



Washington State Department of Ecology

Model Toxics Control Act (MTCA) Cleanup Regulations

Small Business Economic Impact Statement for Amendments to Chapter 173-340 WAC

*Prepared for
Ecology's Toxics Cleanup Program*

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Conclusion

Based on research and analysis required by the Regulatory Fairness Act (RCW 19.85.011), Ecology has determined the proposed amendments to WAC 173-340 have a disproportionate impact on small business. Although the number of potentially impacted small businesses is small, the cost per employee is disproportionately high as compared to large businesses. Therefore, Ecology must include cost-minimizing features in the rule where it is legal and feasible to do so.

Purpose Analysis

The Washington State Department of Ecology (Ecology) is amending the Model Toxics Control Act, Chapter 173-340 WAC. The Regulatory Fairness Act (RCW 19.85.011) requires Ecology to show we have considered the impacts of the rule on small businesses in comparison to large businesses. This report provides the results of these analyses and shows the potential impacts associated with the proposed rule.

Important note regarding the SBEIS

When Ecology filed the preliminary draft of these rule amendments and the associated economic analyses, Ecology did not believe there to be any small businesses required to comply with the rule amendments. For this reason, Ecology did not file a Small Business Economic Impact Statement (SBEIS) at that time.

Upon further review following public comment, Ecology found that small business may be impacted by the rule amendments. In order to examine disproportionate impacts on small versus large businesses required to comply with the rule amendments, Ecology has now performed the required analysis of small-business impacts, as discussed further in this SBEIS.

Background

In November 1998, Washington State voters passed the Model Toxics Control Act (MTCA), Chapter 70.105D RCW. The law became effective on March 1, 1989. The law establishes the basic authorities and requirements for cleaning up contaminated sites in Washington State. The objective of the MTCA is to prevent or remedy threats to human health and the environment caused by hazardous waste sites.

The Washington State Legislature created a MTCA Policy Advisory Committee (PAC) in 1995. Ecology initiated a negotiated rule making process in 1997 that resulted in significant amendments to the MTCA Cleanup Regulation. Ecology adopted the amendments in February 2001 and they became effective on August 15, 2001. Many of the rule changes were developed in response to recommendations made by the PAC.

The MTCA Cleanup Regulation adopted in 2001 defined the policies and procedures governing toxics clean up. This included the provision that a person undertaking cleanup action may use the US Environmental Protection Agency's (US EPA's) toxicity equivalency factors (TEFs) to calculate cleanup levels for mixtures of chlorinated dibenzo-p-dioxins and chlorinated dibenzofurans (called "dioxins" and "furans" in this report).

The text of the rule did not specify how users of the rule should use the TEFs to calculate dioxin/furan cleanup levels because the EPA publication referenced in the regulation was thought to adequately describe the procedure. To help users of the rule without access to EPA's publication, Ecology included TEF calculation guidance in the Cleanup Levels and Risk Calculation (CLARC) created later in 2001 (Ecology, 2001).

The EPA publication and CLARC guidance describe the process for converting dioxin and furan concentrations to a toxic equivalent concentration of the reference chemical—2,3,7,8 tetrachloro dibenzo-p-dioxin (2,3,7,8 TCDD). This means that:

- A concentration of a dioxin or furan is converted to an equivalent concentration of the reference chemical establishing a toxicity relative to the reference chemical.
- The toxic equivalent concentration of the reference chemical (2,3,7,8 TCDD) is then compared to its cleanup level to determine whether the site requires remedial clean up.

The reference cleanup level is set by law and is based on the excess cancer risk¹ posed by the contaminant. The cleanup level applied can be different under federal and state law because the excess cancer risk limit adopted under federal and state law can differ.

Reason for This Rule

In November 2005, Rayonier Properties LLC filed a lawsuit challenging Ecology's application of the CLARC guidance document at the Rayonier Port Angeles Mill Site. Rayonier argued that the CLARC guidance was not consistent with the procedures for establishing soil cleanup levels established in the MTCA rule. The MTCA rule requires Ecology to establish cleanup levels using a cancer risk level of 10^{-6} applied to individual substances and 10^{-5} as the total site risk. Rayonier argued that dioxins and furans are mixtures of congeners, and therefore, the risk of 10^{-6} should apply to each congener individually. By this reasoning, they argued, the CLARC guidance incorrectly applies a 10^{-6} risk level to the whole dioxin/furan mixture.

In April 2006, Ecology settled the lawsuit. The agency agreed that one plausible interpretation of the rule could allow the more general rule requirements for single substances and mixtures to be applied to dioxin and furan mixtures. That is, dioxin

¹ In excess of background cancer risk.

and furan congeners could be considered individual substances, each regulated at a cancer risk level of 10^{-6} with each mixture additionally regulated at a cancer risk level of 10^{-5} . Ecology agreed to settle the lawsuit because neither the current MTCA rule nor the federal guidance referenced in the MTCA rule explicitly requires the procedures in the CLARC guidance.

Concurrent with the settlement discussions, several environmental organizations submitted a rule-making petition to Ecology in March 2006. These groups requested that Ecology amend the rule to ensure that dioxin and furan mixtures would be regulated at a cancer risk level of 10^{-6} , as specified in the CLARC guidance, to protect against significant health threats posed by such mixtures.

Ecology reviewed the rulemaking petition and decided to launch a focused rulemaking process to re-evaluate this issue and explicitly define in the rule how the federal methodology should be used within the MTCA regulatory framework.

Two approaches for using TEF/TEQ methodology

The existing MTCA rule does not clearly specify how the Toxic Equivalency Factor (TEF) methodology must be used within the context of the MTCA Cleanup Regulation, when calculating cleanup levels for mixtures of dioxins/furans and PAHs. Two approaches have been used to establish cleanup levels using the EPA TEF methodology under the MTCA rule:

1. **Cleanup Levels and Risk Calculation (CLARC) guidance:** In November 2001, Ecology published guidance on how to use the TEF methodology when establishing and evaluating compliance with MTCA cleanup levels. The guidance directed people to:

- Use the TEF methodology to calculate a total toxic equivalency concentration.
- Compare the calculated value to the applicable cleanup level for the reference chemical (2,3,7,8 TCDD for dioxins/furans or benzo[a]pyrene for cPAHs).

Under this approach, the mixture is characterized by a single value (the total toxicity equivalent concentration). Cleanup levels for the mixture are then established using a cancer risk level of one-in-one million (10^{-6}) under MTCA cleanup rule Method B and one-in-one hundred thousand (10^{-5}) under MTCA cleanup rule Method C.

2. **Rayonier settlement:** As discussed above, Rayonier Properties LLC argued that the MTCA rule requires Ecology to establish cleanup levels using a cancer risk level of 10^{-6} applied to individual substances and 10^{-5} applied to mixtures of hazardous substances, as opposed to applying 10^{-6} risk level to the whole mixture. Ecology agreed that Rayonier's approach was a plausible approach for using the TEF methodology to implement the current MTCA rule. Under this approach, the TEF methodology is used to calculate a toxic equivalent concentration for each dioxin/furan congener,

which can be compared to the cleanup level for 2,3,7,8 TCDD. The total site risk (taking into account all congeners, other hazardous substances, and multiple exposure pathways) cannot exceed a cancer risk of one-in-a-hundred thousand (10^{-5}).

Because neither the current MTCA rule, nor the federal guidance referenced in the MTCA rule, explicitly requires the procedures in the CLARC guidance, Ecology will consider the Rayonier Settlement approach described above to be the baseline interpretation of the current rule on this issue. However, it is important to note that the final rule contains additional revisions that would result in changes to how cleanup levels are calculated under both approaches discussed above, in certain limited contexts.

Baseline for Analysis

The revised rule described above may lead to changes in cleanup levels determined under the MTCA. **The costs and benefits associated with the final rule are due to differences between the cleanup levels established under the past and final rules.**

Ecology has calculated the cleanup levels that the revised rule requires, and compared those to cleanup levels required under the past rule. In making that comparison, Ecology has evaluated the incremental changes relative to the regulatory baseline:

The regulatory baseline

To calculate the regulatory baseline, cleanup levels are established for each congener (or cPAH compound) using a cancer risk level of 10^{-6} (as opposed to applying 10^{-6} risk level to the mixture). The TEF methodology published by the EPA (1989) is used to calculate a toxic equivalent concentration for each congener, which can be compared to the cleanup level for 2,3,7,8 TCDD (or benzo[a]pyrene for carcinogenic PAHs). The total site risk (taking into account all congeners, other hazardous substances, and multiple exposure pathways) cannot exceed a cancer risk of one-in-a-hundred thousand (10^{-5}). Under this approach, cleanup levels must also:

- Comply with all applicable or relevant and appropriate requirements.
- Comply with the requirements based on preventing non-carcinogenic health risks (Hazard Index must be less than one).
- Comply with the ecological protection requirements in the MTCA rule.

The Final Rule

Ecology developed the revised rule to establish policies and procedures for calculating cleanup levels for mixtures of dioxin/furan, PCBs, and PAHs. The final rule includes:

- **Clear statements on the cancer risk policies:** Ecology is amending WAC 173-340-708(8) to clarify how users of the rules should use TEF methodology to establish cleanup levels for:
 - Mixtures of dioxins/furans
 - Carcinogenic PAHs
 - PCBs

Under the final rule, cleanup levels for the mixture must be established using a cancer risk level of one-in-one million (10^{-6}) under Method B and one-in-one hundred thousand (10^{-5}) under Method C.

- **Updated toxic equivalency factors:** Ecology is amending WAC 173-340-708(8) to:
 - Incorporate the most recent toxicity equivalency factors (TEFs) for dioxins/furans and PCBs recommended by the World Health Organization (Van den Berg et al. 2006)
 - Update potency equivalency factors (PEFs) for carcinogenic PAHs adopted by the California EPA (Cal-EPA, 2005).
- **Relative bioavailability:** Ecology is adopting procedures for modifying one of the default exposure parameters (the gastrointestinal absorption fraction) used to establish soil cleanup levels for mixtures of dioxins and furans.
- **Cross-media transfer:** Ecology is amending the rule to clarify that cleanup proponents must consider the properties of individual dioxin/furan/PCB congeners and cPAH compounds when they evaluate cross-media impacts (e.g., migration of contaminants from soil to ground water).

For more information on the final revised rule and the change from the baseline, please refer to the Concise Explanatory Statement and Responsiveness Summary (Ecology publication no. 07-09-108)

Scope of Analysis

This analysis covers foreseeable compliance costs at affected cleanup sites. Due to insufficient information about the timing and duration of cleanup actions, all costs are calculated without discounting for a rate of time preference. This means that all costs are presented as though they occur immediately and instantaneously—and the actual present value of costs is likely to be lower.

Businesses Affected

Ecology is estimating cleanup costs for the final rule based on 12 sites as hypothetically having to address added dioxin cleanup costs. This number was based on identifying which facilities were most likely to be affected. Ecology does not expect sites contaminated with PCBs or carcinogenic PAHs to experience any added

costs associated with these rule revisions. (Refer to the Final Cost Benefit Analysis for further discussion.) During the course of this rulemaking, potentially affected industries did not provide to Ecology additional information about specific affected sites or costs of compliance at those sites.

Ecology was able to determine that the primary source of air deposited dioxins – resulting in contaminated soils – was from the historic practice of burning salt laden wood waste. Before modern air pollution controls, facilities burning large amount of salty wood wastes potentially produced significant dioxin emissions.

Ecology regulates wood waste boilers as an air pollution source. Dioxin formation appears to be a problem for wood waste boilers only when they use salt laden wood or bark as fuel. Wood waste includes fuel that has been “hogged,” that is, fed through a grinder. Logs that have been stored or transported in salt water absorb significant amount of salt, especially in the bark. If the bark is burned, chlorine from the salt is available, when combusted with organic material, for chemical conversion to dioxins. In recent years Ecology has been identifying sources of dioxin in Washington and has begun collecting information about wood waste boilers for regulatory purposes. These reports do not include information about historical practices of wood burning. It’s unlikely that records about how much salty fuel was burned historically exist. But the practice of burning wood wastes is thought to be relatively recent; early practices would have been to dump most of the wastes without burning.

Ecology concluded that sites identified as possibly burning salty fuels in wood waste boilers 10 wood-waste boilers plus two additional facilities with known soil dioxin contamination will possibly be affected by the final rule. Overall, these 12 facilities belong to corporations with a total workforce of over 229 thousand and annual sales totaling over \$68 billion.

Ecology narrowed this list to facilities it finds to be most likely affected by the final rule change. These three facilities are identified to date as having confirmed or suspected dioxin/furan contamination still in need of additional investigation and potential remediation.

Among the 12 facilities considered as possibly affected by the rule amendments, Ecology identified at least one small business.

This small business is one of three PLPs (Potentially Liable Parties; businesses or entities that are potentially liable for the costs of compliance with the rule amendments) on a site—where it owns the property. This small business was not responsible for the contamination. The other PLPs on the site have consented to perform investigation/remediation, and one portion of the site has been identified as requiring No Further Action. Ecology acknowledges, however, that a firm identified as a PLP may, ultimately, be liable for a portion of these costs if remaining PLPs fail to pay for necessary investigation/remediation.

Analysis of compliance costs for business

Costs of Investigation and Remediation

Costs for sampling and analysis

Pulp and paper mills and wood-waste boilers—which Ecology determined are likely to be the only cleanup proponents affected by the final rule—incur additional investigation costs due to the need to define a larger contaminated footprint in soil surrounding smokestacks. These costs may differ for each site depending on wind patterns and contaminant dispersal levels. Ecology has estimated the likely additional acreage impacted as 1.65 acres. Sampling costs for this additional acreage, with ten samples per acre, are likely to be between \$11,550 and \$18,150 per site (based on costs of \$700 and \$1100, respectively, per sample; see EPA, 2005c).

Site cleanup costs associated with measures to remove, treat, or cover contaminated soils with clean materials

Ecology expects a number of factors will determine the actual remediation levels, and consequently limit remediation costs at affected sites:

- Cleanup requirements at many pulp and paper mill sites will continue to be driven by cleanup levels for other contaminants.
- At some sites, the volume of soil requiring removal will not change. There is very little difference between cleanup levels under the baseline and revised rules.
- Cleanup levels based on ecological risk will drive cleanup at some sites. If ecological cleanup levels drive remediation under both the baseline and final rule, Ecology expects no change in remediation.

For an expanded discussion of site cleanup costs, see the Final Cost-Benefit and Least Burdensome Analysis for these amendments (Ecology publication no. 07-09-105).

Costs for distinguishing site from background contamination

Under MTCA the “natural background” level is defined by rule as concentrations consistently present in the environment, not influenced by localized human activity. Based on sampling done by Ecology (Ecology, 1999b), the natural background TEQ for dioxin mixtures in Washington soils is estimated at 2.2 ppt. This is the calculated background TEQ for sampling data combined from forested and open areas.

The MTCA does not require cleanup sites to perform remediation in excess of the natural background level of contamination. The final cleanup level is well in excess of this concentration and higher than typical urban background TEQ found in Washington State (7.7 ppt).

Thus, small businesses are not expected to incur any extra expenses associated with distinguishing site impacts from natural and area background concentrations.

Expected remediation ignoring background contamination

The total per-site expected cost of the final rule equals the product of the unit cost of remediation and the increased volume of soil removed under the final rule.

Ecology estimates remediation costs of the rule at \$170,000 per-site, at the weighted average unit cost. Depending on the remedial method chosen, this cost can fall in the range of \$130,000 to \$220,000 per-site.

In some cases, cleanup levels for ecological health may be lower (more stringent) than cleanup levels driven by human health concerns (cancer risk). The final rule does not change calculation of ecological cleanup levels, so Ecology concluded that for any site on which ecological cleanup levels are lower (more stringent) than human health driven cleanup levels, there will be no change in remediation. On sites where the ecological health risk drives cleanup, the per-site cost will be zero since the ecological based cleanup levels are not changing.

Note that this estimated remediation cost is a highly conservative value, given that in urbanized areas where cleanup is likely to be driven by human health risk (instead of ecological risk), larger areas are likely to be covered by existing buildings, roads, and other structures. In addition, industrial properties would need to cleanup less area, offsetting this increased area. Considering these factors, Ecology believes that the actual increase in remediation cost will be considerably smaller than the above estimate.

Avoided Evaluation and Compliance Costs

Expenditures associated with terrestrial ecological evaluations (TEEs)

The final rule does not change calculations for ecological cleanup standards. Therefore, sites on which cleanup is driven by ecological standards under the baseline will not be affected by the final rule, and there will be no change in the ultimate level of remediation.

The final rule alters the likelihood that cleanup proponent will need to perform an ecological risk evaluation. Compared to the baseline, the cleanup level decreases (becomes more stringent) under the final rule. This makes dioxin/furan concentrations that are acceptable for human health risk less likely to exceed screening levels for ecological risk.

If concentrations are less likely to exceed screening levels, Ecology is less likely to require an evaluation of ecological risks on the site. WAC 173-340-7493(1)(d) states that Ecology may determine that a site-specific TEE is not

necessary because "...the cleanup action plans developed for the protection of human health will eliminate exposure pathways of concern to all of the soil contaminants..." The final rule results in lower (more stringent) cleanup levels for human health protection than those established under the baseline. Consequently, Ecology expects that the final rule will reduce (to an uncertain degree) the need to perform site-specific TEEs.

Expenditures associated with evaluating multiple hazardous substances and multiple exposure pathways

The MTCA rule specifies that total site cancer risk cannot exceed one-in-one hundred thousand (10^{-5}), and total noncancer site risk cannot exceed a hazard index of one. The MTCA rule requires that cleanup levels established for individual substances be adjusted downward if the total site risk (taking into account multiple hazardous substances and multiple pathways of exposure) exceeds these limits.

Under the baseline, total site risk adjustments will need to be made at nearly every site given the number of dioxin and furan congeners (17) and the likelihood of multiple exposure pathways at some site, resulting in the total risk exceeding 10^{-5} . The calculations are complex and therefore can be time consuming and expensive. The final rule reduces the need to evaluate such adjustments because cleanup levels for the mixture are set using a cancer risk level of one-in-one million (10^{-6}) and a hazard quotient of one.

Cost savings on industrial (Method C) sites

This analysis does not directly consider the reduced costs attributable to higher cleanup levels for industrial properties. Depending on the extent of industrial properties impacted by the site, these reduced costs could potentially offset any increased cleanup costs in other non-industrial areas. Note that this change does not affect the level of human health cancer risk that would be applied to industrial properties (10^{-5}), so there would be no impact to cancer mortality or incidence.

Summary of investigation and remediation costs of the final rule

Ecology estimates that some, but not all, pulp and paper mills and wood waste boilers will incur additional costs to identify areas subject to the final rule and to clean those areas. Ecology estimates that most pulp and paper mills and wood waste boilers are already in compliance with the new rule and therefore will incur no compliance costs. Ecology also estimates that the final rule will save firms the expense of preparing environmental assessments that would otherwise be required.

Based on Ecology's analysis of the record, and our experience implementing the MTCA, Ecology estimates the total compliance costs associated with the final rule to range from \$132 thousand to \$218 thousand, per site, for affected pulp and paper mills and wood waste boilers, from additional investigation

(including sampling) and remediation costs. These costs are likely to be mitigated to some degree by the benefit of avoided compliance costs, avoided analysis of multiple hazardous substances, and cost savings in remediation of industrial sites.

Real Estate Impacts

Cleanup cost responsibility

Under MTCA, the PLP(s) found liable for contamination are responsible for paying for cleanup on *all* impacted properties. This includes contaminated residential and commercial property owned by third parties that have a defense to liability.

Residential/commercial property, at or below background levels

If affected residential/commercial property lying within the additional estimated acreage of contaminated soil under the final rule is below background levels established for the area, additional site cleanup is not required. This leaves soil contaminated at or below background levels on the property. As background levels of contamination are common to properties in the area, Ecology does not expect a property value differential across sites specifically attributed to the PLP's contamination, as compared to other sites in the area that carry background contamination. Existing area property values are expected to already incorporate and reflect background contamination and the associated perceived risk of purchasing property contaminated at this level.

Residential/commercial property affected, above background levels

If affected residential/commercial property lying with the additional estimated acreage of contaminated soil under the final rule is above background levels established for the area, additional cleanup is required to address contamination exceeding background levels.

In addition, residential/commercial property that requires additional remediation under the final rule (i.e., lies within the additional estimated acreage of contaminated soil) may end up with a lower excess cancer risk level than under the baseline. In particular, property that would otherwise have been adjacent to cleanup area (with soil dioxin/furan concentration above 11 ppt) will be cleaned to a lower level of contamination (at most 11 ppt) under the final rule. Where the final rule creates a change in cleanup behavior, the perception that a property has been cleaned up to a greater degree than it would have been under the baseline works to mediate downward pressure on property values.

Residential/commercial property not affected

The impact of the final rule is analyzed in comparison to the baseline—meaning that the incremental impact of the rule on residential sites is limited

to those sites within (or intersecting) the estimated additional cleanup acreage. Residential/commercial sites that would have experienced cleanup under both the baseline and final rule are not included in cost analysis. These properties, however, may experience cleanup to a lower excess cancer risk level under the final rule than under the baseline—within the limitations of background contamination levels.

Public perception that property has been cleaned to a greater degree than it would have been under the baseline works to mediate any downward pressure on property values.

Costs of contamination: property values

Ecology acknowledges that there are lags in both real estate transactions and remediation efforts. The effect of these lags means that residential or commercial property owners in the additional cleanup acreage estimated by the Cost-Benefit Analysis may:

- Have difficulty selling property during cleanup lags (after contamination is identified as in need of cleanup until remediation is complete)
- Have to sell property at a lower price, to reflect the buyer's purchase of additional financial and perceived risk
- Encounter difficulty using property as collateral

(McClusky & Rausser, 2001). Ecology only expects these effects to occur if a residential or commercial property owner would otherwise wish to sell the property or use it as collateral during the cleanup lag. Furthermore, while there may be some interim impacts during the cleanup phase, the impacts are only temporary and property values are likely to rebound after cleanup.

The size of this prospective cost depends on both the size of devaluation arising from perceived risk, and the length of the cleanup lag. During the cleanup lag, the property will also appreciate, inflation will affect the real property value, and delayed sale will reduce present value.

Likelihood of property value impact

Ecology does not believe the above interim effects are likely (as compared to the baseline) in the case of dioxin/furan contamination on or near affected sites because:

- **Costs of cleanup will be borne by the identified PLP.** This eliminates the impact of possible future remediation costs on third party property owners. This means that buyers' willingness to pay for a property will not be affected by future cleanup costs, because they are protected from having to pay for the cleanup themselves.
- **Perceived risk based on existing and vague information will drive property values.** Generally speaking, people are relatively informed about

contamination surrounding major industrial sites. Area property values may already reflect a perceived risk (stigma) of contamination—especially in the presence of uncertainty about the extent of contamination in the interim. Hence, Ecology does not expect the small change in allowable contamination and associated excess cancer risk to further impact willingness to pay for property in the area in the interim. However, when the extent of contamination and necessary remediation is fully identified, properties requiring restrictive covenants will likely experience property value impacts.

- **Perceived risk due to contamination is not limited to properties explicitly identified as contaminated above allowable levels.** Given that the final rule is expected to expand the cleanup area by a median of 1.65 acres per site, the affected area is likely to include real estate that would have lower value under the baseline as well, due to its proximity to contaminated land.

Multiple economic studies have estimated the impact of proximity to cleanup sites on property values in the surrounding area (contaminated and uncontaminated land). These studies find that the stigma and perceived risk of living near a cleanup site impacts properties beyond the defined contaminated acreage.² This is especially likely in the case of uncertainty regarding the precise extent of contamination in the interim. Ecology additionally notes that several research studies on the impacts of contaminated sites on residential property values suggest that the long-term impact of contamination—once remediated—on property values is small or zero and property values rebound to levels similar to surrounding areas.

- **Stigma occurs for a flexible geographic area.** The initial property to be remediated is not clearly defined at the outset of investigation, but develops and becomes more defined as cleanup of more highly contaminated areas progresses and analysis continues. This variance in properties expected to be contaminated beyond allowable levels broadens the impacted area of real estate values.

Compensation for property access and impacts to third parties from cleanup

Access to property

To perform remediation on properties owned by third parties, the cleanup proponent will need to negotiate access. This could include:

- Relocating residents and businesses
- Moving buildings
- Storing property
- Returning real estate to good condition

² See Reichert (1997, 1999), Wise and Pfeifenberger (1994), Ketkar (1992), Greenberg and Hughes (1992), Kohlhasse (1991), and Dale, et al. (1999).

- Compensation to the property owner for these and other related expenses.

Ecology reviewed access agreements from a number of sites in Washington State to determine the impacts of the final rule on efforts to gain access to third party properties for cleanup.

Commercial Property

On commercial property, Ecology expects cleanup to be performed in a manner that imposes minimal interference with business activity. This includes performing cleanup during non-business hours and days that a business does not operate—options that are likely unavailable in residential cleanup. Ecology expects *de minimis* cost of access to commercial properties.

Moreover, Ecology believes that on commercial properties, the high percentage of land covered by buildings and pavement (relative to residential properties) will mitigate the amount of dioxin/furan depositing on soils. This will reduce the impact of the proposed rule on commercial property because there will be less dioxin contamination in soils on paved and built-up property.

Residential Property

Ecology estimated the wage of an additional negotiator of access as up to \$30 per hour. This is an upper limit for the hourly wage of an Environmental Specialist 4 working for the State of Washington.³ Including the public and private sectors, the US Bureau of Labor Statistics (BLS) estimated that the median wage of an environmental scientist is equivalent to \$56 thousand in 2006 (BLS, 2006). This is equivalent to \$27 per hour—a value near the \$30 per hour figure used by Ecology.

Multiplied by two to eight hours of additional negotiation per affected property, and by three to seven properties per affected site, this equals \$180 – 1,680 per affected site.

Ecology multiplied the per-diem lodging, meal, and incidental expense average of \$102 by the number of expected relocations and length of relocation for an affected facility.⁴ Ecology expects the final rule to result in \$427 – 997, per affected site, of additional relocation cost to the PLP, depending on the location of the site.

Compensation for impacts from land-use restrictions

³ The Environmental specialist 4 is in Washington State Pay Range 55, which pays \$21 – 30 per hour.

⁴ \$102 is the average total per diem for lodging and meals in western Washington counties. Ecology limited its data to western Washington because affected sites are more likely to be located on or near bodies of salt water. See Section 4.3 of the Cost-Benefit Analysis for further explanation.

Third-party properties on which contaminated soil is not fully excavated—in favor of capping and institutional controls—will require land-use restrictions via restrictive covenants to prevent future human exposure to the contamination. The PLP responsible for the cleanup will likely need to compensate the property owner for the impacts from land-use restrictions. This could include compensation for any reduction in property value or lost use of the property that results from the restriction. Future buyers of the property likely will pay less for land with such limitations.⁵

Based on the nature of cleanup of dioxin/furan contamination due to air deposition, Ecology believes that the majority of remediation will be excavation. Contamination occurring in surface soil is more easily excavated than deep contamination, and is therefore less likely to require capping and institutional controls.

Because most cleanup of third-party property is likely to be full excavation, meaning that very few—if any—properties will require institutional controls, Ecology believes that compensation for reduced property value due to land-use restrictions is most likely zero.

Commercial Property

Ecology concluded that most commercial properties are unlikely to experience reductions in property value due to land-use restrictions because cleanup of third-party properties is likely to be full excavation (see above). In addition, commercial properties have a higher degree of land-coverage—that is, the amount of land covered with buildings or pavement—that works to prevent dioxin/furans in the air from depositing in the soil.

Based on these factors, Ecology concluded that commercial property in the additional acreage impacted by the proposed rule is unlikely to experience the impacts of land-use restrictions.

Residential Property

Ecology concluded that most residential properties are unlikely to experience reductions in property value due to land-use restrictions because cleanup of third-party properties is likely to be full excavation (see above).

⁵ Studies indicate that the long-term impact of contamination that is fully remediated on property values is small or zero (see Dotzour (1997); Nelson (1981); Kinnard, et al. (1991)) and that property values rebound to levels similar to surrounding areas, unless deed restrictions are put in place (see Dale, et al. (1999); Simons and Sementelli (1997); Gamble and Downing (1992)). Moreover, area-wide stigma and risk impacts on property values have also been shown to rebound over time (see Wise and Pfeifenberger (1994); Greenberg and Hughes (1992); Kohlhasse (1991); and Dale, et al. (1999)).

Summary of Real Estate Costs

Ecology estimated the costs of access to residential property for cleanup at \$180 – 1680 per site. In addition, relocation of residents during cleanup was estimated to cost \$427 – 997 per site.

Total Costs of Compliance with the Final Rule

Ecology estimated the total cost, per site, to comply with the final rule is:

Action	Cost
Investigation and remediation	\$132,000.00 – \$218,000.00
Residential property access costs	\$180.00 – \$1,860.00
Relocation of Residents	\$427.00 – \$997.00
Total:	\$133,000.00 - \$221,000.00

Comparison of Costs for Small versus Large Businesses

Based on the employment information available for the Potentially Liable Parties (PLPs) at 12 possibly affected sites, Ecology calculated the costs to comply with the final rule, per employee. The number of employees at the PLPs ranges from four to over 60 thousand employees.

Because the total estimated cost of compliance per site is constant across PLPs—i.e., is unrelated to the size of the PLP—Ecology determined that the compliance cost per employee is disproportionately larger for small businesses. In particular, the range of per-employee costs is:

- \$2 – 10 per employee at the largest businesses
- \$33 – 155 thousand per employee at small businesses

A small business incurs incremental compliance costs per employee under the rule amendments that are four orders of magnitude larger than those for the largest businesses. This is clearly a disproportionate burden on small businesses.

NAICS Codes of Impacted Industries

This table lists the NAICS codes possibly or likely affected by these rule amendments. These facilities are paper manufacturers, wood product manufacturers, petroleum refiners, and real estate/financial trusts that may be liable for cleanup.

NAICS Codes of Possibly Affected Industries				
321113	32212	324110	525930	531312
321211	322121			

Employment Impacts

Ecology used the 1997 OFM input output table to estimate economy-wide labor impacts.⁶ Labor impacts in this model are based on established interactions between industries, the extent of compliance costs expected to be incurred by industry, and where those costs are paid.

Ecology expects that three types of companies may be impacted by the final rule: state companies, interstate companies, and multinationals. In turn, each type of firm may incur compliance costs on a site it may or may not currently operate.

To maintain conservative estimates, Ecology treated facilities currently operating in Washington State as though they could not distribute costs across a broader interstate or multinational base.⁷ Ecology is aware, however, that there are current dioxin/furan cleanup sites that are no longer in operation, so Ecology treated facilities responsible for remediation at these sites as incurring a portion of costs in Washington State—while allocating their costs across a broader national or multinational base—if available—based on Washington share of national or world Gross Domestic Product.

Ecology estimated that the final rule may create at least 32 employment positions across the Washington State economy. This net increase in employment arises from payments made to professionals that perform sampling, testing, remediation, waste disposal, and management.

Ecology notes, however, that because some facilities are able to distribute the incremental costs of these rule revisions across a national or multinational base, this in-state increase in employment may be mitigated by job losses outside of the state.

Actions Taken to Reduce the Impact of the Rule on Small Business

When rule amendments impose disproportionate burden of compliance costs on small versus large businesses, Ecology is directed to, "...where legal and feasible in meeting the stated objectives of the statutes upon which the rule is based, reduce the costs imposed by the rule on small businesses" (RCW 19.85.030).

Previous analyses of the MTCA Cleanup Regulation established that the MTCA itself imposes disproportionate costs on small businesses. The initial SBEIS document

⁶ <http://www.ofm.wa.gov/economy/io/default.asp>

⁷ Note that an interstate or multinational firm faced with increased compliance costs in Washington State may—due to efficiency concerns—reduce employment in other states instead of at the location incurring increased compliance costs.

developed for the creation of the MTCA in 1989 states, “the draft regulation does have a disproportional impact on small business,” (Ecology, 1989).

The 2001 SBEIS reiterates this point, stating, “The principle finding of that analysis was that cleanup costs are proportional to business size—larger businesses have a larger sales base over which to spread regulatory costs...In this rule revision, more sophisticated methods are available to make risk assessment and risk management decisions, but these methods may not be as readily used by small business as large business because they are more complex and technical,” (Ecology, 1999a).

The MTCA rule does, however, provide numerous forms of existing regulatory relief to small businesses:

- A remediation level that leaves hazardous substances at the site in concentrations above cleanup levels may be considered protective of human health and the environment.
- Ecology accepts a wide variety of financial assurance mechanisms.
- Ecology provides for technical consultations and assistance for independent remedial actions. Independent remediation is largely undertaken by small businesses, which are directly benefited by this provision.
- Providing a choice of methods for calculating cleanup levels allows businesses to maintain flexibility in business decisions relating to remediation costs.
- Assistance with remediation efforts is available through some State Toxics Control Account funds.
- Ecology can facilitate resource sharing during data collection activities related to monitoring.
- Ecology considers financial resources available to cleanup proponents for site remediation when deciding which cleanup proponents to pursue.
- Ecology has a provision establishing an administrative process for issuing agreed orders that will help to mitigate the impacts of the final rule on small business.
- Interim cleanup actions on a site may spread remediation costs over time, reducing the real (inflation-adjusted) cost of complete remediation.

These provisions, one the whole, work to mitigate the MTCA’s disproportionate impact on small businesses.

Ecology did not expand on the existing MTCA provisions that assist small businesses to comply with the final rule. Ecology believes that the existing provisions of the MTCA rule provide adequate assistance to small businesses while retaining adequate protection of human health.

Involvement of Small Business in the Development of the Final Rule

The development and understanding of the impacts of the final rule were a gradual process for Ecology. Throughout this process, Ecology was careful to be aware of the impact of the final rule on potentially affected small businesses. Until late in the rule development process, however, Ecology did not believe that existing small businesses would be affected by the changes to the rule. For this reason, Ecology did not explicitly involve small businesses in the process to amend the rule.

Ecology did, however, mail information about the proposed rule, including public involvement opportunities and public hearing announcements, to over 450 parties. Recipients included environmental organizations, businesses, the Association of Washington businesses, Washington tribes, and other interested persons.

Ecology held three public hearings addressing the proposed rule amendments; one in Seattle, one in Spokane, and one in Port Angeles. Notice of the public hearing was published in five newspapers: the Peninsula Daily News, the Columbian, the Seattle Times, the Yakima Herald-Republic, and the Olympian. Hearing dates were posted on the Ecology Public Events Calendar webpage. Ecology's Site Register, which is distributed to over 1,500 individuals, included announcements of the public hearings. In total, forty-two people attended the hearings and ten people provided oral testimonies.

Initially, Ecology believed that—due to the nature of dioxin/furan contamination and cleanup—only pulp and paper mills would be affected. To determine the extent of small business impacts, Ecology reviewed employment information for pulp and paper mill operators in Washington State. Under this definition of affected facilities, Ecology determined that there were no such firms that employed 50 or fewer individuals.

Further investigation and review of additional documents led Ecology to consider that certain wood-waste boilers may be impacted by the final rule as well. Based on the information in documents that describe salt-laden wood waste burning practices at pulp and paper mills and other facilities operating wood waste boilers, Ecology determined which facilities in Washington were likely to be impacted by the rule amendments.

Some facilities included in this set were currently operating, while others were closed. Ecology determined that responsibility for investigation/remediation on the contaminated sites of closed facilities included firms that were not necessarily directly involved in contamination, but retained potential responsibility due to ownership of the land.

Ecology reviewed employment information for firms that are currently identified as Potentially Liable Parties (PLPs) on impacted cleanup sites, and at facilities

potentially affected due to hypothetical contamination. Review of the number of employees at these firms revealed that small businesses are potentially affected by the final rule due to potential liability at cleanup sites.

The determination that small businesses are potentially impacted by the final rule moved Ecology to perform an analysis of small business impacts (compose a Small Business Economic Impact Statement; SBEIS) to determine the extent of disproportionate impacts of the final rule on small businesses.⁸ As we stated earlier, this determination of small business impacts came late in the rule development process—leaving little time to more directly involve small businesses in revision of the MTCA rule.

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⁸ Ecology did not perform a preliminary analysis of small business impacts for the draft rule amendments because it did not believe any small businesses to be affected at that time.

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