



DEPARTMENT OF
ECOLOGY
State of Washington

Status of Developing Model Remedies

2016 Report to the Governor and Legislature

Toxics Cleanup Program

DECEMBER 2016

Publication No. 16-09-054

Publication and Contact Information

This report is available on the Department of Ecology's website at <https://fortress.wa.gov/ecy/publications/SummaryPages/1609054.html>

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Washington State Department of Ecology
Olympia, Washington

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Photos

Photo 1: Contaminated soil and rusting underground storage tanks were removed from a cleanup site near Spokane using one of Ecology’s model remedies in 2015. Rusting tanks can leak petroleum into soils and groundwater, which can impact human health and our environment and take years to clean up. Since 85% of cleanup sites in Washington have some petroleum contamination, model remedies developed specifically for sites impacted by petroleum can help accelerate cleanup of this contamination. Photo credit: Department of Ecology (2015) 3

Photo 2: Ecology requested formal proposals for additional model remedies from qualified engineers, consultants, and contractors in 2015 and 2016 for sites impacted by petroleum. Photo credit: Northwest Environmental Business Council (NEBC) 2016)..... 9

Acronyms & Abbreviations

ISIS	Integrated Site Information System database
LUST	leaking underground storage tank
MTCA	Model Toxics Control Act
NEBC	Northwest Environmental Business Council
NFA	no further action
PLP	potentially liable person
RCW	Revised Code of Washington
TCP	Toxics Cleanup Program
UST	underground storage tank
WAC	Washington Administrative Code

1.0. Executive Summary

The Model Toxics Control Act (MTCA) is one of Washington's principal environmental laws. Adopted in 1989 in response to a 1988 citizens' initiative, MTCA helps protect our health and environment from the improper use or disposal of hazardous substances which may result in the contamination of our state's land and waters. The Toxics Cleanup Program (TCP) at Washington State's Department of Ecology (Ecology) is primarily responsible for implementing and enforcing this law, and oversees or manages the cleanup of most contaminated sites in our state.

In 2013, the Washington Legislature made significant changes to MTCA. One of the changes included additional direction to Ecology regarding the establishment of model remedies: standardized cleanup methods designed to help streamline and accelerate the selection of cleanup actions that are protective of human health and the environment.

This report, *Status of Developing Model Remedies: 2016 Report to the Governor and Legislature*, summarizes Ecology's progress in establishing standardized cleanup methods in response to the requirements outlined in RCW 70.105D.030(4). The report briefly describes: a) how MTCA and model remedies facilitate contamination cleanups in Washington; b) which model remedies were used before 2013 and the new ones developed since then; c) how Ecology engaged the public in the development process; d) opportunities to use model remedies in the future; and e) Ecology's next steps.

Statutory Language

[RCW 70.105D.030(4)] *By November 1, 2016, the department must submit to the governor and the appropriate legislative committees a report on the status of developing model remedies and their use under this chapter. The report must include:*

- 1) *The number and types of model remedies identified by the department under subsection (1)(k) of this section;*
- 2) *The number and types of model remedy proposals prepared by qualified private sector engineers, consultants, or contractors that were accepted or rejected under subsection (1)(k) of this section and the reasons for rejection; and*
- 3) *The success of model remedies in accelerating the cleanup as measured by:*
 - a) *The number of jobs created by the cleanup, where this information is available to the department,*
 - b) *The acres of land restored, and*
 - c) *The number and types of hazardous waste sites successfully remediated using model remedies.*

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2.0. Background: Model Toxics Control Act and Model Remedies

MTCA

The Model Toxics Control Act (MTCA) was adopted in 1989 to help protect our health and environment from the improper use or disposal of hazardous substances which may result in the contamination of our state's land and waters. Funds to conduct the cleanup of this contamination come from a voter-authorized tax on hazardous substances such as petroleum products, certain chemicals, and pesticides. The Department of Ecology is one of several agencies that use MTCA funds to clean up, restore, and protect our environment. Ecology's Toxics Cleanup Program is primarily responsible for implementing and enforcing MTCA. Pursuant to this work, TCP develops the rules and guidelines governing cleanup and oversees or manages the cleanup of most contaminated sites in our state.

MTCA's impact on our state has been powerful. Since the law was adopted 27 years ago, Ecology has identified more than 12,450 sites in Washington that have confirmed or suspected contamination. As of June 30, 2016, more than 6,600 contaminated sites have been cleaned up and/or determined to require no further action. There are another 200 sites with cleanups completed that are being monitored to ensure their cleanup remedies are working.

Much work still remains. More than 5,600 sites in Washington currently require further investigation and cleanup, and hundreds of new sites are reported to Ecology each year: on average, 270 sites are reported to Ecology annually, with a record 400 new sites in 2015 alone.

Simply put, new sites are arriving faster than they can be cleaned up. Model remedies are one way Ecology is addressing this escalating demand.



Photo 1: Contaminated soil and rusting underground storage tanks were removed from a cleanup site near Spokane using one of Ecology's model remedies in 2015. Rusting tanks can leak petroleum into soils and groundwater, which can impact human health and our environment and take years to clean up. Since 85% of cleanup sites in Washington have some petroleum contamination, model remedies developed specifically for sites impacted by petroleum can help accelerate cleanup of this contamination. Photo credit: Department of Ecology (2015)

Model Remedies

Model remedies are standardized methods used to facilitate the cleanup of contaminated sites. While the 2013 legislation requires that model remedies meet the cleanup standards and remedy selection criteria of MTCA, these standardized methods are intended to streamline and accelerate the selection of cleanup actions that protect human health and the environment, with a preference for permanent solutions to the maximum extent practical.

One example of a model remedy would include excavation and removal of contaminated soil, followed by testing to determine how successful the cleanup action was. If all contamination could not be removed, a legal agreement (such as an environmental covenant) would be filed to help ensure the remedy remained protective of human health and the environment over time.

There are advantages to selecting and using a model remedy. For example, if a site meets the requirements for using a model remedy, it is not necessary to conduct a Feasibility Study or Disproportionate Cost Analysis in order to select the model remedy. Ecology also has the authority to waive review fees at cleanups that qualify for and appropriately use a model remedy (Ecology 2015b and 2016a).

Before model remedies were addressed in the 2013 changes to MTCA, Ecology had used existing MTCA rule language to develop four model remedies to clean up arsenic and lead contaminated soil stemming from the Tacoma Smelter Plume. To date, 1898 properties have implemented at least one of these model remedies.

In response to the more recent 2013 legislative direction, Ecology focused on developing model remedies for sites impacted by petroleum, since approximately 85% of all contaminated sites in Washington State have some petroleum contamination. In 2015 and 2016, Ecology engaged the public in this development process through:

- Announcements through TCP's Model Remedies email distribution list (about 90 recipients);
- Announcements in TCP's [Site Register](#);
- Announcements on TCP's [Model Remedies webpage](#);
- Informal listening sessions in August 2015 and June 2016;
- Presentations at a remediation workshop (May 2016) and Northwest Environmental Business Council (NEBC) Remediation Conference (October 2015); and
- Drafts available for public comment on Ecology's [Publications website](#).

Ecology staff were also available to answer questions from the public by phone and email. Feedback and comments from these interactions helped shape the final guidance documents.

Following the informal feedback sessions and 30-day public comment periods in 2015 and 2016, Ecology issued two model remedy guidance documents. The first was completed in September 2015, titled: [*Model Remedies for Sites with Petroleum Contaminated Soils*](#) (Ecology 2015b). In August 2016, Ecology released [*Model Remedies for Sites with Petroleum Impacts to Groundwater*](#) (Ecology 2016). These documents provide a total of 19 new model remedy options for addressing petroleum contamination.

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3.0. Model Remedies Established by the Department of Ecology

To date, 23 different model remedy options have been developed by Ecology. Four address arsenic and lead contaminated soil from the Tacoma Smelter Plume, seven are for sites with petroleum contaminated soil, and twelve are for sites where groundwater is impacted by petroleum. The petroleum model remedies are relatively new and therefore the effectiveness of these options is still in the early stages of evaluation.

Tacoma Smelter Plume

For almost 100 years, the Asarco Company operated a copper smelter in Tacoma. Air pollution from the smelter settled on the surface soil over more than 1,000 square miles of the Puget Sound basin. Arsenic, lead, and other heavy metals are still in the soil as a result of this pollution. This area is called the Tacoma Smelter Plume and extends through King, Pierce, and Thurston counties. An estimated 700,000 properties are potentially impacted by the smelter's air emissions. In November 2009, Asarco emerged from bankruptcy with a total settlement obligation of \$1.79 billion nationwide. Washington's share for the Tacoma Smelter Plume cleanup actions was \$94.6 million. (Ecology 2015a).

With the impending settlement funds, Ecology developed an interim action plan to address the most contaminated areas and most vulnerable populations. Since these model remedies were adopted in 2012, 1898 properties have used one of the options to implement cleanup, resulting in 449 acres being remediated. Of the 1898 properties, 37 have applied for and received a property-specific no further action (NFA) letter from Ecology.

For more information on the Tacoma Smelter Plume project, visit Ecology's Tacoma Smelter Plume website at:

http://www.ecy.wa.gov/programs/tcp/sites_brochure/tacoma_smelter/2011/ts-hp.htm.

Specific information on the model remedies developed can be found in Chapter 11 of the *Final Interim Action Plan for the Tacoma Smelter Plume* (Ecology publication no. 12-09-086), available at: <https://fortress.wa.gov/ecy/publications/SummaryPages/1209086.html>

Model Remedies for Sites with Petroleum Contaminated Soils

As work began to develop petroleum model remedies in 2014, Ecology decided to first focus on sites with petroleum contaminated soil. Ecology selected this approach because its narrowly defined scope of work provided a relatively straightforward path to completion.

The 2013 legislation requires that model remedies meet the cleanup standards and remedy selection criteria established under MTCA. To ensure compliance with this provision, staff first assessed information found in Ecology's Integrated Site Information System (ISIS) database, a catalog of approximately 12,650 confirmed or suspected contaminated sites known to Ecology.

The evaluation revealed that approximately 600 sites with only petroleum contaminated soil had received an NFA letter between January 2012 and June 2014. A detailed file review was then completed for more than 100 of these sites, in order to identify previously approved remedies. This analysis formed the basis for seven proposed model remedies that were released for review during a 30-day public comment period in April 2015.

All seven proposed soil model remedy options were included in the final guidance issued in September 2015, [*Model Remedies for Sites with Petroleum Contaminated Soils*](#) (Ecology 2015b).

Model Remedies for Sites with Petroleum Impacts to Groundwater

Once the model remedy guidance for sites with petroleum-contaminated soil was largely complete, Ecology began work on the second phase of petroleum model remedies.

As with model remedy development for sites with petroleum contaminated soil, staff evaluated Ecology's ISIS database and found that approximately 300 sites with petroleum contaminated groundwater had received a no further action letter between January 2012 and June 2015.

The remedies successfully used at these sites were instrumental in developing the 12 model remedy options that were released for public review in May 2016. The feedback received during the 30-day public comment period was generally supportive and Ecology finalized the document three months later.

The 12 new model remedy options were included in the final guidance released August 2016, [*Model Remedies for Sites with Petroleum Impacts to Groundwater*](#) (Ecology 2016).

4.0. Proposals from Qualified Engineers, Consultants, or Contractors

The 2013 Legislation specifies that Ecology must solicit and consider proposals from qualified persons during the development of model remedies.

Ecology asked for information that would support the establishment of model remedies for sites with petroleum impacts to groundwater (beyond those already being considered) at an August 2015 listening session.

A similar request was included in the May 2016 formal *Site Register* announcement when the public review draft of [*Model Remedies for Sites with Petroleum Impacts to Groundwater*](#) was released (Ecology 2016a).

At the time of this report (December 2016), Ecology had not received any formal proposals for additional model remedies. However, a firm that specializes in in-place thermal treatment is considering submitting site-specific data to demonstrate that this technology is appropriate as a model remedy for petroleum contamination.



Photo 2: Ecology requested formal proposals for additional model remedies from qualified engineers, consultants, and contractors in 2015 and 2016 for sites impacted by petroleum. Photo credit: Northwest Environmental Business Council (NEBC) 2016).

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5.0. Success of Model Remedies in Accelerating Cleanups

At the time of this report (December 2016), Ecology has limited site-specific information for evaluating the success of model remedies in accelerating the pace of cleanup. The available information is summarized below. Participants at two Ecology-sponsored meetings in June 2016 expressed appreciation for the model remedy options that have been developed to date, and generally believed that petroleum cleanups would move along more quickly as a result. For more information on these meetings, see the listening sessions' summary available on TCP's Model Remedies website: <http://www.ecy.wa.gov/programs/tcp/policies/model-remedies/Model%20Remedy%20Listening%20Sessions%20Summary%20June%202016.pdf>.

Number of jobs created by the cleanup, where this information is available to the department

While there is no direct information on the number of jobs created, an estimate has been made based on the amount of money spent on remedial action work at the Tacoma Smelter Plume during FY2016. Specifically, Ecology determined that \$8.4 million was expended on the cleanup of contaminated properties at this site using model remedies. This information was provided to the Office of Financial Management (OFM) for evaluation. OFM used their standard methodology and calculated that this expenditure would result in the creation of 104 jobs. In addition, there have been 14 petroleum contaminated sites that have completed cleanup using a model remedy since the 2013 legislation passed. While the number of jobs created at these sites is unknown, it is expected to have been limited.

Acres of land restored

Since 2012 when model remedies were made available, 1894 single-family properties and 4 multi-purpose, multi-family properties have been cleaned up within the Tacoma Smelter Plume using a model remedy. This represents approximately 449 acres of land remediated using these model remedy options.

In addition to these properties, 14 sites with petroleum contamination were cleaned up in 2015 and 2016 using one of the 19 available model remedy options. Information in Ecology's ISIS database indicates that approximately 9 acres of land have been restored at these 14 sites.

Overall, Ecology estimates that nearly 458 acres of land have been cleaned up and restored in Washington State as a result of model remedy implementation.

Number and types of hazardous waste sites successfully remediated using model remedies

Available data for the Tacoma Smelter Plume indicate that 1898 properties were remediated using model remedies since 2012, of which 37 formally requested and received a no further action letter from Ecology. In addition, 14 petroleum contaminated sites have successfully used one of the new petroleum model remedies to address the contamination since these options became available in September 2015 (soil) and August 2016 (groundwater).

6.0. Actions to Address the 2015-17 Model Remedies Biennial Budget Appropriation

Ecology was appropriated \$2 million in the 2015-17 Biennial Budget from the Model Toxics Control Act (MTCA) Accounts for projects to develop, implement, and evaluate model remedies for Leaking Underground Storage Tank (LUST) sites. Since the May 2015 revenue forecast that the 2015-17 Biennial Budget was based on, actual and projected revenue for MTCA Accounts dropped. Ecology delayed implementation of these projects until the 2016 Supplemental Budget was passed and \$1.15 million became available in April 2016. This supplemental funding was directed toward assessing the need for additional cleanup measures at specific sites. The funding may also be used to prevent environmental degradation of sites with abandoned tanks or at sites where property owners have declared bankruptcy.¹

Shortly after receiving the supplemental funding, Ecology evaluated the status of the sites that were identified in the original budget request to determine which ones could be addressed under the new supplemental budget. Based on the initial screening, 19 sites were identified as needing additional site investigations and four were identified as ready for cleanup and follow-up sampling. A proposed scope of work was prepared for each of these sites and work is scheduled to begin this year.

In addition to this site-specific work, \$850,000 was allocated for non-site-specific activities to help evaluate and implement model remedies, which include:

- Reviewing remedial technologies;
- Evaluating the effectiveness of model remedies;
- Assessing data from other pathways such as vapor intrusion; and
- Considering information on alternative proposals submitted by qualified persons.

The primary goal of these efforts is to use available information to identify specific model remedy options that will speed up the investigations and cleanup of leaking underground fuel tanks.

Work began on these non-site-specific components soon after the MTCA legislative changes were passed in 2013, and will continue throughout the 2015-17 biennium. Data generated from the planned and future site-specific work will be used to develop new model remedies.

¹ Source: 2016 Supplemental Budget Engrossed Substitute House Bill 2380 (ESHB 2380).

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7.0. Future Opportunities to Use Model Remedies

During a 2015 listening session, Ecology received preliminary feedback that establishing model remedies for sites with petroleum impacts to groundwater would be useful. Since Ecology released [*Model Remedies for Sites with Petroleum Impacts to Groundwater*](#) in August 2016, specific comments from consultants and potentially liable parties (PLPs) indicate there is considerable interest in using these types of model remedies.

Currently, there are more than 2,800 leaking underground storage tank (LUST) sites in Washington State that have not completed cleanup. While almost 85% of these sites have started the cleanup process, many of them are more than 15 years old. This often means that progress has stalled, possibly due to lack of funding for property owners, or a change in ownership, or the number of steps needed to complete the MTCA process. Another 12% of these sites—more than 300—have not yet started work.

It is likely that many of these sites could benefit from using one of the 19 available model remedies. Ecology is hopeful that the selection of model remedies to address petroleum contamination will increase significantly during the 2017 construction season, and will continue to work with consultants and PLP's to promote the use of model remedies. Efforts will also be made to continue collecting data to further refine and develop model remedies.

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8.0. Conclusions and Next Steps

The four model remedies used to address arsenic and lead contamination within the Tacoma Smelter Plume allowed developers and property owners to better manage contaminated soil during site redevelopment. Similarly, significant progress has been made over the last three years in the development of model remedies for sites impacted by petroleum.

To ensure that model remedies provide useful options to streamline and accelerate the selection of cleanup actions, Ecology intends to complete the following actions over the next several years:

1. Explore options for additional model remedies. In 2017, Ecology will evaluate whether developing model remedies for other types of contamination would be beneficial by evaluating the ISIS database, consulting with regional Ecology Cleanup Project Managers, and seeking feedback from cleanup professionals.
2. Evaluate usefulness of existing model remedies. Once sufficient information becomes available, Ecology will seek feedback regarding the utility of model remedies. Comments will be gathered through listening sessions, statewide workshops, and the Model Remedies website.
3. Continue to solicit alternative model remedy proposals from qualified persons.
4. Announce results. Ecology will periodically post information on the [Model Remedies](#) webpage regarding the progress made to establish and utilize model remedies. This will include the number of sites and the corresponding acreage that was successfully remediated using model remedies.

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Appendix A:

MTCA Cleanup Regulation: Model Remedies (WAC 173-340-390)

WAC 173-340-390 Model remedies.

(1) **Purpose.** The purpose of model remedies is to streamline and accelerate the selection of cleanup actions that protect human health and the environment, with a preference for permanent solutions to the maximum extent practicable.

(2) **Development of model remedies.** The department may, from time to time, identify model remedies for common categories of facilities, types of contamination, types of media, and geographic areas. In identifying a model remedy, the department shall identify the circumstances for which application of the model remedy meets the requirements under WAC [173-340-360](#). The department shall provide an opportunity for the public to review and comment on any proposed model remedies.

(3) **Applicability and effect of model remedies.** Where a site meets the circumstances identified by the department under subsection (2) of this section, the components of the model remedy may be selected as the cleanup action, or as a portion of the cleanup action. At such sites, it shall not be necessary to conduct a feasibility study under WAC [173-340-350](#)(8) or a disproportionate cost analysis under WAC [173-340-360](#)(3) for those components of a cleanup action to which a model remedy applies.

(4) **Public notice and participation.** Where a model remedy is proposed as the cleanup action or as a portion of the cleanup action, the cleanup action plan is still subject to the same public notice and participation requirements in this chapter as any other cleanup action.

[Statutory Authority: Chapter [70.105D](#) RCW. WSR 01-05-024 (Order 97-09A), § 173-340-390, filed 2/12/01, effective 8/15/01.]

Appendix B:

Model Toxics Control Act: Establishment of Model Remedies and Reporting Requirements RCW 70.105D.030(1)(k) and (4)

RCW 70.105D.030(1) Department's powers and duties.

- (1) The department may exercise the following powers in addition to any other powers granted by law:
 - (k) Establish model remedies for common categories of facilities, types of hazardous substances, types of media, or geographic areas to streamline and accelerate the selection of remedies for routine types of cleanups at facilities;
 - (i) When establishing a model remedy, the department shall:
 - (A) Identify the requirements for characterizing a facility to select a model remedy, the applicability of the model remedy for use at a facility, and monitoring requirements;
 - (B) Describe how the model remedy meets clean-up standards and the requirements for selecting a remedy established by the department under this chapter; and
 - (C) Provide public notice and an opportunity to comment on the proposed model remedy and the conditions under which it may be used at a facility;
 - (ii) When developing model remedies, the department shall solicit and consider proposals from qualified persons. The proposals must, in addition to describing the model remedy, provide the information required under (k)(i)(A) and (B) of this subsection;
 - (iii) If a facility meets the requirements for use of a model remedy, an analysis of the feasibility of alternative remedies is not required under this chapter. For department-conducted and department-supervised remedial actions, the department must provide public notice and consider public comments on the proposed use of a model remedy at a facility. The department may waive collection of its costs for providing a written opinion under (i) of this subsection on a cleanup that qualifies for and appropriately uses a model remedy; and
 - (l) Take any other actions necessary to carry out the provisions of this chapter, including the power to adopt rules under chapter 34.05 RCW.

RCW 70.105D.030(4)

(4) By November 1, 2016, the department must submit to the governor and the appropriate legislative committees a report on the status of developing model remedies and their use under this chapter. The report must include: The number and types of model remedies identified by the department under subsection (1)(k) of this section; the number and types of model remedy proposals prepared by qualified private sector engineers, consultants, or contractors that were accepted or rejected under subsection (1)(k) of this section and the reasons for rejection; and the success of model remedies in accelerating the cleanup as measured by the number of jobs created by the cleanup, where this information is available to the department, acres of land restored, and the number and types of hazardous waste sites successfully remediated using model remedies.

[[2013 2nd sp.s. c 1 § 6](#); [2009 c 560 § 10](#). Prior: [2007 c 446 § 1](#); [2007 c 225 § 1](#); [2007 c 104 § 19](#); [2002 c 288 § 3](#); [2001 c 291 § 401](#); [1997 c 406 § 3](#); [1995 c 70 § 2](#); prior: [1994 c 257 § 11](#); [1994 c 254 § 3](#); 1989 c 2 § 3 (Initiative Measure No. 97, approved November 8, 1988).]

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