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Regulatory Impact Analysis of the Phase IV Land Disposal Restrictions Final Rule for Newly Identified Wood Preserving Wastes

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REGULATORY IMPACT ANALYSIS OF THE PHASE IV LAND DISPOSAL RESTRICTION FINAL RULE FOR NEWLY IDENTIFIED WOOD PRESERVING WASTES

Prepared for:
U.S. Environmental Protection Agency
Office of Solid Waste

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REGULATORY IMPACT ANALYSIS OF THE PHASE IV LAND DISPOSAL RESTRICTION FINAL RULE FOR NEWLY IDENTIFIED WOOD PRESERVING WASTES

This Regulatory Impact Analysis (RIA) estimates the costs, economic impacts, and benefits of the wood preserving wastes provisions of the Phase IV Land Disposal Restriction (LDR) rule. EPA is promulgating standards for newly-listed wood preserving wastes (F032, F034, and F035).

In accordance with the requirements of Executive Order No. 12866, EPA must develop and submit to the Office of Management and Budget (OMB) an RIA for any significant regulatory action. The purpose of this document is to present the industries and wastes that will be affected by the rule, estimate the costs associated with treating those wastes to comply with LDR standards, determine the impact that these additional treatment costs will have on facilities' operating costs, and evaluate the human health and ecological benefits attributable to reductions in pollutant discharges required by the rule. This document also includes analysis of impacts on small businesses as required of the Agency by the Small Business Regulatory Enforcement Fairness Act (SBREFA).

BACKGROUND

The Phase IV Land Disposal Restriction (LDR) rule is one in a series of regulations that restricts the continued land disposal of hazardous wastes under the 1984 Hazardous and Solid Waste Amendments (HSWA) to the Resource Conservation and Recovery Act (RCRA).[1] Section 3004(g) of RCRA outlines a schedule for the development of waste treatment and disposal practices for wastes that EPA determines are hazardous. Under RCRA, waste is deemed hazardous either because it demonstrates the characteristic of ignitability, corrosivity, reactivity, or toxicity (ICRT wastes), or because it contains constituents listed as hazardous by EPA.[2]

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[1] Land disposal includes any placement of hazardous waste in a landfill, surface impoundment, waste pile, injection well, land treatment facility, salt dome formation, salt bed formation, or underground mine or cave.

[2] Appendix VIII of 40 CFR part 261 identifies these hazardous constituents, as well as the eleven factors that EPA considers in determining whether the constituent poses significant human health risks.

At the time HSWA was enacted, EPA was required to promulgate treatment and disposal standards by May 8, 1990 for wastes already identified or listed as hazardous. EPA established treatment standards and waste management practices for these wastes in five rules promulgated between 1986 and 1990 (the solvents and dioxins rule, the California list rule, and the First Third, Second Third and Third Third rules).

Treatment standards for wastes subsequently identified or listed as hazardous must be developed by EPA within six months of waste listing or identification. EPA is addressing these wastes in "phases." The Phase I LDR rule established standards for hazardous debris and several newly identified wastes. The Phase II LDR rule established treatment standards for newly identified pesticide wastes (D012 through D017) and newly identified toxic organic wastes (D018 through D043). The Phase II LDR rule also established Universal Treatment Standards (UTS) for 216 constituents in hazardous waste. UTS levels, which set a common treatment standard for a constituent across all waste types, were developed for both wastewaters and nonwastewaters based on the best demonstrated achievable technology (BDAT) for reducing these contaminants. The Phase III rule established treatment standards for two newly listed wastes (aluminum potliners and carbamate wastes). In addition the Phase III rule established end-of-pipe discharge treatment standards for underlying constituents in land-based wastewater treatment systems managing "decharacterized" characteristic waste.

REQUIREMENTS OF THE PHASE IV LDR RULE

The Phase IV LDR rule finalizes treatment standards for three wood preserving wastes. Pursuant to Section 3001 of RCRA, EPA listed as hazardous wastes those from wood preserving processes that use either chlorophenolic, creosote, and/or inorganic preservatives. Exhibit 1 contains descriptions of these wastes. In December 1990, EPA promulgated a final listing determination for F032, F034, and F035 wood preserving wastes. The listing rule established that these wastes contain a number of inorganic and organic toxic constituents, including in some cases dioxins and furans, that could present human health risks. EPA is requiring that constituents of concern in these wastes meet UTS levels. Alternatively, EPA has established BDAT for F032 and F034 organic wastes as combustion, allowing affected facilities to incinerate these wastes and dispose of the residuals in a Subtitle C unit rather than meet UTS levels prior to disposal. For other waste forms, EPA has determined that the treatment standards can be achieved using the following technologies:

- **Organics in wastewater** - a single treatment technology or a normal wastewater treatment train including technologies such as biological treatment, steam stripping, carbon adsorption, or combinations of these technologies;

- **Metals in wastewater** - lime addition followed by sedimentation and filtration for arsenic, and chemical precipitation followed by sedimentation for chromium;

- **Metals in nonwastewaters** - stabilization or vitrification for arsenic and stabilization for chromium.

These treatment methods are not requirements under the promulgated rule. Therefore any type of treatment other than impermissable dilution may be used to achieve UTS levels.[3]

Exhibit 1

NEWLY LISTED WOOD PRESERVING WASTES*

Wastecode	Hazardous Waste Description
F032	Wastewaters, process residuals, preservative drippage, and spent formulations from wood preserving processes that currently use, or previously used, chlorophenolic formulations.
F034	Wastewaters, process residuals, preservative drippage, and spent formulations from wood preserving processes that currently use, or previously used, creosote formulations, but have never used chlorophenolic formulations.
F035	Wastewaters, process residuals, preservative drippage, and spent formulations from wood preserving processes that use inorganic preservatives containing arsenic and chromium.

* This listing does not include K001 bottom sediment sludge from treated wastewaters.

NEWLY LISTED WASTES SUBJECT TO LDRs

According to industry reports, the wood preserving industry uses one or a combination of the following three preservative types to treat wood products:

- Chlorophenols,
- Creosotes, and
- Inorganic formulations of arsenic and chromium.

Facilities routinely use these preservatives to protect wood products against rotting and insects and to extend the products' useful life. These compounds and their derivatives contain constituents with known carcinogens or systemic toxicants, many of which are listed as hazardous under 40 CFR 261.

[3] See the preamble to this rule for more details on the specific provisions of the final rule.

Industry data indicate that inorganic formulations, and in particular chromated copper arsenate (CCA), are the most frequently used preservative types. Other commonly used inorganic compounds include acid copper chromate (ACC), ammoniacal copper arsenate (ACA), and chromated zinc chloride (CZC). Wastes resulting from inorganic formulations are listed as F035 waste.

Unlike the waterborne inorganic preservatives, creosote compounds comprise heavy residual oils collected from the distillation of tar or crude petroleum. Creosote-based formulations usually consist of pure coal tar creosotes or creosote diluted with other preservatives (e.g., coal tars or petroleum oils). The American Wood Preservers' Association limits creosote preservative use to only coal-tar distillates. Also, many wood preserving facilities fortify their creosote-based preservatives with insecticides (e.g., pentachlorophenol, arsenic trioxide, and malathion) prior to use. Wastes generated from creosote-based preservatives are classified as F034 waste.

Chlorophenols are the least common organic preservative type used by wood treating facilities. Typically mixed with petroleum oils (e.g., butane and naphtha), chlorophenols represent a group of synthetic organic compounds that include pentachlorophenol (PCP). PCP formulations are used in a variety of wood preserving solvents and are often carcinogenic. Wastes generated from chlorophenolic formulations are categorized as F032 waste.

In instances where facilities use mixed preservative formulations (e.g., chlorophenols and creosotes or creosotes and inorganics), the equipment units can remain contaminated with F032 and F034 hazardous constituents (e.g., PCP, polychlorinated dibenzo-p-dioxins, and polychlorinated dibenzofurans). Under such cross-contamination scenarios, F032 supersedes F034 waste classifications and F034 supersedes F035 waste classifications.[4]

By applying chlorophenolic, creosote, or inorganic chemicals during the wood conditioning-preserving-storage cycle, wood preserving facilities generate four distinct wastes. They are:

- Wastewaters generated during the wood preserving process, and again when cylinders and tanks are cleaned;
- Process solid residuals, which typically include wood chips, sawdust, and dirt that has collected in the cylinders and work tanks;
- Preservative drippage, which occurs after the wood has been treated and excess preservative "drips" and collects onto pads; and

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[4] *Regulatory Impact Analysis for the Final Listing of Certain Wood Preserving Wastes*, prepared by ICF Incorporated for EPA's Office of Solid Waste, November 1990, Chapter 2.

- Discarded spent formulations, which accumulate throughout the wood preserving process and generally are discarded as work tanks are cleaned and maintained.[5]

This analysis assesses the potential response of wood preserving facilities to LDRs for these wastes by evaluating two treatability groups, wastewaters and nonwastewaters.

AFFECTED UNIVERSE

According to 1993 industry statistics, 352 companies own and operate 471 domestic wood preserving facilities.[6] Of these 471 facilities, 469 operate pressure treating plants and two facilities manage non-pressure processing plants.[7] The two non-pressure wood treating facilities generate less than 100 kilograms of hazardous waste per month.[8] As small quantity generators, both facilities are exempt from RCRA regulations, and are not affected by the proposed Phase IV restrictions. The remaining 469 wood preserving facilities treat their wood products using the "empty cell" pressure process or the "full cell" pressure process, and generate Phase IV restricted wastes.[9]

Wastewaters

According to data from the Micklewright report, 107 of the 469 affected facilities generate organic wastewaters (i.e., F032 and F034 combined wastewaters and drippage). Of these, 58 facilities generate approximately 340,000 tons of F034 wastewaters and 49 facilities generate

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[5] *Regulatory Impact Analysis for the Final Listing of Certain Wood Preserving Wastes*, p. 2-28. Data gathered in support of the final listing rule suggests that the amount of spent formulations generated by wood preserving facilities is minimal, and will not be affected by the proposed Phase IV rule.

[6] We were unable to use more recent data in our analysis because more recent estimates are incomplete.

[7] *Wood Preservation Statistics, 1993: A Report to the Wood-Preserving Industry in the United States* prepared by James T. Micklewright for the American Wood Preservers' Association, May 1994.

[8] *Regulatory Impact Analysis for the Final Listing of Certain Wood Preserving Wastes*, p. 5-11.

[9] For a more detailed description of pressure and non-pressure treating processes refer to *Regulatory Impact Analysis for the Final Listing of Certain Wood Preserving Wastes* (Chapter 2).

approximately 200,000 tons of F032 wastewaters.[10] The *RIA for the Final Listing of Certain Wood Preserving Wastes* indicates that facilities generating organic wastewaters generally treat and discharge their wastewaters to publicly owned treatment works (POTW), and therefore are not affected by EPA's land disposal restrictions.[11] Bottom sediment sludges resulting from F032 and F034 wastewater treatment processes are also not affected under the proposed Phase IV rule. These sludges are already listed as K001 hazardous.[12] Recent research, however, suggests that some facilities may dispose of their F032 and F034 wastewaters through underground injection wells. Underground injection wells disposing of F032 and/or F034 wastewaters are therefore potentially affected facilities.

Estimates for F032 wastewaters incorporate quantities of waste generated from using mixed chlorophenolic/inorganic, chlorophenolic/creosote, and chlorophenolic/creosote/inorganic formulations during the wood preserving processes. Under these cross-contamination scenarios, equipment units can remain contaminated with F032 residuals. Therefore, wastes resulting from mixed F032, F034, and F035 preservative use are classified and treated as F032 waste.

Similarly, processes that require mixed creosote and inorganic preservatives can result in equipment units that are contaminated with F034. Wastes resulting from these mixed formulations are classified and treated as F034 waste. The quantity estimates for F034 wastewaters therefore include quantities for wastes generated as a result of using mixed creosote/inorganic formulations. Exhibit 2 provides a more detailed breakdown of these quantity estimates by preservative type.

Facilities that use inorganic preservatives employ a conditioning process that generates little or no wastewaters (F035 combined wastewaters and drippage). Any wastewater that is generated is immediately recycled and reused, and therefore is not affected by the proposed Phase IV restrictions.[13] The Micklewright report suggests that the majority of wood preserving facilities (362 facilities) use inorganic preservatives and recycle/reuse the resulting wastewaters. This estimate includes pressure-treating facilities that use mixed inorganic/fire retardant formulations.

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[10] Estimates were derived from 1993 treated wood volume estimates in *Wood Preservation Statistics, 1993: A Report to the Wood-Preserving Industry in the United States* (Tables 7 and 8) and waste generation rates listed in *Regulatory Impact Analysis for the Final Listing of Certain Wood Preserving Wastes* (Exhibit 2-17), p. 2-28.

[11] *Regulatory Impact Analysis for the Final Listing of Certain Wood Preserving Wastes*, p. 2-10.

[12] *Regulatory Impact Analysis for the Final Listing of Certain Wood Preserving Wastes*, p. 2-24.

[13] *Regulatory Impact Analysis for the Final Listing of Certain Wood Preserving Wastes*, p. 2-24.

Exhibit 2

QUANTITY ESTIMATES FOR NEWLY LISTED WOOD PRESERVING WASTES BY PRESERVATIVE TYPE

Preservative Type (Wastecode)	Number of Generating Facilities[a]	Low-End, Micklewright-based Quantity (tons)[b]	High-End, BRS-based Quantity (tons)[c]
Wastewaters[d]			
Creosote (F034)	40	284,375	440
Creosote/Inorganic (F034)	18	55,220	0
Chlorophenol (F032)	19	56,754	12,761
Chlorophenol/Inorganic (F032)	12	34,632	0
Chlorophenol/Creosote (F032)	6	37,193	0
Chlorophenol/Inorganic/Creosote (F032)	12	77,835	0
Inorganic (F035)	362	0[e]	59
TOTAL	469	546,009	13,260
Nonwastewaters[f]			
Creosote (F034)	40	1,086	1,671
Creosote/Inorganic (F034)	18	242	8,751
Chlorophenol (F032)	19	348	2,385[g]
Chlorophenol/Inorganic (F032)	12	240	1,645[g]
Chlorophenol/Creosote (F032)	6	170	1,165[g]
Chlorophenol/Inorganic/Creosote (F032)	12	424	2,907[g]
Inorganic (F035)	362	1,350	284
TOTAL	469	3,860	18,808

a. Number of active facilities data was taken from the 1993 Micklewright report; BRS data indicate a total estimate of over 200 facilities generating primary newly listed wood preserving wastes.

b. Quantity estimates are based on data from *Wood Preservation Statistics, 1993: A Report to the Wood-Preserving Industry in the United States* (Tables 7 and 8) and waste generation rates from *Regulatory Impact Analysis for the Final Listing of Certain Wood Preserving Wastes* (Exhibit 2-17).

c. Quantity estimates are based on data from "Revised Wood Preserving Estimates," a memorandum from ICF Incorporated to EPA's Capacity Programs Branch, June 18, 1996 and include an unknown amount of soil and debris.

d. Includes quantity estimates for wastewaters and preservative drippage.

e. No wastewaters/preservative drippage are generated. Facilities recycle/reuse all of their F035 wastewaters.

f. Includes quantity estimates for process solid residuals. Spent formulations are assumed to be minimal, and therefore are not affected by the proposed Phase IV restrictions.

g. In the BRS scenario, we were unable to directly classify all F032-bearing wastes. Therefore, we have allocated the total F032-bearing waste quantity (8,102 tons) according to the proportions in the Micklewright scenario.

Nonwastewaters

Process residuals from many wood preserving processes contain high concentrations of hazardous constituents.[14] These nonwastewaters accumulate as wood particles and wood leachate derivatives in the wood preserving solutions and then settle in the processing cylinders (retorts), tanks, drip pads, and other storage containers. All three preservative types generate process solid residuals. Currently, wood preserving facilities are required to manage their process residuals according to RCRA Subtitle C guidelines.[15]

In order to estimate the range of nonwastewater quantities, we considered low-end and high-end scenarios.[16] The low-end estimate was derived using 1993 data from the Micklewright report. Estimated treated wood quantities were multiplied by waste generation rates, producing industry-wide waste quantities.[17] The high-end estimate is the total of primary, newly listed wood preserving wastes as extracted from the 1993 Biennial Reporting System (BRS) database.[18]

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[14] *Regulatory Impact Analysis for the Final Listing of Certain Wood Preserving Wastes*, Chapter 2.

[15] *Regulatory Impact Analysis for the Final Listing of Certain Wood Preserving Wastes*, p. 4-26.

[16] The American Wood Preservers Institute (AWPI) compiled more recent quantity information in the *1994 Wood Preserving Industry Production Statistical Report*, published in September, 1995. While this report contains industry-wide waste generation estimates, the data is based on a 30 percent response rate to an industry survey. By comparison, the 1993 Micklewright report based industry statistics on responses from over 80 percent of the facilities. The 1994 AWPI report, therefore, may not accurately reflect waste generation quantities due to a comparatively low response rate.

[17] Estimates were derived from 1993 treated wood quantity estimates in *Wood Preservation Statistics, 1993: A Report to the Wood-Preserving Industry in the United States* (Tables 7 and 8) and waste generation rates listed in *Regulatory Impact Analysis for the Final Listing of Certain Wood Preserving Wastes* (Exhibit 2-17), p. 2-28.

[18] Estimates for the high-end scenario were derived from "Revised Wood Preserving Estimates" (Table 2), a memorandum from ICF Incorporated to EPA's Capacity Programs Branch, June 18, 1996.

In the Micklewright scenario, data indicate that of the 469 Phase IV-affected wood preserving facilities, 49 generate approximately 1,200 tons of F032 nonwastewaters and 58 facilities generate approximately 1,300 tons of F034 nonwastewaters.[19] F032 quantities include estimates for combined chlorophenolic/inorganic, chlorophenolic/creosote, and chlorophenolic/inorganic/creosote formulations. Likewise, F034 quantities include estimates for nonwastewaters that are generated as a result of mixed creosote/inorganic formulations. Micklewright data also indicate that the 362 facilities using only inorganic compounds generate 1,350 tons of F035 nonwastewaters, annually.

Using the same categorization criteria, the BRS-based scenario indicates that Phase IV-affected wood preserving facilities generate approximately 8,100 tons of F032 nonwastewaters, 10,400 tons of F034 nonwastewaters, and 300 tons of F035 nonwastewaters.[20] It is also important to note that these BRS-based estimates contain an undetermined amount of soil and debris and therefore represent an upper-bound quantity estimate. Exhibit 2 presents quantity estimates for both scenarios according to preservative type.

COSTS OF LDRs FOR NEWLY LISTED WOOD PRESERVING WASTES

Methodology

The incremental costs of treating the newly listed wood preserving wastes to meet Phase IV treatment standards are based on data from:

- *Regulatory Impact Analysis for the Final Listing of Certain Wood Preserving Wastes* prepared by ICF Incorporated for EPA's Office of Solid Waste (November 1990),
- *Wood Preservation Statistics, 1993: A Report to the Wood-Preserving Industry in the United States* prepared by James T. Micklewright for the American Wood Preservers' Association (May 1994),
- "Revised Wood Preserving Estimates" memorandum prepared by ICF Incorporated for EPA's Capacity Programs Branch, June 18, 1996,

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[19] *Wood Preservation Statistics, 1993: A Report to the Wood-Preserving Industry in the United States* (Tables 7 and 8) and *Regulatory Impact Analysis for the Final Listing of Certain Wood Preserving Wastes* (Exhibit 2-17), p.2-28.

[20] "Revised Wood Preserving Estimates" (Table 2).

- *Baseline and Alternative Waste Management of Cost Estimates for the Third Third Land Disposal Restrictions* prepared by DPRA Incorporated for EPA's Office of Solid Waste (May 1990),

- Commercial incineration estimates provided by Rollins Environmental, Incorporated to Paul Borst, EPA Office of Solid Waste, in a July 10, 1996 letter, and

- "Hazardous Waste Incineration 1995," *EI Digest*, May 1995.

To estimate the incremental cost of the Phase IV rule on the wood preserving industry, we evaluated the incremental cost of requiring treatment prior to Subtitle C landfill disposal (i.e., the cost of treatment and disposal under the rule less the baseline cost of Subtitle C disposal without treatment).

As previously discussed, F032 and F034 organic wastewaters are treated and discharged to a POTW, or treated and disposed of in a Class I underground injection well.[21] F035 inorganic wastewaters are recycled and reused, and therefore will not be affected by the Phase IV LDRs. Likewise, F032 and F034 organic wastewaters which are sent to a POTW will not be affected by the Phase IV restrictions. Some wood preserving facilities, however, generate F032 and F034 wastewaters and contract with commercial facilities to treat and dispose of their listed organic wastes using underground injection wells. The commercial facilities receiving these wastewaters and injecting them into Class I wells for disposal comprise the universe of UIC facilities potentially affected by the Phase IV restrictions.

The Phase IV LDRs will prohibit facilities from disposing of F032 and F034 wastes in Class I underground injection wells unless the constituents of concern meet UTS, or the Class I facility can successfully petition for exemption from the ban by proving no-migration. Data indicate that six Class I commercial facilities currently treat and dispose of F032 and F034 wastewaters using underground injection wells. Further research indicates, however, that all six Class I facilities have modified their no-migration petitions to include F032 and F034 constituents in response to previous LDR rulemaking efforts. In other words, all six facilities have anticipated the Phase IV restrictions by incorporating waste analysis and modeling data for F032 and F034 restricted wastes in previous

[21] This analysis assumes that wood preserving facilities are in compliance with the listing rule and treat F032 and F034 wastewaters in RCRA exempt tanks or surface impoundments that meet Subtitle C minimum technical requirements prior to discharge to a POTW.

modifications to their existing no-migration petitions. Data further indicate that all six Class I facilities successfully demonstrated no-migration of Phase IV wood preserving wastes. As a result, none of these facilities will incur incremental costs under the current rulemaking effort.[22]

For F032 and F034 nonwastewaters, EPA will establish a treatment standard that includes thermal destruction in a Subtitle C incinerator or cement kiln followed by residual stabilization and disposal at a Subtitle C landfill.[23] Most wood preserving facilities currently lack the technology to incinerate these wastes on-site, and will likely send process solid residuals off-site to a commercial treatment facility.[24]

Although cement kiln incineration is less expensive than commercial incineration, not all facilities will be able to take advantage of this option. Three factors will affect whether a wood preserving facility will be able to send F032 and F034 wastes to the lower cost cement kilns: the willingness of cement kilns to accept the waste directly, rather than through a commercial fuel blender; the distance between the wood preserver and the treatment facilities; and the available capacity at the treatment facility. The first factor stems from the technical requirements of cement kilns. Generally, cement kilns require a constant stream of homogenous fuel for proper operation. Because the wood preserving universe represents many decentralized sources, each generating a relatively small quantity of waste, it might be necessary to consolidate many wastestreams through a commercial fuel blender to create a dependable fuel source for a cement kiln. Costs to generators for fuel blending services are comparable to costs for commercial incineration.[25] The second factor is a cost issue; long travel distances would imply higher travel costs, effectively eliminating the cost advantage of the cement kiln treatment. The third factor may not be a significant barrier for many facilities. According to the Capacity Analysis completed for

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[22] According to correspondence received from Robert Smith (USEPA, Groundwater Protection Division) on March 26, 1997, six commercial Class I facilities treat and dispose of F032 and F034 wastewaters using underground injection wells. All six facilities have approved no-migration petitions that include F032 and F034 waste constituents. Conversations between Mr. Smith and Region VI representatives verify these data.

[23] Our analyses indicate that these treatment trains represent the least costly, most effective treatment options available to the wood preserving industry. Other treatment standards considered include incineration plus residual vitrification for F032 and F034 nonwastewaters and high temperature metals recovery (HTMR) or vitrification plus disposal in a Subtitle C landfill for F035 nonwastewaters.

[24] *Regulatory Impact Analysis for the Final Listing of Certain Wood Preserving Wastes*, Chapter 2.

[25] *EI Digest*, October 1995. The average price paid to fuel blenders in 1995 was $1,360 per ton.

the Phase IV LDRs, at least 20,000 tons of nonwastewater capacity exists at an Ash Grove Cement Company kiln in Chanute, KS. This exceeds the high-end estimate for wood preserving waste generated of 18,808 tons.[26]

Our analysis suggests that those facilities located in the north-central and south-central regions of the country will be able to send their F032 and F034 wastes to a cement kiln.[27] These regions account for 70 percent and 56 percent of total industry production volumes using creosote and oil-borne solutions, respectively.[28] It is unclear what wood preservers in other regions of the country will do with F032 and F034 wastes, and it is possible that some wood preservers in the north-central and south-central regions will send their wastes to commercial incinerators instead of cement kilns. For these reasons, this analysis adopts the conservative assumption that 50 percent of all F032 and F034 wastes will be treated through cement kilns and 50 percent through commercial incinerators.[29]

The cost of commercial incineration is $1,050 per ton for F032 and/or F034 wastes (organic-only wastes) and $1,550 per ton for wastes mixed with F035. These estimates include the cost of treating and disposing of related waste residuals ($1,000 per ton for organic-only waste and $1,500

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[26] *Proposed Phase IV Third Thirds Rule Background Document*, prepared by ICF Incorporated for EPA's Office of Solid Waste, February 1995. Information provided by ICF Incorporated and Ash Grove Cement Company indicate that the Ash Grove facility in Chanute, KS is in the process of being permitted to accept these wastes, will accept wood preserving wastes directly, and currently has sufficient capacity (over 20,000 tons of nonwastewater capacity). ICF also indicated that an additional 20,000 tons of capacity exists, although it is unclear whether other facilities would accept wood preserving wastes directly.

[27] The north-central and south-central regions of the country fall almost entirely within a 600 mile radius of this facility.

[28] *1994 Wood Preserving Industry Production Statistical Report*, AWPI, p. 8.

[29] It is possible that more than 50 percent could be sent to cement kilns, but we were unable to confirm information regarding other cement kilns permitted to accept these wastes with available capacity.

per ton for organic wastes mixed with F035[30]), and transportation costs to ship hazardous waste to a treatment facility of $50 per ton.[31] Alternatively, the cost of cement kiln incineration is only $831 per ton (including $680 per ton for treatment and $151 per ton for transportation costs).[32]

Baseline costs are estimated at $188 per ton and are based on a Subtitle C landfill disposal cost of $138 per ton and the same transportation costs described above.[33] Baseline cost estimates also take into account a small amount of F032 waste (180 tons) that contains D037 waste (pentachlorophenol). According to the 1993 BRS, these F032/D037-mixed wastes are already sent to incinerators, kilns, or fuel blenders to comply with the Phase II LDRs that require treatment to UTS levels, therefore increasing the associated baseline treatment and disposal costs.

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[30] Incineration costs derived from correspondence from Rollins Environmental, Incorporated, to Paul Borst, EPA Office of Solid Waste, July 10, 1996. The unit cost to incinerate organic-only waste is $0.50 per pound ($0.50 x 2,000 = $1,000 per short ton) and mixed waste is $0.75 per pound ($0.75 x 2,000 = $1,500 per short ton). The cost differential is a result of the presence of metal constituents in inorganic formulations.

[31] *Estimating Costs for the Economic Benefits of RCRA Noncompliance*, prepared by DPRA Incorporated for EPA's Office of Regulatory Enforcement, September 1994. Transportation cost based on the commercial transportation price per ton-mile for bulk solid hazardous waste shipped 200 miles (data indicate that most wood preserving facilities are within a 200 mile radius of a commercial incinerator). Costs in 1992 dollars inflated to 1995 using the GDP implicit price deflator for services (source: *Survey of Current Business*, Table 7.1, January/February 1996 and July 1996) from 1992 to 1995: $45.85 x (1 + .099) = $50.39 per ton.

[32] Treatment cost from *EI Digest*, May 1995, p. 3. Transportation costs reflect the increased travel distance of shipping wastes to cement kilns and were derived from the transportation costs described above ($50.39 per ton-mile for bulk hazardous waste shipped 200 miles). The estimated per ton-mile cost for shipping bulk hazardous waste 600 miles is $50.39 x 3 = $151.17.

[33] *Estimating Costs for the Economic Benefits of RCRA Noncompliance*, prepared by DPRA Incorporated for EPA's Office of Regulatory Enforcement, September 1994. Disposal cost in 1993 dollars inflated to 1995 using the GDP implicit price deflator for services (source: *Survey of Current Business*, Table 7.1, January/February 1996 and July 1996) from 1993 to 1995: $130 x (1 + .061) = $137.93 per ton.

For F035 nonwastewaters, EPA assumes that facilities will implement stabilization followed by disposal in a Subtitle C landfill. Again, most pressure treating facilities are likely to ship their wastes off-site to a commercial vendor. The total treatment cost for these wastes is $495 per ton.[34] The baseline Subtitle C disposal costs are the same as those for F032 and F034 nonwastewaters (i.e., $188 per ton, which includes transportation costs of $50 per ton and Subtitle C landfill costs of $138 per ton).

Results

To estimate incremental compliance costs, we divided wood preserving facilities into groups by preservative use and wastecode. Then, we arrived at a combined LDR treatment and Subtitle C disposal cost for each preservative type by multiplying the affected waste quantities presented in Exhibit 2 by the estimated cost per ton for treatment and cost per ton of disposal in a Subtitle C landfill. The baseline cost for each preservative type assumes that wood preserving facilities currently comply with all other RCRA Subtitle C requirements.[35] Finally, we subtracted these baseline costs from the combined LDR treatment and Subtitle C disposal costs to arrive at the incremental treatment cost attributable to the Phase IV LDRs.

Exhibit 3 illustrates the incremental compliance costs for wood preserving facilities affected by the proposed Phase IV LDRs. Generators of newly listed wood preserving wastes will incur an estimated total annual incremental compliance cost of approximately $2.5 million in the low-end Micklewright scenario and $17.1 million in the high-end BRS scenario to comply with the Phase IV LDRs. In the low-end scenario, the 49 facilities generating F032 wastes will incur a total annual incremental cost of approximately $1.1 million and the 58 facilities generating F034 wastes will incur a total incremental cost of $1.1 million per year. The 362 facilities generating inorganic nonwastewaters will incur a total incremental cost of approximately $400,000 per year. In the high-

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[34] *Baseline and Alternative Waste Management Cost Estimates for Third Third Land Disposal Restrictions.* The total cost of $495 per ton includes $212 per ton for stabilization and $283 per ton of raw waste for Subtitle C landfill disposal and transportation, reflecting the residual factor of 150% associated with stabilization (i.e., the baseline Subtitle C disposal and transportation costs multiplied by 150%: $188.32 x 150% = $282.48 per ton). Stabilization treatment costs in 1993 inflated to 1995 using the GDP implicit price deflator for services (source: *Survey of Current Business*, Table 7.1, January/February 1996 and July 1996) from 1993 to 1995: $200 x (1 +.061) = $212.20.

[35] *Regulatory Impact Analysis for the Final Listing of Certain Wood Preserving Wastes*, p. 1-5.

end scenario, total annual incremental costs will be $7.0 million for facilities generating F032 wastes, $10.0 million for facilities generating F034 wastes, and $90,000 for facilities generating F035 wastes.[36]

It is important to bear in mind four factors when considering these cost estimates. First, these cost estimates are based on one vendor's quote for commercial incineration. Prices may vary considerably by region and by vendor, and therefore individual generators may encounter different prices. For example, generators that currently ship large quantities of wastes to a commercial facility may face lower unit prices. Second, the high-end BRS-based scenario contains an unknown quantity of soil and debris in the affected waste estimate. EPA's analysis of the effects of wood preserving LDRs on contaminated soils (found elsewhere in the docket for this rule) suggests per-ton compliance costs will be much less for soils, which are not necessarily required to be incinerated. Third, cement kiln incineration could emerge as a nationally viable alternative to commercial incineration, further mitigating total incremental compliance costs. Fourth, this analysis is based on continued usage of preservatives at their current rates and does not consider possible dynamic responses facilities could undertake to mitigate costs. In particular, a facility could respond to additional compliance costs by switching to a different preservative product with lower per unit treatment costs, such as an inorganic formulation.[37]

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[36] Because of cross contamination issues, F032 nonwastewater costs include estimates for treating mixed chlorophenolic/inorganic, chlorophenolic/creosote, and chlorophenolic/creosote/inorganic wastes. F034 nonwastewater costs include estimates for treating mixed creosote/inorganic wastes.

[37] For example, pentachlorophenol (PCP) has long been preferred by utility companies for poles and crossarms, mainly because PCP-treated poles are easier for utility workers to climb. In 1985, Hickson Corporation developed the emulsion technology (ET) process specifically as an alternative to PCP. Since then, the percentage of poles treated with inorganic formulations has increased to 39 percent (*1994 Wood Preserving Industry Production Statistical Report*, AWPI). According to Hickson and other industry representatives, the most significant cost associated with a wood preserving facility switching from one preservative to another is the cost of cleaning the process equipment of the old preservative. Wood preservers using PCP could chose to reduce compliance costs by adopting the ET process, although it is not clear whether the compliance cost savings would justify investment in the ET process (ET is a proprietary process patented by Hickson). Assuming all PCP-only wood preserving facilities switched to inorganic formulations and similar waste generation rates, incremental treatment costs could be reduced by a maximum of approximately $450 per ton of F032 waste. Possibilities also exist for substitution of inorganic preservatives for creosote formulations.

Exhibit 3

ESTIMATED INCREMENTAL TREATMENT COSTS OF THE PROPOSED RULE: NEWLY LISTED WOOD PRESERVING WASTES

Preservative Type (Wastecode)	Waste Quantity Affected (tons)	Total Costs (in millions)		Incremental Treatment Cost Attributable to Phase IV LDRs (in millions)
		Combined LDR Treatment and Subtitle C Disposal[a]	Subtitle C Land Disposal (Baseline)	
Creosote (F034)	1,086 to 1,671	$1.0 to $1.6	$0.2 to $0.3	$0.8 to $1.3
Creosote/Inorganic (F034)	242 to 8,751	$0.3 to $10.4	$0.1 to $1.6	$0.2 to $8.8
Chlorophenol (F032)	348 to 2,385	$0.3 to $2.2	$0.1 to $0.6[d]	$0.3 to $1.6
Chlorophenol/Inorganic (F032)	240 to 1,645	$0.3 to $2.0	$0.1 to $0.3	$0.2 to $1.6
Chlorophenol/Creosote (F032)	170 to 1,165	$0.2 to $1.1	$0.1 to $0.2	$0.1 to $0.9
Chlorophenol/Inorganic/Creosote (F032)	424 to 2,907	$0.5 to $3.5	$0.1 to $0.5	$0.4 to $2.9
Inorganic (F035)[b]	1,350 to 284	$0.7 to $0.1	$0.3 to $0.1	$0.4 to $0.1
TOTAL[c]	**3,860 to 18,808**	**$3.3 to $20.9**	**$0.7 to $3.7**	**$2.5 to $17.1**

Note: Cost estimates are based on information from both the low-end, Micklewright and high-end, BRS-based scenarios and are for Phase IV affected nonwastewaters only. F032 and F034 wastewaters are treated and discharged to a POTW and F035 wastewaters are recycled/reused.

[a] Incineration costs for F032 and F034 nonwastewaters assume a 99.99 percent destruction and removal efficiency rate.

[b] The values in the F035 range appear in descending order to maintain the format within the range: the first value references the low-end Micklewright scenario, while the second value references the high-end, BRS scenario. This is reflected in the totals.

[c] Totals may not add due to rounding.

[d] Baseline costs for F032 include incineration costs for 180 tons of F032/D037-mixed waste regulated by Phase II LDRs.

ASSESSING ECONOMIC IMPACTS OF COMPLIANCE

This analysis assesses the relative magnitude of the compliance costs presented above and gauges the impact of the Phase IV restrictions on wood preserving facilities. Specifically, we examine the impacts of the Phase IV LDR rule on all affected wood preserving facilities using two basic economic impact screens: the ratio of *new compliance costs to total revenues* and the ratio of *new compliance costs to total profits.* These analyses place compliance costs in context and allow us to determine if costs may substantially affect wood preserving facility operations by

illustrating the portion of current company sales and profits that could be diverted by the costs of complying with the Phase IV rule. In the remainder of this section, we describe our methodology and present the results of our analyses.

Methodology

This assessment of economic impacts focuses first on the ratio of new compliance costs to total revenues and then examines the ratio of new compliance costs to total profits. Each analysis considers both the industry-wide effect of the Phase IV rule and then examines impacts in greater detail at the sector level (i.e., by preservative type). Specifically, we compare total incremental compliance costs for the wood preserving industry to total revenues or profits, followed by a comparison of estimated sector-level incremental compliance costs to industry sector revenues or profits.[38]

Wood preserving facilities will face the additional cost of record keeping requirements of the Phase IV LDRs. The estimated financial burden associated with recordkeeping requirements of Phase IV LDRs is $597,268 for all wood preserving facilities, or $1,273 per facility.[39] Taking this cost into account, the total estimated cost of compliance for wood preserving facilities becomes $3.1 million in the low-end and $17.7 million in the high-end.

New Compliance Costs to Total Revenues Analysis

The incremental cost of compliance for the wood preserving industry equals less than 1.0 percent of total industry revenues. The 1992 Census indicates that the wood preserving industry had shipments valued at $2.7 billion in 1992, or $3.0 billion inflated to 1995 dollars.[40] Therefore, the estimated cost of compliance for the wood preserving industry equals 0.10 percent of the value of shipments in the low-end, Micklewright scenario ($3.1 million/$3.0 billion) and 0.59 percent of value of shipments in the high-end, BRS scenario ($17.7 million/$3.0 billion).

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[38] *1992 Census of Manufactures; Industry Series Wooden Containers and Miscellaneous Wood Products*, Industries 2441, 2448, 2449, 2401, 2492, 2499, Bureau of Census, U.S. Department of Commerce, June 1995, Table 1A, Historical Statistics for the Industry, 1992 and Earlier Years.

[39] *Supporting Statement for EPA Information Collection Request 1442.14 LDRs Phase IV Mini-Rule: Treatment Standards for Waste from Wood Preserving (Draft)*, prepared by ICF Incorporated, January 6, 1997.

[40] Value of shipments inflated to 1995 dollars using the GDP implicit price deflator for services from *Survey of Current Business*, Table 7.1, January/February 1996 and July 1996.

To perform the economic screening analysis at an industry sector level, it was first necessary to calculate the revenue for each sector (both single-preservative and multi-preservative) of the industry. Revenues were derived from the Micklewright report and the *1992 Census of Manufactures* according to the following steps.

- Line-items in the Census of Manufactures were classified by preservative type using product descriptions in the Census and the 1994 Wood Preserving Industry Production Statistical Report published by the American Wood Preservers Institute (AWPI) (e.g., railroad crossties are almost exclusively treated with creosote formulations). This provided an estimate of revenues ascribed to single-preservative use.

- These single-preservative revenues were then divided by the total volume of wood treated by each preservative, as found in the 1993 Micklewright report, creating revenue for each preservative type per cubic foot of wood treated.

- These revenue rates were then applied to the volume of wood treated by preservative, by industry sector to reflect production rates in multi-preservative sectors.

Exhibit 4 shows the results of this sector analysis. In the low-end, Micklewright-based scenario, the estimated cost of compliance is below one percent of revenues for each sector. In the high-end, BRS-based scenario, estimated compliance costs are below one percent of revenues for F034 and F035 facilities and above one percent for the other categories. There are 67 wood preserving facilities in the categories exceeding one percent, or 14 percent of the 469 wood preserving facilities.

New Compliance Costs to Total Profits Analysis

Approach

Profit data for the wood preserving industry sectors are not directly reported in any single source. We determined that compiling profit data for 469 individual wood preserving facilities would be infeasible, if only because many of the facilities are privately held and do not report their profits in any publicly available source. Therefore we used two approaches to estimate profits through indirect means:

Exhibit 4

ECONOMIC IMPACT SCREENING ANALYSIS BY WOOD PRESERVING SECTOR

Preservative Type (Waste Code)	Number of Facilities	Record-keeping and Reporting Cost	Incremental Treatment Cost (in millions)	Total Cost (in millions)	Estimated Revenues (in millions)	Total Costs/ Revenues (%)	Estimated Short-run Profits (in millions)	Total Costs /Short-run Profits (%)	Estimated Long-run Profits (in millions)	Total Costs /Long-run Profits (%)
F034	40	$0.05	$0.8 to $1.3	$0.9 to $1.3	$349	0.3 to 0.4	$47	1.9 to 2.8	$35	2.6 to 3.7
F034/F035	18	$0.02	$0.2 to $8.8	$0.2 to $8.8	$112	0.2 to 7.8	$15	1.3 to 58.2	$11	1.8 to 78.4
F032	19	$0.02	$0.3 to $1.6	$0.3 to $1.6	$131	0.2 to 1.2	$18	1.7 to 9.1	$13	2.3 to 12.3
F032/F035	12	$0.02	$0.2 to $1.6	$0.2 to $1.6	$122	0.2 to 1.3	$16	1.2 to 9.8	$12	1.6 to 13.2
F032/F034	6	$0.01	$0.1 to $0.9	$0.1 to $0.9	$59	0.2 to 1.5	$8	1.3 to 11.3	$6	1.7 to 15.3
F032/F034/F035	12	$0.02	$0.4 to $2.9	$0.4 to $2.9	$181	0.2 to 1.6	$24	1.6 to 11.9	$18	2.2 to 16.1
F035	362	$0.5	$0.4 to $0.1	$0.9 to $0.5	$2,009	<0.1	$270	0.3 to 0.2	$201	0.4 to 0.2
Total:	**469**	**$0.6**	**$2.5 to $17.1**	**$3.1 to $17.7**	**$2,962**	**-**	**$398**	**-**	**$295**	**-**

Notes:
1) All revenue and profit information is derived from the 1992 Census of Manufactures and the Micklewright report.
2) Totals may not add due to rounding.
3) Recordkeeping costs are from *Supporting Statement for EPA Information Collection Request 1442.14 LDRs Phase IV Mini-Rule: Treatment Standards for Waste from Wood Preserving (Draft).*
4) All figures are in 1995 dollars.

- **Deriving profits based on publicly available data as reported in the 1992 Census of Manufactures.** We estimated short-run profits as the total value of shipments less the cost of materials, employment costs, rental payments, and purchased services, and long-run profits as short-run profits less depreciation. The advantage of this approach is that it is based on reported data with a high response rate. One disadvantage is that, while value of shipments can be disaggregated by formulation type, the costs are reported only at the industry level -- as a result, we are forced to assume a constant profit margin across formulation type (for example, long-run profits estimated with this method are approximately 10.0 percent of revenue). A second disadvantage is that the resulting profit estimates may not account for other categories of extraordinary expenses or other sources of profits at these facilities.

- **Estimating profits based on model plant analysis developed to support the Regulatory Impact Analysis for the listing of wood preserving wastes.**[41] The model plant analysis reflects variability in costs of materials and prices of finished products for 18 model plant types that consider three classes of formulators, four geographic regions, and three size classifications. The model plant analysis output includes price and short-run and long-run profit estimates per cubic foot of production. The advantage of this "bottom-up" approach is that the results provide information on the variation in profits by formulation use, facility location and size. One disadvantage is that the price and operating cost data reflect conditions in the industry in 1987, and regional and facility size-specific updates to the price and operating cost data could not be developed within the time frame for this analysis. A second disadvantage is that the model plants did not include multiple formulation configurations. We use the results of these calculations primarily to evaluate the reasonableness of the estimates developed from the Census of Manufactures data, and to explore the potential effect of variations in estimated profit on our overall conclusions for the single formulator groups.

Results

The results of our analysis based on Census of Manufactures data are summarized in the last four columns of Exhibit 4. Under the low-end affected waste and cost scenario, costs make up less than two percent of short-run profits and less than three percent of long-run profits in all industry sectors. Under the high-end scenario, however, at least one industry sector (F034/F035) is likely to

[41] *Regulatory Impact Analysis for the Final Listing of Certain Wood Preserving Wastes*, prepared by ICF Incorporated for the Economic Analysis Staff, Office of Solid Waste, November 1990.

incur costs over half of short-run profits and roughly three quarters of long-run profits, suggesting that facility closures in this group are likely. For all other sectors, we estimate costs will not exceed 12 percent of short-run profits and 17 percent of long-run profits.

We used the 1987 model plant data to evaluate whether our profit estimates based on Census of Manufactures data are consistent with the profit margins from the model plant analysis, and discovered some important differences. Exhibit 5 indicates the range of the ratio of profits to price from the model plant analysis. Note that the plants did not include multiple formulation models, so our comparison relies on data from single formulation models. The 1987 data indicate profit margins for pentachlorophenol and creosote formulation users were similar to each other, but profit margins are lower for inorganic users. As noted above, based on Census of Manufactures data we estimate the overall long-run profit to revenue ratio for the industry as a whole is 10.0 percent; the comparable industry-wide estimate for short-run profits is 13.4 percent. We therefore conclude that the Census of Manufactures estimates of short-run profit may be conservatively low for F032 and F034 in some cases, but may be high for F035 facilities. The Census of Manufactures estimates of long-run profit are in the middle of the range from the model plant analysis for F032 facilities, but are high for F034 and F035 facilities.[42]

It is also important to consider four factors which could further reduce the ratio of total incremental treatment costs to revenues and profits. First, organic preservatives have accounted for a steadily decreasing portion of production in the wood preserving industry. Second, the proportion of F032 and F034 wastes sent to cement kilns could increase in the future as other cement kilns amend their permits to accept these wastes. Third, this analysis is based on continued usage of preservatives at their current rates and does not consider possible dynamic responses facilities could undertake to mitigate costs, such as product substitution. Fourth, it is possible that facilities will pass incremental treatment costs along to consumers in the form of higher prices, thereby increasing revenues by an amount that might in some instances approach the incremental costs.

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[42] Because profit margins derived from the Census of Manufactures differ from those in the model plant output, and because the model plant analysis results in significant variation in estimated profits for different model plants that use the same formulation, we conducted a sensitivity test on the results in Exhibit 4. Using the lowest possible profit margin estimate from the model plant analysis for F035 facilities (1.4 percent) would a imply a compliance cost to profit ratio of 3.2 percent, which we believe is highly unlikely to lead to plant closure. In addition, using the high-end cost estimate and the lowest model plant profit margin estimates for the other two single formulation groups, the cost to long-run profit ratios for F032 and F034 facilities are 26.0 percent and 6.9 percent, respectively. These estimates suggest that economic impacts in these single formulator groups could be higher than estimated in Exhibit 4, but would be unlikely to be large enough to lead to closures. Unfortunately, profit estimates for the most affected sector of facilities, in the F034/F035 category, could not be reliably estimated from the 1987 model plant data.

Exhibit 5 RANGE OF PROFIT MARGINS IN MODEL PLANT ANALYSIS		
Formulator Type	**Ratio of Short-Run Profits to Revenue**	**Ratio of Long-Run Profit to Revenue**
F032	12.2 to 20.5%	4.7 to 16.4%
F034	12.2 to 18.3%	5.4 to 12.3%
F035	3.4 to 7.1%	1.4 to 4.9%
Source: Derived from Exhibit 4-19, page 4-27 of the Regulatory Impact Analysis for the Final Listing of Certain Wood Preserving Wastes, prepared by ICF Incorporated for the Economic analysis Staff, Office of Solid Waste, November 1990.		

ASSESSING SMALL BUSINESS IMPACTS OF COMPLIANCE

We have also assessed EPA's requirements under the Small Business Regulatory Enforcement Fairness Act (SBREFA). SBREFA amends the Regulatory Flexibility Act (RFA) of 1980, which requires Federal agencies to consider the impacts of proposed rules on small entities (i.e., small businesses). Both acts require an assessment of whether the regulatory option will have a "significant economic impact" on a "substantial number" of small entities. According to the size standards established by the Small Business Administration (SBA), wood preserving facilities employing fewer than 500 people are considered to be small. Research indicates that each of the 469 wood preserving facilities employs fewer than 249 people, implying they are all small entities.[43]

EPA guidance for analysis of small business impacts under SBREFA provide criteria for assessing whether a "significant economic impact" would be imposed on a "substantial number" of small entities as a result of the rule.[44] The preferred test for evaluating whether a significant economic impact is imposed on small business entities is the ratio of incremental compliance costs to annual sales. This measure is the same as that presented in Exhibit 4 in the previous section.

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[43] Two factors support the assumption that all wood preserving facilities in operation in 1993 were small. First, the *1992 Census of Manufactures* indicates that all wood preserving facilities in operation in 1992 were small. Second, the Micklewright report documents a slight annual decline in the total number of wood preserving facilities in operation between 1986 and 1993, suggesting only minor annual adjustments in the industry.

[44] EPA SBREFA Task Force, *EPA Interim Guidance for Implementing the Small Business Regulatory Enforcement Fairness Act and Related Provisions of the Regulatory Flexibility Act*, February 5, 1997.

According to the EPA guidance, the evaluation of "substantial number" should be based on the absolute numbers of facilities and the percentage of affected small entities that would experience a significant impact.

Using criteria established by the EPA SBREFA Task Force, the wood preserving LDR rule could be classified as a "Category 1" rule (implying that the rule would not have a significant economic impact on a substantial number of small entities) for the following reasons:

- Our analysis indicates that no more than 67 of the 469 affected facilities, or approximately 14 percent, would incur costs in excess of one percent of annual sales. Under the low-end cost scenario, no facilities would incur costs greater than one percent of annual sales. These estimates of the number of affected facilities are less than the thresholds for a "substantial number" determination (i.e., 100 facilities and/or 20 percent of affected entities).

- A total of 18 facilities, or less than 4 percent of affected small entities, would incur costs under the high-end scenario in excess of 3 percent of annual sales. These costs could be as much as nine percent of annual sales. Although this level of costs could represent a significant economic impact, the number of facilities affected at this level is small, and much less than the guideline threshold of 100 facilities for a determination of a substantial number. In addition, under the low-end scenario, none of these facilities would incur costs in excess of 1 percent of annual sales.

BENEFITS OF LDRS FOR NEWLY LISTED WOOD PRESERVING WASTES

This section of the RIA presents EPA's assessment of the benefits of land disposal restrictions for newly listed wood preserving wastes. This assessment of the benefits of the LDR requirements focuses on direct health benefits of the rule. We consider the cancer and non-cancer health effects of drinking ground water contaminated by the leaching of constituents from waste management units. The rule, by requiring the destructive treatment of hazardous organic constituents and the stabilization of metal constituents to prevent their leaching over time, may also provide other environmental benefits. These other benefits categories include reduction of toxic air emissions that could volatilize from land-based units, reductions of exposures to hazardous constituents through indirect pathways (e.g., food-chain pathways for persistent or bioconcentrated contaminants), recreational benefits, ecological benefits, and changes in non-use values for natural resources.

In general, we conclude from available information that there are small human health risks associated with baseline management practices for newly listed wood preserving wastes, and that the rule may reduce those health risks by some unknown amount. The treatment requirements of the final wood preserving LDRs may reduce baseline risks by providing additional safeguards for

preventing human exposures to hazardous constituents, as well as long-term assurances of exposure prevention through destructive treatment of organics.

Comparison of Current to Post-LDR Management Practices

We evaluated current management practices to determine which wood preserving wastes will be affected by the proposed Phase IV rule. As established in the Affected Universe section of this chapter, wastewaters generated by the wood preserving industry will not be affected by the LDR restrictions because current management practices for wastewaters are in compliance with the new requirements. Nonwastewaters, which are currently managed in Subtitle C units but are not required to meet treatment standards, could be affected by the proposed legislation. The proposed Phase IV LDRs require treatment of nonwastewaters through combustion (for F032 or F034 wastes) or stabilization (for F035 wastes). Residuals from these treatment processes would be required to be disposed in a Subtitle C landfill. The current and post-LDR management practices are summarized in Exhibit 6 below.

Exhibit 6

SUMMARY OF CURRENT AND POST-LDR MANAGEMENT PRACTICES

Waste Code and Form	Constituents of Concern	Current Management Practice	Post-LDR Management Practice
F032, F034, and F035 wastewaters	Various organics and metals	Wastewater treatment, discharge to POTW or surface water, UIC well	Unchanged
F032 and F034 nonwastewaters	Primarily organics, potentially some dioxins and furans, potentially contaminated with metals	Landfilling in a Subtitle C landfill without treatment	Combustion in a RCRA-permitted incinerator or BIF, with disposal of residuals in a Subtitle C landfill
F035 nonwastewaters	Primarily metals	Landfilling in a Subtitle C landfill without treatment	Stabilization or other treatment to meet UTS levels, followed by disposal in a Subtitle C landfill

Note: A BIF is a boiler or industrial furnace that meets RCRA requirements for hazardous waste incineration.

Changes in Exposures to Hazardous Constituents

Changes in human exposures to hazardous constituents resulting from required changes in management practices include the following:

- Reduction in potential exposures to organics (for F032 and F034 nonwastewaters) and metals (for F035 nonwastewaters) that might leach or, in the case of organics, volatilize from Subtitle C landfills; and

- Increases in exposures to airborne pollutants from incineration.

The reductions in potential exposures from currently operated landfills are likely to be small. RCRA Subtitle C landfills are subject to a wide range of requirements designed to prevent leachate and air emissions from escaping from the landfill. These requirements are designed to prevent releases long after the landfills have closed. All of the Subtitle C landfill requirements apply to current management practices.

Nonetheless, through operator error, faulty operation or maintenance of release prevention and detection equipment, spills of hazardous materials, and unforeseen natural events, releases from Subtitle C landfills can occur. The LDR treatment standards provide an additional margin of safety in the event a release of this type occurs, because the released material is likely to contain a lower concentration of hazardous constituents. For example, incineration in most cases will result in a destruction and removal efficiency rate of 99.99 percent for organic constituents present in F032 and F034 nonwastewaters. This suggests that the concentrations of organics in the residual will be sufficiently small to prevent significant risk should a release from a Subtitle C unit occur.

Increases in exposure to hazardous constituents from the incineration process could occur, but are unlikely to result in significant increases in risk. The Office of Solid Waste, working jointly with the Office of Air and Radiation, is currently developing Maximum Achievable Control Technology (MACT) standards for hazardous waste combustion facilities. As part of this effort, EPA has begun developing estimates of risks around incinerators and waste-burning kilns. While risks to special subpopulations (e.g., subsistence farmers) may be significant, risks to the typical resident appear to be *de minimis*.[45]

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[45] *Risk Assessment Support to the Development of Technical Standards for Emissions from Combustion Units Burning Hazardous Waste*, U.S. EPA, forthcoming.