting treatment standards and, therefore, cannot be treated to meet the applicable treatment standard; for example, exotic wastes, wastes formed by inadvertent mixing, and wastes that require the use of technologies different from those used to set the treatment standard. If a petitioner can successfully demonstrate that a waste is significantly different from the wastes in its treatability group such that it cannot meet the treatment standard, EPA will grant a variance from the treatment standard for that particular waste. In granting a variance, EPA will establish a new treatability group for that waste (and all similar wastes), and set a new treatment standard.

For EPA to grant a variance, the petitioner must not only successfully demonstrate that the waste is significantly

different from the wastes evaluated by EPA in setting the treatment standards, but also demonstrate that the waste cannot meet the treatment standard. The petitioner must show (by actual treatment attempts that fail, or by extensive analyses of the waste) that treatment of the waste by well-designed and well-operated technologies is unsuccessful in meeting the specified levels, or that the waste cannot be treated by the specified technology.

Anyone submitting a petition for a variance from the treatment standard must certify that all information in the petition (see Appendix A) is true, accurate, and complete. In addition, they must comply with all applicable hazardous waste management regulations during the petition evaluation process.

In considering variance petitions, EPA first will compare the physical and chemical characteristics of the petitioner's waste with the physical and chemical characteristics of the wastes evaluated by the Agency in setting the treatment standard. This comparison will enable EPA to reexamine its treatment standard for the waste. EPA will then determine whether the petitioner's treatment system (if any) is well designed and well operated, and whether the system reflects treatment by BDAT (although the restricted wastes are not required to be treated by BDAT).

#### Two-Year National Capacity Variance (Section 268.30)

Certain wastes may continue to be land disposed without treatment for up to two years past the statutory effective dates of the restrictions rule if EPA determines that adequate treatment capacity is not available on a nationwide basis. In determining the need for a national capacity variance, EPA will consider, on a nationwide basis, both the capacity of alternative treatment technologies and the quantity of

restricted waste generated. If sufficient waste treatment capacity is available, the restriction on land disposal of that waste goes into effect on the statutory deadline. If there is a significant shortage of national capacity to treat all the restricted waste, EPA may set an alternative effective date based on the earliest date on which adequate treatment capacity becomes available.

In determining available capacity, EPA will consider both permitted and interim status on-line facilities. EPA will also consider planned facilities and capacity extensions that will be on-line by the effective date of a land disposal prohibition. On-line facilities will include on-site and off-site facilities, as well as stationary and mobile facilities. EPA will not consider underground injection in its capacity determinations until the Agency has determined whether such injection is fully protective of human health and the environment.

EPA will compare available treatment capacity nationwide to the quantities of the restricted waste generated annually nationwide. Available capacity will include:

- Commercially available capacity.
- Private facility capacity which can be used to manage additional waste generated by that facility.
- Private facility capacity which can be used to manage wastes generated by other facilities (i.e., can act as a commercial facility).

#### Case-by-Case Extensions (Section 268.5)

In cases where alternative treatment or disposal capacity cannot reasonably be made available by the effective date of the land disposal prohibitions, interested parties may petition EPA for an extension of the effective date on a case-by-case

basis. EPA may grant a case-by-case extension of up to one year. This extension is renewable only once.

To be considered for a case-by-case extension, a petitioner must demonstrate a good faith effort to locate and contract with hazardous waste treatment, recovery, or disposal facilities nationwide to manage the waste. A petitioner must also demonstrate that he has entered into a binding contract to construct or otherwise provide adequate treatment, recovery, disposal capacity sufficient to manage the entire volume of wastes. In addition, a petitioner must demonstrate that, due to circumstances beyond his control, alternative treatment, recovery, or disposal capacity cannot reasonably be made available by the effective date.

Anyone submitting a petition for a case-by-case extension must certify that all information in the petition (see Appendix B) is true, accurate, and complete. In addition, they must comply with all applicable hazardous waste management regulations during the petition evaluation process.

If wastes that receive an extension to the effective date (either a 2-year national variance or a case-by-case extension) are to be placed in or on the land, then they must be placed in a facility that is in compliance with the minimum technological requirements. These requirements, including a double liner, leachate collection system, and ground-water monitoring system, apply to new units, replacement units, or lateral expansions of existing landfills or surface impoundments at existing facilities. Wastes receiving an extension may also be placed in such facilities that meet other alternative operating practices, design features, or siting characteristics determined by the EPA Administrator to be equally protective of human health and the environment.

## "No Migration" Petitions (Section 268.6)

EPA will consider allowing land disposal of restricted wastes if a petitioner can demonstrate, to a reasonable degree of certainty, that such disposal will not allow migration of hazardous constituents from the disposal unit or injection zone for as long as the wastes remain hazardous. In general, a successful "no migration" petition (see Appendix C for petition requirements) will allow only land disposal of a specific waste at a specific unit.

EPA believes that there will be very few instances when "no migration" demonstrations can be successfully made. However, candidates for a successful petition include cases where wastes containing relatively immobile hazardous constituents are placed in monofills located in arid climates with no ground-water recharge. Other candidates for "no migration" petitions are cases where a small amount of compatible waste is placed in a massive and stable geological formation such as a salt dome.

## Rulemaking Procedures

All variances and extensions are rulemaking procedures. Variances from the treatment standard, case-by-case extensions, and "no migration" exemptions are petition processes (the two-year national capacity variance is solely an EPA determination). EPA will publish its tentative determination on a petition in the Federal Register. After a 30-day comment period, EPA will publish its final decision in the Federal Register.



4. TREATMENT IN SURFACE IMPOUNDMENT EXEMPTION (SECTION 268.4)

EPA will allow hazardous wastes to be treated in surface impoundments under the following conditions:

- Treatment residuals not meeting the treatment standards can remain in a surface impoundment for up to one year. Beyond that time period, the treatment residuals that do not meet the treatment standards must be removed and treated to meet the treatment standards before being disposed, and may not be placed into another surface impoundment (treatment residuals that do meet the treatment standards may remain in the surface impoundment). In cases where the volume of liquid wastes annually flowing through an impoundment (or series of impoundments) is greater than the capacity of the impoundment, this flow-through may constitute annual removal of the supernatant for the purposes of this requirement (this will not, however, constitute removal of any sludge residues requiring annual removal).
- The surface impoundment must meet minimum technological requirements including a double liner, leachate collection system, and ground-water monitoring system, or
- The surface impoundment must meet other alternative operating practices, design features, or siting characteristics determined by the EPA Administrator to be equally protective of human health and the environment.

A surface impoundment may receive a waiver from the double liner and leachate collection system requirements if EPA determines that it meets certain other conditions, including:

- It has at least one liner that is not leaking; it is located more than one-quarter mile from an underground drinking water source; and it is in compliance with the applicable ground-water monitoring requirements of RCRA Section 3005.

or

- It is located, designed, and operated so as to ensure that no hazardous constituents will migrate to ground water or surface water in the future.

Owners or operators seeking an exemption for treatment in surface impoundments must certify to the EPA Regional Administrator that the impoundment meets the minimum technological requirements (or is exempt as discussed above), and must submit a copy of the facility's waste analysis plan.

5. PROHIBITION ON DILUTION (SECTION 268.3)

The land disposal restrictions rule prohibits the dilution of restricted wastes as a substitute for adequate treatment to meet the treatment standards. This provision ensures that no individual circumvents the intent of EPA's concentration-based regulations by simply adding material to wastes that do not meet the treatment standards, rather than treating the wastes.

Dilution as a necessary part of the waste treatment process is allowed under the final rule. For example, the addition of an acidic or basic reagent to a waste in a neutralization pond does not merely dilute the waste into a larger volume of waste; rather, the addition of the reagent is a necessary part of the process of chemically altering the waste so as to render it less hazardous.



6. STORAGE PROHIBITION (SECTION 268.50)

Under the land disposal restrictions rule, storage of restricted wastes is prohibited except where storage is solely for the purpose of accumulating sufficient quantities of wastes to facilitate proper treatment, recovery, or disposal. Treatment, storage, and disposal facilities may store restricted wastes for as long as needed, provided that such storage is solely for this purpose. However, if the facility stores a restricted waste for more than one year, it bears the burden of proof, in the event of an enforcement action, that the storage was solely for this purpose (there is no notification requirement for storage of more than one year). For storage of less than one year, EPA bears the burden of proof that such storage was not for the sole purpose of accumulating sufficient quantities of wastes to facilitate proper treatment, recovery, or disposal. This prohibition on storage does not apply to wastes which meet the treatment standard, wastes which have been granted an extension to the effective date, and wastes which are the subject of a "no migration" exemption.

For generators without a RCRA permit or interim status, the rules governing storage (Section 262.34) have not changed under the land disposal restrictions rule. Large quantity generators may store restricted hazardous wastes on-site for 90 days or less without a permit or interim status. Small quantity generators of 100 to 1,000 kg of hazardous wastes per month may accumulate wastes for up to 180 days, or 270 days if the waste must be transported 200 miles or more to a treatment, storage, or disposal facility. (The EPA Regional Administrator may grant a 30-day extension to these storage limits on a case-by-case basis.) The land disposal restrictions now impose the additional requirement that such storage must be solely for the purpose of accumulating sufficient quantities of waste to facilitate proper treatment, recovery, or disposal.

As prior to the land disposal restrictions, all generator storage must comply with the applicable standards of RCRA Part 265, including contingency planning, preparedness and prevention, and personnel training. In addition, generators must store their wastes in containers or tanks that are clearly marked with the words "Hazardous Waste" and with the date on which the tanks or containers enter storage. All container markings must be clearly visible for inspection.

If compliance with the land disposal restrictions requires storage beyond 90 days (or 180 days for small quantity generator waste), generators must obtain RCRA interim status or a RCRA permit. For a generator to qualify for interim status, the wastes must have been placed into storage in tanks or containers before the effective date of the restrictions. A generator must also demonstrate that the additional storage time is necessary to comply with the land disposal restrictions. Generators who need to obtain interim status must submit a Part A application to EPA by the earlier of two deadlines:

- Six months after publication of regulations which first require the facility to comply with RCRA Part 265.
- Thirty days after the date the facility first becomes subject to the Part 265 standards. This is the most likely deadline for most generators since a generator first becomes subject to the permitting requirements when the accumulation time limit is exceeded.

Interim status granted under these conditions will apply only to those restricted wastes identified in the Part A application.

Generators who obtain interim status are subject to the applicable RCRA Part 265 standards. EPA can take corrective action against these generators pursuant to Section 3008(h) for failure to comply with these standards. EPA can also require the generator to submit a Part B permit application.

The rules governing storage at transfer facilities (Section 263.12) have not changed under the land disposal restrictions. Transporters may store restricted wastes at a transfer facility for up to 10 days without a permit or interim status.

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## 7. PERMIT PROGRAM

### Interim Status Facilities

Under RCRA, treatment facilities operating under interim status may make certain changes to their operations which enable them to handle new wastes. These changes include:

- Accepting new wastes.
- Increasing design capacity (if the facilities can demonstrate to EPA that there is a lack of available capacity).
- Changing treatment, storage or disposal processes as necessary to comply with state or local laws.

To accept new wastes, interim status facilities must revise their Part A permit applications. To increase the design capacity or change a treatment, storage, or disposal process, an interim status facility must obtain prior approval from EPA. RCRA limits these changes to facility alterations and expansions that do not exceed 50 percent of the capital cost of a comparable new facility.

In a notice published in the Federal Register on December 11, 1986, EPA proposed to give interim status treatment and storage facilities more flexibility in managing wastes restricted from land disposal. EPA proposed to allow these interim status facilities to expand their operations by more than 50 percent in order to treat or store restricted wastes in tanks or containers.

### Permitted Facilities (Section 270.42)

Prior to the November 7, 1986 land disposal restrictions rule, permitted treatment facilities did not have the same

flexibility to make waste management changes as interim status facilities. In the November 7th rulemaking, EPA made some changes (Section 270.42) which will allow permitted facilities to treat restricted wastes more promptly and to increase the availability of treatment capacity. A permitted facility may now treat restricted wastes not identified in the permit if the treatment is such that the treatment residual meets the applicable treatment standards. In addition, permitted facilities may treat new wastes as long as such treatment does not pose substantially different risks from the risks associated with wastes included in the permit. These changes require an EPA-approved minor permit modification.

EPA proposed in the December 11, 1986 notice to give permitted treatment and storage facilities more flexibility in managing wastes restricted from land disposal. EPA proposed to allow these permitted facilities, through the minor permit modification process, to change their operations so as to treat or store restricted wastes in tanks or containers. The proposed rule would allow only those changes needed to comply with the land disposal restrictions rule. These permitted facilities would be required to submit a major modification request, which EPA would process at a later date, and to comply with all applicable requirements of the RCRA Part 264 standards.

## 8. TESTING AND RECORDKEEPING (SECTION 268.7)

The testing and recordkeeping requirements of the land disposal restrictions rule reflect EPA's philosophy of tracking wastes from generation to ultimate disposal. All restricted wastes, whether treated and disposed on-site, or sent off-site to a RCRA treatment or disposal facility or to a non-RCRA recycling facility (although recycling facilities may be exempt from RCRA regulation, the wastes they receive and the resulting residues are regulated by RCRA and subject to the land disposal restrictions), are subject to some testing and recordkeeping requirements. Generators, treatment facilities, and land disposal facilities each have specific responsibilities under the land disposal restrictions rule; however, the land disposal facility bears the ultimate responsibility for ensuring that only wastes meeting the treatment standards (or wastes that are subject to an exemption or variance) are land disposed.

### Generator Responsibilities

The generator is responsible for testing his waste or an extract of his waste (developed by using the TCLP), or using knowledge of his waste, to determine if his waste is restricted from land disposal. If the generator determines that he is managing a restricted waste, he is responsible for determining whether his waste meets the applicable treatment standard. The generator can also make this determination based either on knowledge of the waste, or by testing the waste or waste extract (developed by using the TCLP). If the generator has used knowledge of his waste (whether it is sent to a treatment facility or a disposal facility) to determine the applicable treatment standard, or to determine if the applicable standard has been met without treatment, he must maintain records (at the location where the waste is generated) of all supporting data used to make the determination. As prior to the land disposal restrictions, the generator must also conduct a waste

analysis if there is any reason to believe that the waste composition or the generating process has changed; he cannot rely on his knowledge of the waste in such cases.

If the waste meets the treatment standard, the generator may transport the waste directly to the disposal facility, providing a notice with the following information:

- The EPA Hazardous Waste Number(s).
- The applicable treatment standard(s).
- The manifest number associated with the waste shipment.
- The waste analysis data (if available).

The generator must also provide a certification which states that the waste delivered to the disposal facility meets the treatment standard, and that the information included in the notice is true, accurate, and complete. If EPA has granted an extension to the effective date for a particular waste, it is the generator's responsibility to notify the land disposal facility.

For restricted wastes that do not meet the treatment standard, the generator must send a notice with each shipment to the treatment facility. The generator must determine the appropriate treatment standard based on waste analysis data, knowledge of the waste, or both.

Generators who treat and/or dispose of restricted waste on-site must also comply with the recordkeeping requirements of treatment and/or disposal facilities (except for the manifest number).

#### Treatment Facility Responsibilities

Treatment facilities are responsible for treating restricted wastes to the levels specified by the applicable

treatment standards, or by the specified technology(ies). A treatment facility also is responsible for:

- Keeping a copy of the notice and any available waste analysis data provided by the generator in the treatment facility's operating record.
- Testing the treatment residual using the TCLP (according to the frequency established in the facility's waste analysis plan) to determine whether it meets the waste extract concentration level.
- Conducting a waste analysis if there is any reason to believe that the waste composition or the treatment process has changed.

Where treatment residuals meet the treatment standards, the treatment facility, like the generator who ships waste directly to a disposal facility, must submit a notice and certification to the disposal facility. The certification must state that the treatment standards have been met in accordance with the prohibition on dilution, and that the information is true, accurate, and complete.

Where treatment residuals do not meet the treatment standards and the facility ships the residuals off-site to another treatment facility for further treatment, the notice requirements are the same as for the original generator sending the wastes to the treatment facility.

#### Land Disposal Facility Responsibilities

Land disposal facilities are responsible for ensuring that only wastes meeting the treatment standards (or wastes that are subject to an exemption or variance) are land disposed. In addition, land disposal facilities must document that the waste has been treated in accordance with the applicable EPA treatment standards. The results of any waste analyses must be placed in the land disposal facility's operating record, along with a copy of all certifications and notices.



## 9. TREATMENT STANDARDS FOR SOLVENTS (SECTION 268.41)

### What Solvent Wastes Are Covered Under the F001-F005 Listing? (Section 268.31)

Only solvent constituents listed in Table CCWE (Table 2 in this booklet), when used to solubilize (dissolve) or mobilize other constituents, are considered spent solvents under the land disposal restrictions rule. A solvent is considered "spent" when it has been used and is no longer fit for use without being regenerated, reclaimed, or otherwise reprocessed. Examples of spent solvents include solvents that are used as degreasers, cleaners, fabric scourers, diluents, extractants, and reaction and synthesis media. Manufacturing process wastes containing F001-F005 solvent constituents are not spent solvents where the solvent constituents are reactants and not carriers (solvents) in the process.

### Basis for the Solvent Treatment Standards

EPA identified nine treatment technologies that are demonstrated and commercially available for F001-F005 spent solvents. Using data that represented only well-designed and well-operated systems, EPA calculated average performance values for each specific waste treated with a particular technology. Where one technology performed better than others, EPA based the treatment standard on the best technology. If several technologies performed equally well, EPA averaged the performance values and multiplied the average value by a variability factor to derive the treatment standard. The variability factor was calculated in to account for fluctuations inherent in the normal process of well-designed and well-operated treatment systems.

EPA established three separate treatability groups for spent solvent wastes:

- Wastewaters (defined for the purposes of Table CCWE as solvent-water mixtures containing less than or equal to 1 percent total organic carbon [TOC] by weight).
- Methylene chloride-containing wastewaters containing less than or equal to 1 percent TOC generated from pharmaceutical plants.
- All other spent solvent wastes, including wastewaters containing greater than 1 percent TOC, solvent-containing solids, solvent-containing sludges, and solvent-contaminated soils.

Of the nine demonstrated treatment technologies, the following four technologies formed the basis for the solvent treatment standards:

- Steam stripping.
- Biological treatment.
- Activated carbon treatment.
- Incineration.

The solvent treatment standards are set as concentration levels based on the above technologies; EPA is not requiring that these specific technologies be used to meet the treatment standards. Table 2 lists the spent solvent treatment standards expressed as concentrations in the treatment residual extract.

Effective Date of Solvent Land Disposal Restrictions (Section 268.30)

The following spent solvent wastes (F001-F005) have been granted the maximum two-year national variance. Effective November 8, 1988, these wastes are prohibited from disposal.

- Wastes generated by small quantity generators of 100 to 1,000 kg/month of hazardous wastes.
- Wastes resulting from CERCLA response actions and RCRA corrective actions.
- Solvent-water mixtures, solvent-containing sludges or solids, and solvent-contaminated soil containing less than one percent total F001-F005 solvent constituents.

TABLE 2  
**SOLVENT TREATMENT STANDARDS<sup>a</sup>**

TABLE CCWE

CONSTITUENTS OF F001-F005 SPENT SOLVENT WASTES	EXTRACT CONCENTRATIONS (mg/l)	
	WASTEWATER	OTHER
Acetone	0.05	0.59
n-Butyl Alcohol	5.00	5.00
Carbon disulfide	1.05	4.81
Carbon tetrachloride	0.05	0.96
Chlorobenzene	0.15	0.05
Cresols (cresylic acid)	2.82	0.75
Cyclohexanone	0.125	0.75
1,2-Dichlorobenzene	0.65	0.125
Ethyl acetate	0.05	0.75
Ethylbenzene	0.05	0.053
Ethyl ether	0.05	0.75
Isobutanol	5.00	5.00
Methanol	0.25	0.75
Methylene chloride	0.20 <sup>b</sup>	0.96

<sup>a</sup>For determining the applicable treatment standard, wastewaters are defined as solvent-water mixtures containing less than or equal to 1 percent total organic carbon.

<sup>b</sup>Treatment standard for wastewaters generated from pharmaceutical plants is 12.7 mg/l.

TABLE 2 (CONT.)

CONSTITUENTS OF F001-F005 SPENT SOLVENT WASTES	EXTRACT CONCENTRATIONS (mg/l)	
	WASTEWATER	OTHER
Methyl ethyl ketone	0.05	0.75
Methyl isobutyl ketone	0.05	0.33
Nitrobenzene	0.66	0.125
Pyridine	1.12	0.33
Tetrachloroethylene	0.079	0.05
Toluene	1.12	0.33
1,1,1-Trichloroethane	1.05	0.41
1,1,2-Trichloro-1,2,2-trifluoroethane	1.05	0.96
Trichloroethylene	0.062	0.091
Trichlorofluoromethane	0.05	0.96
Xylene	0.05	0.15

10. TREATMENT STANDARDS FOR DIOXINS (SECTION 268.41)

The treatment standards for dioxin-containing wastes F020, F021, F022, F023, F026, F027, and F028 are based on incineration to 99.9999 percent destruction and removal efficiency. The standards require treatment to a level below the routinely achievable detection limit of 1 ppb (using Method 8280 in SW-846) in the waste extract for the specific isomers of tetra-, penta-, and hexachlorodibenzo-p-dioxins and -dibenzofurans listed in Table CCWE. The treatment standards for the chlorophenols also require treatment to a level below the routinely achievable detection limit in the waste extract as listed in Table CCWE.

Table 3 shows the dioxin-containing waste treatment standards expressed as concentrations in the treatment residual extract.

Effective Date of Dioxin Land Disposal Restrictions  
(Section 268.31)

EPA has determined that there is a lack of treatment capacity nationwide to handle dioxin wastes, therefore EPA has granted the maximum two-year national variance to the effective date of the dioxin land disposal restrictions to allow time for the regulated community to develop the necessary capacity. Effective November 8, 1988, the F020-F023 and F026-F028 dioxin-containing wastes are prohibited from land disposal.

TABLE 3  
DIOXIN TREATMENT STANDARDS

TABLE CCWE

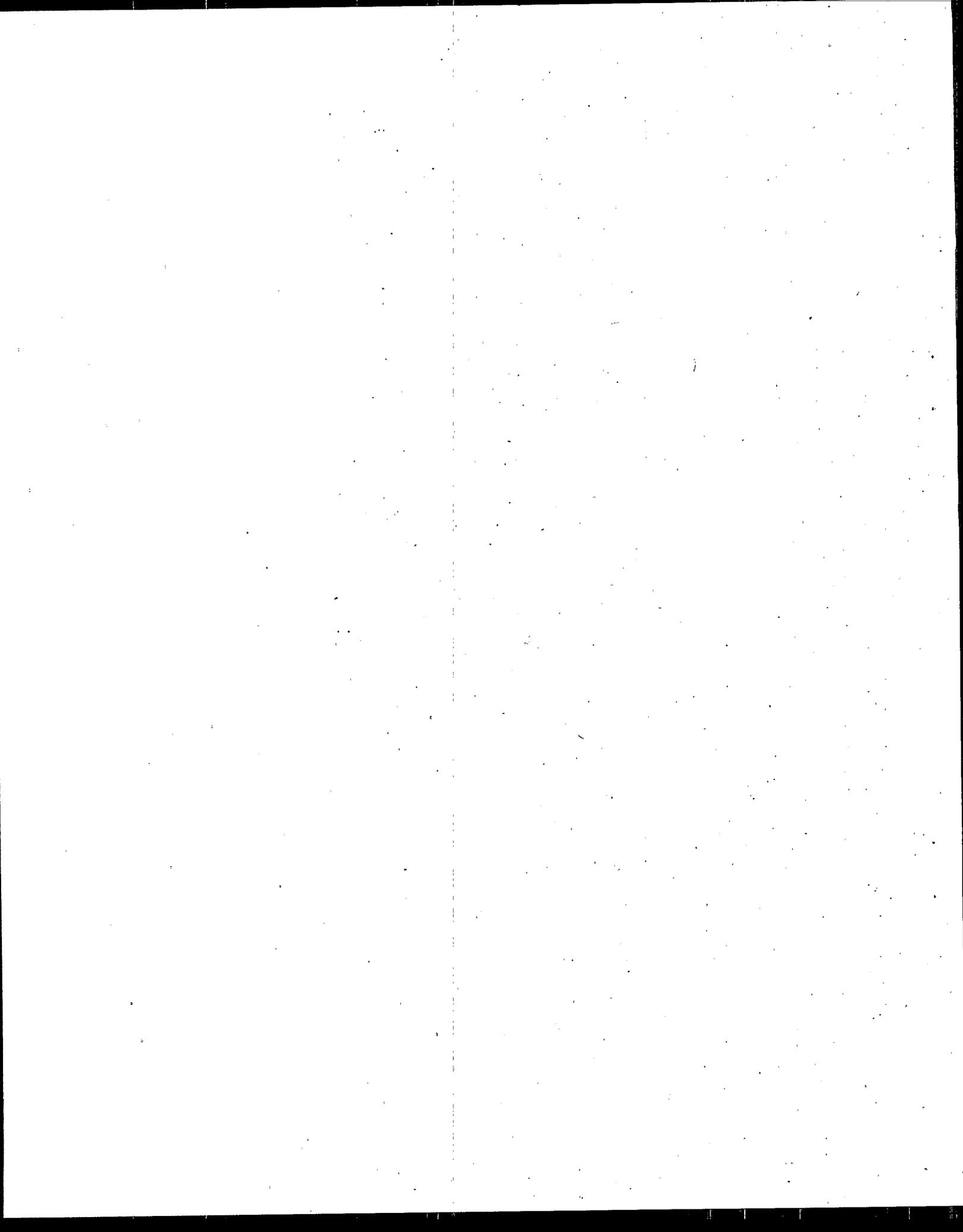
F020-F023 AND F026-F028 DIOXIN-CONTAINING WASTES	EXTRACT CONCENTRATIONS
HxCDD - All Hexachlorodibenzo-p-dioxins	< 1 ppb
HxCDF - All Hexachlorodibenzofurans	< 1 ppb
PeCDD - All Pentachlorodibenzo-p-dioxins	< 1 ppb
PeCDF - All Pentachlorodibenzofurans	< 1 ppb
TCDD - All Tetrachlorodibenzo-p-dioxins	< 1 ppb
TCDF - All Tetrachlorodibenzofurans	< 1 ppb
2,4,5-Trichlorophenol	< 0.05 ppm
2,4,6-Trichlorophenol	< 0.05 ppm
2,3,4,6-Tetrachlorophenol	< 0.10 ppm
Pentachlorophenol	< 0.01 ppm

ppb = ug/l  
ppm = mg/l

0503K

**Appendix A**

**Information Requirements for a Petition  
for a Variance From the Treatment Standard**

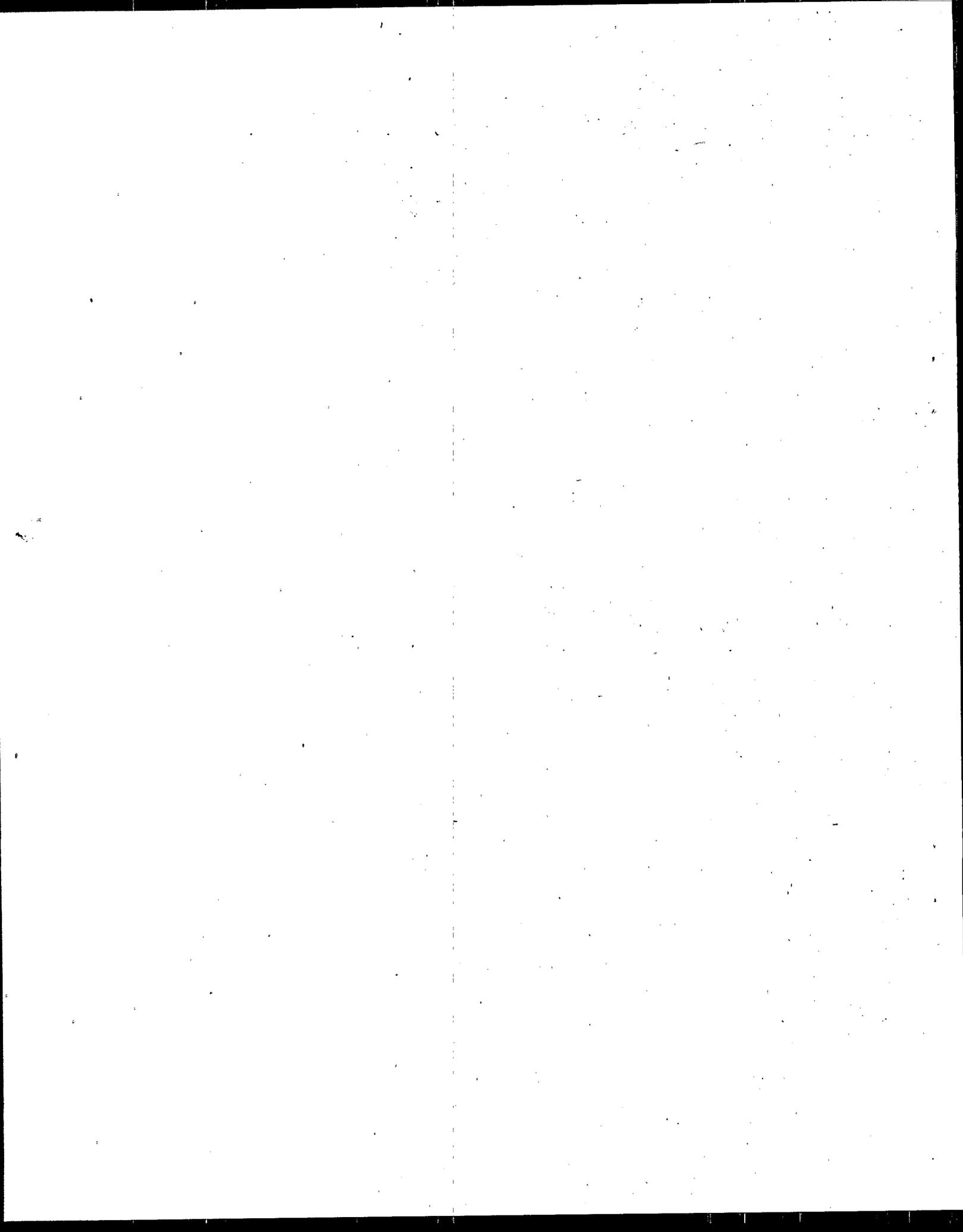


## Appendix A

### Information Requirements for a Petition for a Variance From the Treatment Standard

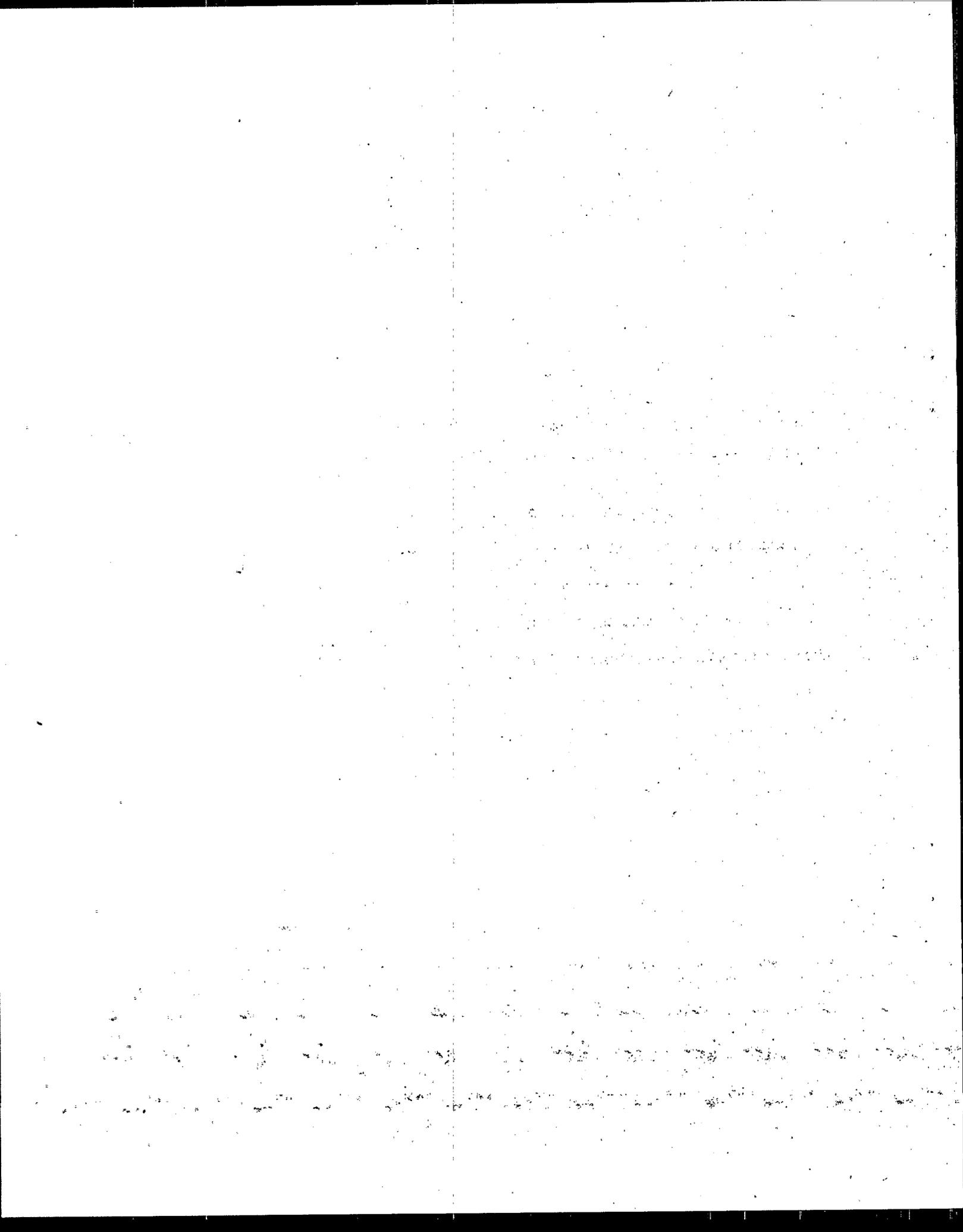
A petition from the treatment standard must include the following information:

- The petitioner's name and address.
- The name, address, phone number, and EPA identification number of the generating facility and of the facility contact person.
- A description of the waste generating processes and feed materials.
- A detailed description of the petitioner's waste (including data and information on the physical and chemical characteristics of the waste) that EPA can use to compare the petitioner's waste to the wastes considered by EPA in developing BDAT.
- If the waste has been treated, a description of the treatment system, including the process design, operating conditions, and an explanation of why the treatment standards cannot be achieved using the treatment system, or an explanation of why the specified treatment technology is inappropriate for the petitioner's waste.
- If the waste has not been treated, an explanation of why the petitioner believes the waste will react to treatment differently from the wastes evaluated by EPA in developing the treatment standard.
- A description of any alternative treatment systems examined by the petitioner, and, as appropriate, the concentrations in the treatment residual (using the TCLP) that can be achieved by applying such treatment to the waste.
- The dates of the sampling and testing.
- A description of the methodologies and equipment used to obtain representative samples.
- A description of the sample handling and preparation techniques.
- A description of the tests performed (including results).



**Appendix B**

**Information Requirements for a Petition for a  
Case-by-Case Extension to the Effective Date**

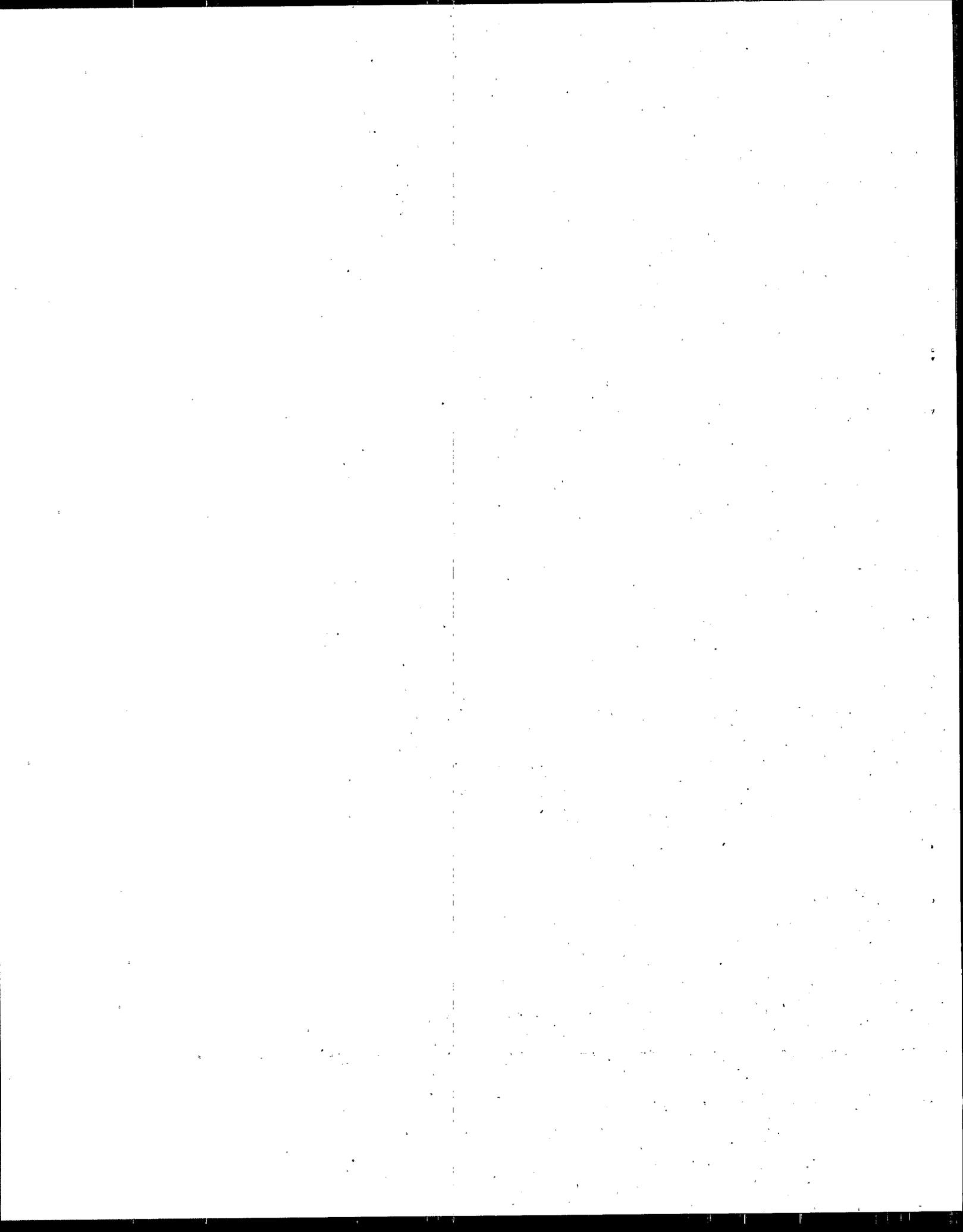


Appendix B

Information Requirements for a Petition for a  
Case-by-Case Extension to the Effective Date

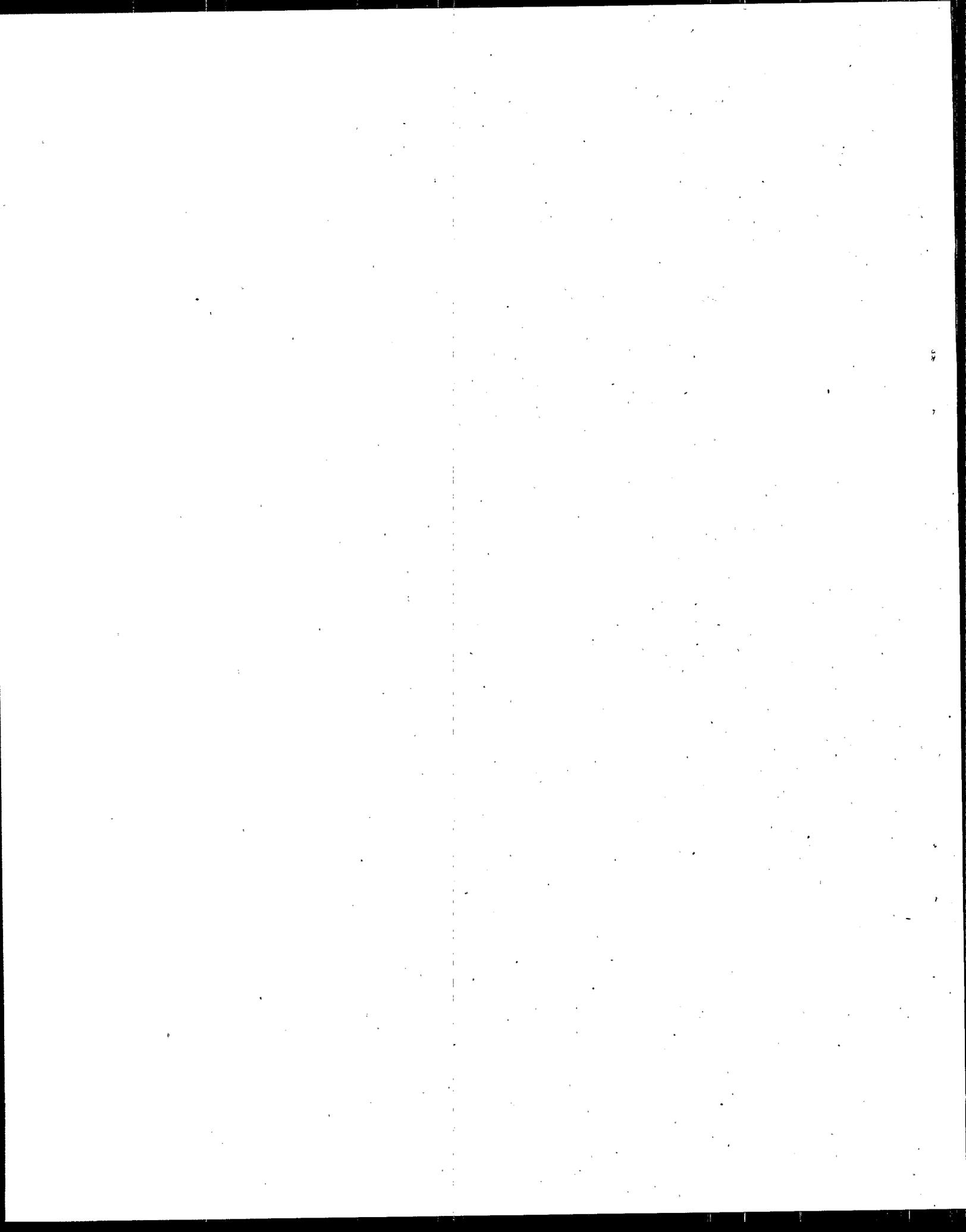
A case-by-case petition must include the following information:

- A demonstration that a good faith effort has been made to locate and contract with hazardous waste treatment, recovery, or disposal facilities nationwide to handle the waste.
- A demonstration that the petitioner has entered into a binding contract to construct or otherwise provide adequate treatment, recovery, or disposal capacity for the waste.
- A demonstration that, due to circumstances beyond the petitioner's control, alternative treatment, recovery, or disposal capacity cannot reasonably be made available by the effective date of the land disposal restriction.
- A demonstration that the capacity being constructed or otherwise provided will be sufficient to manage the waste.
- A detailed schedule for obtaining all necessary operating and construction permits and an outline of how and when alternative capacity will be available.
- A demonstration that arrangements have been made for adequate capacity to manage the waste during the extension. This demonstration must include an identification and description of all waste management sites.



Appendix C

Information Requirements for a Petition for a  
"No Migration" Exemption



## Appendix C

### Information Requirements for a Petition for a "No Migration" Exemption

A "no migration" petition must include the following information:

- The identification and a full characterization of the specific waste, including a comprehensive chemical and physical characterization.
- The identification and a comprehensive characterization of the disposal unit, including background air, soil, and water quality.
- A demonstration that all waste and environmental sampling, test, and analysis data are accurate and reproducible.
- A demonstration that EPA-approved sampling, testing, and estimation techniques were used.
- A demonstration that all simulation models for the specific waste and disposal site conditions were calibrated, and that the models were verified by actual measurements.
- Analyses performed to identify and quantify any aspects that could contribute significantly to uncertainty regarding the suitability of the site, including the potential for damage from earthquakes, floods, severe storms, droughts, or other natural phenomena.
- A quality assurance and quality control plan that addresses all aspects of the "no migration" demonstration.

