

WASHINGTON STATE
DEPARTMENT OF
E C O L O G Y

Terrestrial Environmental Evaluation Pilot Study Report

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**Department of Ecology
Toxics Cleanup Program**

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This report was prepared by Ecology staff to partially fulfill the recommendations of the MTCA Policy Advisory Committee (MTCA/PAC).

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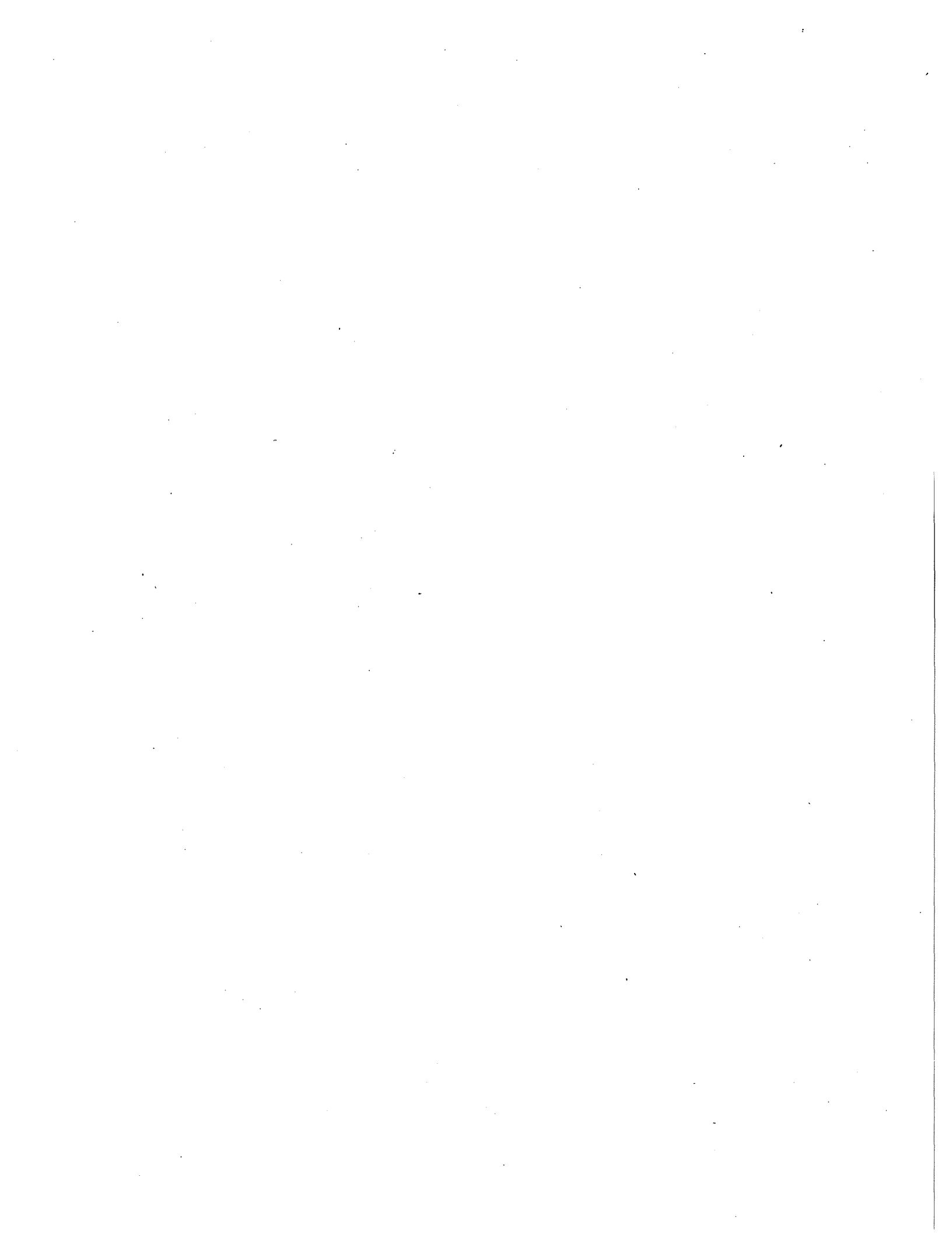


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The Dec. 14, 1998 version of the draft regulation WAC 173-340-7490 to -7494 used in the Pilot Study is available at http://www.wa.gov/ecology/tcp/regs/reg_main.html and can also be obtained from the Department of Ecology by calling Carol Esget at (360) 407-7224.



**Washington Department of Ecology
Toxics Cleanup Program**

Terrestrial Environmental Evaluation Pilot Study Report

Executive Summary

In December 1996, the Model Toxics Control Act Policy Advisory Committee (MTCA PAC) recommended that the Terrestrial Environmental Evaluation (TEE, tiered approach) draft rule provisions be pilot tested prior to formal public review of the draft MTCA rule revisions. Early efforts to solicit active sites for voluntary participation were unsuccessful. Input was then solicited from three groups to evaluate the draft rule. First, in 1998 four consultants and one corporate environmental professional (External TEE Pilot Study Group A) agreed to participate in evaluation of the TEE draft rule by applying the draft rule to up to 17 complex sites for which Remedial Investigation/Feasibility Study (RI/FS) information was available from Ecology files. This portion of the study was designed to evaluate usability and economic impact of the draft rule. The scope of the study and the questions in the External Reviewers Form for this evaluation were agreed upon by the pilot study participants and Ecology. Second, additional input was sought from a wider range of external public and private sector reviewers. Two responses were received, one from the Washington Department of Corrections and one from Bechtel-Hanford. These responses focused on usability. Third, to supplement this effort Ecology randomly selected Voluntary Cleanup Program sites submitted to Ecology for a one-and-one-half month period for internal review by Ecology VCP review staff. This portion of the study was designed to evaluate ease of use and comprehensiveness.

General conclusions: The basic process set forth in the draft rule is usable and is comprehensive enough to apply to the sites tested. External (Pilot Study Group A) evaluators agreed that the conceptual approach used in the draft rule is workable and provides a simpler approach to screening at most sites than the current EPA approach. Economic impact was difficult to estimate, but is estimated to be similar to or less than that for human health evaluation for the majority of sites, which are expected to qualify for primary exclusions or simplified evaluations. Complex, sensitive sites are expected to be similar to sites evaluated under the current EPA method. Most typical and some complex sites qualify for primary exclusions from the TEE, and many complex sites qualify for simplified evaluation or exclusions. More guidance is needed to clarify some parts of the simplified and site-specific evaluation sections. Although the basic process set forth in the draft rule was applied and tested by all groups, the site-specific evaluation methodology was not tested by reviewers on an actual site to develop cleanup levels or remedial action approaches. Some changes have been made in the draft rule language in response to input from reviewers.

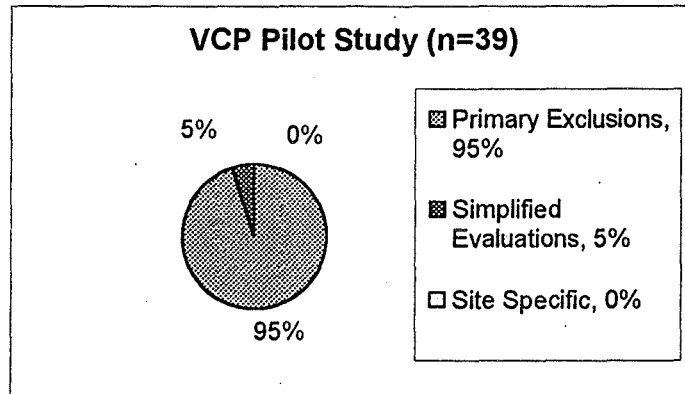


Figure 1

Results of evaluation of 39 randomly selected Voluntary Cleanup Program Sites selected from Ecology's four regional offices. Most of the sites qualified for at least one of the primary exclusions. None of the sites met the conditions requiring a Site-specific Evaluation, indicating that only a small percentage of MTCA sites is likely to require this type of evaluation; a larger sample would be required to estimate this percentage.

Terrestrial Environmental Evaluation Pilot Study Report

Introduction

One recommendation of the Final Report of the Model Toxics Control Act Policy Advisory Committee (MTCA-PAC) was that environmental risk-based cleanup standards be developed, written into rule and pilot tested prior to final release of the proposed MTCA rule revisions for formal public comment (Pages 30-32). This report documents the pilot study of the draft Terrestrial Environmental Evaluation rule and is designed to fulfill the above recommendation of the MTCA PAC.

Pilot Study Components

External Pilot Study Group A: Seven of seventeen Ecology-selected complex sites were evaluated by private sector participants instructed to use the draft rule as the basis for determining whether the sites would require simplified or site-specific environmental evaluation or would qualify for exclusions. Most reviewers had some risk assessment experience, although not all had extensive environmental (ecological) risk assessment training and/or experience. (See Qualifications and Experience submissions in Appendix D for more information.) This study was designed to evaluate the practicability and economic impact of the draft rule, based on the External Reviewers Form questions (see Appendix A), although three questions relating to ease of use and comprehensiveness were included in the form these participants were asked to complete. RI/FS documents were supplemented by site photos to test the draft rule on a non-random selection of complex contaminated sites. Evaluators determined that they would be unable to devote sufficient volunteer time to evaluate all seventeen sites due to workload considerations. Ecology provided photographs and site visit observations for five of the sites selected for evaluation. Two members of the group visited one site with Ecology during the

study. These sites are considered a highly biased sample, since an RI/FS are not normally completed for simple sites. The site set provided was of more complex, high priority, often larger sites. Most sites selected have previously had remedies selected, and many have cleanups complete. Use of these sites in this study was primarily for purposes of testing the draft rule, not to evaluate the need for further action at these sites. For a full listing of sites offered for draft rule study see External Study Results section (below) and Appendix B.

External Pilot Study Group B: Input was solicited from federal, state and local government agencies and private businesses by email, asking first whether they would conduct environmental evaluations in-house or retain a consultant. If they would conduct any part of the environmental evaluation (primary exclusions, simplified or site-specific evaluation) in house, they were asked to complete the appropriate portions of the External Reviewers Form. One response was received from the U.S. Department of Energy contractor at the Hanford Nuclear Reservation and one from the Washington Department of Corrections.

VCP Pilot Study: Thirty-nine sites were randomly selected from VCP submissions to be evaluated by regional Ecology VCP staff. The primary focus of this portion of the study was on ease of use and comprehensiveness, with attention to regulatory outcomes of the draft rule on typical sites. All VCP sites submitted between September 15, 1998, and November 1, 1998, at the Northwest Regional Office, and sites submitted to Ecology's Eastern Regional Office and Central Regional Office closest to that date period were evaluated. Site managers tested the sites against the primary exclusions, and, if the site did not qualify for exclusion, determined what level of evaluation was needed. See Appendix C.

I. Ease of Use and Comprehensiveness

In general, internal Ecology reviewers found the rule easy to understand and apply to the typical range of sites, especially with increasing experience. First evaluations usually took about an hour, subsequent evaluations generally required 20-30 minutes. Thirty-nine sites were evaluated. Of those, 37 (95%) qualified for exclusions and two (5%) required simplified terrestrial environmental evaluation. None required a site-specific terrestrial environmental evaluation (TEE). The sites included gas stations and a range of public and privately owned residential, commercial and industrial facilities. See Appendix C for a complete listing. External Pilot Study Group A generally found the primary exclusions easy to understand and experienced some difficulty coming to consensus on applicability of site-specific and simplified evaluation to several sites. Some of the difficulty arose from differing interpretations of what comprised the "site". External Pilot Study Group B indicated that the TEE process was easy to understand, although one reviewer indicated that their agency would use a consultant to conduct simplified or site-specific TEEs.

II. Practicability and Economic Impact

The short time required for evaluation by Ecology staff with no prior experience conducting primary exclusion evaluations indicates that the economic impact of this portion of the draft rule

is minimal in the context of VCP reviews, and that the draft rule is not particularly onerous or impracticable.

While several External Pilot Study Group A evaluators noted that the process for evaluation is different than the current EPA Method, most seemed to agree that the outcomes for sites evaluated were generally appropriate using the draft rule. Evaluators also generally agreed that the conceptual approach taken in the draft rule is valid and practicable. Several suggestions for additional refinements of definition, guidance needs and modification of rule language were suggested of this group. Issues raised by this group are set forth and discussed below. Differing interpretations of the draft rule under similar site conditions by External Pilot Study Group A indicates the need for guidance and training following finalization of the rule. There was some concern that too many sites might require site-specific evaluation because of adjacent land use (i.e., adjacent lands designated as lands managed for restoration, preservation or maintenance of native vegetation). External Pilot Study Group B indicated that while both would conduct the primary exclusions evaluation in-house, one would conduct the entire range of evaluations internally, the other would retain a consultant if a simplified or site-specific evaluation was required.

Conclusions: The draft rule seemed to be understandable and usable to all evaluators at the primary exclusions level. At the level of determining when a site-specific or simplified terrestrial environmental evaluation was needed, most evaluators were able to reach a conclusion, although some expressed uncertainty about some criteria. The need for additional guidance, and possible modifications to the tables and wording changes for clarity, were noted in sections applying to simplified and site-specific TEEs. External Pilot Study Group A was unable to reach consensus that any of the sites evaluated would require a site-specific evaluation. Reviewers did not apply the methodology of the site-specific evaluation to an actual site to develop site-specific cleanup levels or remedial action approaches, and were not intended to in the context of this study. Since the MTCA PAC recommendation was for pilot testing of the flowchart, and the elements of the flowchart are contained in the process of determining what level of evaluation is appropriate at a site, this pilot study does complete the recommendation of the MTCA PAC for pilot testing by studying the application of the rule to real-world sites.

PAC History

In 1995 the Washington legislature passed ESB 1810 directing Ecology to establish a Model Toxics Control Act (MTCA) Policy Advisory Committee (PAC). That group was to review, provide advice and develop recommendations about MTCA implementation.

The PAC identified the need to establish ecologically based cleanup standards as a priority action within a group of risk assessment issues. The PAC expressed the need for a "roadmap" for approaching environmental risk evaluation, including specific exclusion criteria that would help identify sites not requiring environmental evaluation early in the risk assessment process. This issue was identified as Priority Issue #4. The PAC recommended that a flowchart and guidance be completed by Ecology and be reviewed by the Science Advisory Board (SAB) and the PAC "and other interested parties". In addition, the PAC recommended that the final flowchart and

guidance be tested in a pilot project. The EcoRisk Subcommittee of the SAB participated extensively in review and revision of the TEE/Site Specific Evaluation draft rule sections, and concurred with the final draft. Participation was solicited for testing of the flowchart with very little or no response. Ecology did receive responses from volunteers after soliciting participation in a test of the draft (pilot) rule. This report addresses the process of pilot testing the draft rule and flowchart conceptual model by evaluation of 12 complex sites based on distribution, contaminant type, PLP type and possession of a completed RI/FS for the site, and the results of those evaluation processes. In addition, it includes evaluation of 39 Voluntary Cleanup Sites in a randomly selected block of VCP reports submitted to Ecology and input by two government agencies about how they would respond to the draft rule. The draft flowchart can be found on the Ecology internet site at http://www.wa.gov/ECOLOGY/tcp/mtca_gen/flow.ppt.

Work Plan and Study Design

The Pilot Study Work Plan is included in Appendix A as provided to the External Pilot Study Group A. Seventeen sites with RI/FS information or the equivalent were provided to the group. This portion of the study was focused on Usability and Economic Impact of the draft rule.

The first External Pilot Study Group A teleconference was primarily focused on conveying study principles and guidance to participants by Ecology staff.

First teleconference, November 24, 1998:

- This teleconference dealt with group process and strategy. Points made by Ecology were:
- The status quo for environmental evaluations does not have specific guidance under MTCA.
- The proposed MTCA rule amendments provide a systematic approach to evaluating potential environmental impacts due to the presence of contamination at a site that is based on the informal regulatory approach(es) used by the Toxics Cleanup Program now.
- The Terrestrial Environmental Evaluation Process (TEE) applies only to direct contact with soils at terrestrial sites.
- The pilot study (including the External Pilot Study Group A) is designed to respond to the PAC recommendation to pilot test the process/flowchart prior to seeking public comment on the draft rule.
- Evaluators were directed to focus on the questions in the study work plan and External Reviewer's Form provided to each reviewer with a copy of the draft rule and definitions, and extensive site RI/FS documents or the equivalent. Reviewers were also directed to avoid conducting a site-specific risk evaluation unless the group agreed that was an appropriate choice for a particular site.

External Pilot Study Group B was first asked whether they would use a consultant or conduct the TEE components themselves. If they would conduct a primary exclusions evaluation, a simplified evaluation or site-specific evaluations, they were asked to complete the appropriate parts of the External Evaluators Form (also in Appendix A). The focus of this portion of the study was also on Usability and Economic Impact.

The VCP Pilot Study was conducted by Ecology staff who normally conduct VCP reviews. Most staff had no previous experience conducting terrestrial environmental evaluations, but are site managers with some experience in implementing regulations. The focus of this portion of the study was on Ease of Use and Comprehensiveness, and to test the appropriateness of regulatory outcome(s) of the draft rule.

External Study Results

Seventeen sites were selected for the External Pilot Study Group A study. Criteria for selection included:

1. A completed Remedial Investigation/Feasibility Study or equivalent information was available for the site;
2. The sites collectively formed a reasonably representative sampling of complex sites from all parts of the state; contaminants at the sites were varied and representative of those found at complex sites; and
3. Sites were in a variety of land use settings.

The sites were: (underlined sites are those selected for evaluation by the group)

PS-1 Agricultural Industrial Supply in rural eastern Washington

PS-2 a former metal plating facility in urban eastern Washington

PS-3 a small commercial airport in rural eastern Washington

PS-4 a former electrical transformer rebuilding facility in urban eastern Washington

PS-5 a petroleum bulk plant in urban western Washington

PS-6 a large rail transfer siding in the mountains of rural western Washington

PS-7 a former metal recycling facility in urban western Washington

PS-8 a paper mill in urban coastal western Washington

PS-9 an abandoned coal mine/waste disposal facility in rural western Washington

PS-10 a closed upland landfill in urban western Washington

PS-11 a large shipyard in urban coastal western Washington

PS-12 a former auto salvage yard in suburban western Washington

PS-13 a natural gas metering/pump station in suburban eastern Washington

PS-14 an immersion cattle dip tank facility in rural western Washington

PS-15 a coastal rural landfill in western Washington

PS-16 a petroleum bulk plant in suburban eastern Washington

PS-17 a former petroleum bulk plant in suburban eastern Washington

Nine evaluators initially agreed to, and volunteered to, participate in the external pilot test. See Appendix D for information about reviewers in this group and participation. Two withdrew completely early in the process due to workload issues. Evaluators reached consensus at the first teleconference that it would not be possible to complete even screening evaluations of all seventeen sites in the three and one-half months available for review. All participants agreed to meet by teleconference every three-to-four weeks to discuss issues with the sites chosen for review during that period and to select additional sites for review during the next inter-meeting period. A total of seven sites were evaluated under the draft rule by the external pilot study Group A. Those sites are underlined in the list above. Of those sites, Ecology proposed one site

for a site-specific terrestrial environmental evaluation within the context of the pilot study. Evaluators chose not to conduct a TEE at the site because most of the site was a wetland, although part of the site was terrestrial. All other sites were screened for outcome only (see the four possible outcomes cited in the VCP Study section).

User input and Ecology Responses

Ecology responses appear in bold italics following user input.

First teleconference, November 24, 1998:

Reviewers selected PS-1 and PS-3 for review prior to the December 14 teleconference.

Second teleconference, December 14, 1998: Discussion focused on:

1. Since the pilot study was a volunteer effort in addition to evaluators' normal workload, limits on the number of sites evaluated were necessary.
○ Ecology acknowledges that evaluation of all 17 sites may not be possible because of workload considerations for the volunteer participants.
2. Site visits should be a requirement of the TEE process to assure that the evaluator is familiar with the site and can observe vegetative and habitat use factors. All reviewers agreed that these observations could not be made solely by evaluating documents.
○ Ecology concurs that a site visit by anyone performing a TEE should be a requirement of the process to properly evaluate site conditions and use by potential environmental receptors.
3. Evaluators recommended that there should be an avenue to bypass the environmental evaluation process when the appropriate remedial action is obvious and would clearly be protective based on reviewer's conclusions about site PS-1.
○ Ecology does not agree that an additional presumptive remedy off-ramp is needed. Since the exclusion in WAC 173-340-7491 encompasses the presumptive remedy (removal) suggested in all cases in which External Pilot Study Group A identified that need, an additional specific presumptive remedy exclusion is not needed, and would be redundant if added. Presence of or placement of a physical barrier is also recognized in the primary exclusions as a valid presumptive remedy. Further guidance may be provided following rule adoption.
4. Some evaluators felt that the portion of the site considered in the environmental evaluation should be more clearly defined, especially for large and/or mixed use sites.
○ Ecology does not agree that additional rule language to clarify what portions of a site must be considered in a TEE is needed. The existing statute and rule are quite clear that a site is comprised of all places where contamination resulting from release(s) of hazardous substances has come to be located. This definition has been adequate for the identification and remediation of over 3000 contaminated sites to date, and should continue to suffice for the foreseeable future for both human health and environmental evaluation of MTCA sites.

5. Recommend reconsideration of the scope of the "commercial" property/site definition, based on questions on site PS-3, e.g. some parts of the airport in PS-3 manage vegetation through intensive use of broad-spectrum herbicides, which obviates consideration of plants at such locations. Other parts of some commercial sites, even airports, may have areas of high habitat value, including plants.
 - *Commercial sites are excluded, with industrial sites, from the need to protect plants and soil biota by the provisions of draft WAC 173-340-7490(3)(b). Ecology has revised the section to exclude areas on a commercial or industrial site that must be vegetated to comply with local government planning requirements. Ecology also believes that guidance on use and interpretation of the definition of what comprises the site (see 4. above) will be helpful in resolution of this issue at some sites.*

Sites PS-6 and PS-7 were selected for evaluation in the next round at the end of this teleconference.

Third teleconference, January 6, 1999:

6. Site PS-7 was discussed. Reviewers agreed that primary exclusions did not apply, and that the site would require a site-specific evaluation if ten acres or more of native vegetation were present or a simplified evaluation if vegetation was predominantly non-native. One reviewer commented that their conclusion was reached based on personal experience (with environmental evaluation) not on the basis of the draft regulation.
 - *Ecology agrees that primary exclusions do not apply at PS-7. Ecology and two reviewers also discussed the issue of the basis for determining what level of evaluation should apply to this site during the on-site visit to this site. This highlights the need for a site visit recommended by reviewers in 2. above. It became clear during the site visit that the site would require a site-specific TEE, but on the basis of contiguous land managed for maintenance of native vegetation, not necessarily exclusively on the basis of the presence of native or semi-native vegetation on the site. The conclusion that a site-specific TEE would be required was reached based on rule language and observation of wildlife activity at the site. Not all reviewers were present and not all present agreed with this outcome.*
7. Site PS-6 was discussed. Reviewers agreed that if the parcel (sub-site) examined in detail in the report were taken alone, it would qualify for exclusions, but the site as a whole would require a simplified evaluation.
 - *Ecology agrees with the conclusion of the reviewers at this site (PS-6).*

External Pilot Study Group A meeting, March 16, 1999:

8. The reviewers present agreed that the conceptual approach used in the draft rule is workable and provides a simpler approach to screening at most sites than the current EPA approach. They expressed some concern about the number of sites that might require or be perceived to require a site-specific TEE on the basis of adjacent land managed for preservation, restoration or maintenance of native vegetation.

○ Ecology agrees that the approach is more systematic and offers a simpler evaluation alternative at many sites when compared to the traditional EPA approach to utilizing a site-specific approach at every site. Ecology does not share the concern of reviewers that large numbers of sites will require site-specific TEEs. (See VCP Pilot Study results). Some reviewers felt that the criteria which requires a site-specific TEE where exposure potential for environmental receptors exists on the basis of proximity to land managed for restoration or maintenance of native or semi-native vegetation would draw a large number of sites into the site specific TEE. They felt that some sites that would be included by this criterion should qualify for primary exclusions or a simplified evaluation, and that the volume of these sites requiring a site-specific TEE would overwhelm Ecology's ability to respond to the workload. Ecology notes that a site would not be drawn into the site-specific TEE on the basis cited above if it did qualify for a primary exclusion, because it would never reach the evaluation point at which adjacent land use is considered. The requirement to consult Ecology for sites where a site-specific TEE is to be conducted would assure that sites inappropriate under the rule for evaluation at that level would not be permitted to continue.

9. The PS-15 site was discussed. There was consensus that the site qualified for primary exclusions because it was not a terrestrial site.

○ Ecology proposed PS-15 as a test case for the site-specific TEE, recognizing that significant portions of the site qualify for wetlands designation. Reviewers felt that, because of the presence of wetlands, this site was not appropriate for application of the TEE process and did not evaluate it for that reason. (One reason Ecology chose this site was because the terrestrial ecological risk assessment conducted by EPA at this site was very similar to the way the MTCA site-specific TEE would be conducted.)
10. Reviewers asked for clarification about when or if the TEE process applies to seasonal or permanent wetlands, either considering them as terrestrial habitat or as adjacent areas being maintained or restored to native or semi-native vegetation.

○ Ecology agrees that further clarification of what constitutes a terrestrial environment with regards to seasonal or temporary wetlands is appropriate. Ecology intends to address this in post-promulgation guidance.
11. Reviewers asked that additional guidance be provided in the remedy selection section of the rule to guide the inclusion of environmental considerations in selection of remedy.

○ Ecology has modified the remedy selection section to aid in the inclusion of TEE considerations in selection of remedy. The need for post-promulgation guidance is being considered by Ecology.
12. Reviewers expressed uncertainty about whether Ecology would interpret the rule at a particular site in the same way evaluators would, since no site was subjected to the site-specific process. There was concern that as consultants they might not be able to provide adequate guidance to their clients given this lack of certainty. This also left the group feeling they lacked proof that the site-specific process will work since they did not specifically test it.

○ *Ecology acknowledges and understands the uncertainty of the reviewers. Site PS-15 was provided, but not used, in order to compare the reviewers approaches based on the rule language with the EPA ecological risk assessment actually conducted at the site. Pilot study participants' comments are helpful in identifying areas where guidance is needed. Ecology has sought to balance comments on earlier drafts expressing concern about the length of the TEE sections with the need to include sufficient detail to make the draft rule understandable and usable. Ecology intends to provide guidance to further assist the public, regulated community and consultants in interpreting the rule after it is promulgated, and further anticipates that differences in interpretation will be ongoing, as has been the case with the MTCA rule, and environmental rules in general. The site-specific evaluation process was extensively reviewed by the EcoRisk Subcommittee of the MTCA Science Advisory Board, and the approach and detail found sound by that group.*

13. Some reviewers felt that the petroleum numbers should be removed from the tables, since the numbers are not derived in the same rigorous manner as other risk-based values in the tables. They cited Les Williams' work as a possible basis for including risk-based values.
- *Following issuance of the December 14, 1998 draft regulation which was used by reviewers in this Pilot Study, Ecology completed work on a risk-based approach for deriving petroleum values. This approach draws on the work conducted by Les Williams for the Policy Oversight Group (POG) and has been reviewed by the Science Advisory Board. The values in the revised draft are now based on this risk-based approach.*
14. Some reviewers felt that more clarity was needed regarding what we are protecting (e.g., see 9. above, as well as aquatic birds that venture onto land at a site, transient or migrating animals or birds, etc.).
- *Ecology acknowledges the uncertainty of reviewers (see 12. above). Ecology feels the rule is clear in stating the need to protect ecological receptors from significant adverse effects due to hazardous substance contamination in terrestrial soils. The draft rule clarifies that in industrial or commercial settings, only wildlife will be protected, excluding plants and ecologically important functions of soil biota that affect plants or wildlife, while all three will be protected in other settings. The rule is also clear that species of special concern (threatened and endangered species, etc.) must be protected as individuals, other species are to be protected at the population level. Finally, the rule states that "these procedures are not intended to be used to evaluate potential threats to ecological receptors in sediments, surface water or wetlands". This means, for example, that receptors such as aquatic plants, fish or marine mammals that are unlikely to be directly exposed to terrestrial soil are not considered in this process.*
15. Some reviewers felt there might be some conflict or inconsistency between the considerations of "undeveloped land" and "land maintained or restored to native or semi-native vegetation".
- *Ecology believes that guidance clarifying the underlying purposes which lead to the use of these terms in the rule will be helpful in alleviating these concerns.*

16. Reviewers asked for clarification on reporting requirements, i.e., when must PLPs or others report conditions or changes in site conditions, released discovery, notification to Ecology, etc.
- *While Ecology will provide additional guidance after the rule is promulgated, basic reporting requirements under MTCA are unchanged by the Terrestrial Environmental Evaluation additions to the rule. For example releases to the environment that may pose a threat to human health or the environment must be reported to Ecology either when discovered or in a simultaneous report of release and remediation within ninety days. Because some cleanup or screening levels are lower for environmental receptors than for human health considerations, the level of contamination that triggers reporting may be lower in some instances. Reports submitted to Ecology through the normal release reporting channels will be properly routed internally by Ecology complaint tracking and site management/investigation staff.*
17. Reviewers indicated that they felt they had insufficient guidance to know how to proceed at a site where there are Threatened or Endangered Species or Species of Special Concern. They asked if a TEE should continue even if screening level contaminant values were not exceeded, since most sites are evaluated for population level responses or risks, not individual level responses/risks.
- *Ecology will provide guidance on a case-by-case basis on how to proceed at a site where threatened or endangered species are a consideration. Since this threatened or endangered species issue has not driven cleanup in MTCA ecological risk assessments to date at a cleanup site, it is believed to be a low-probability event. The presence of Threatened or Endangered, or a state-listed species, requires protection of the individual thus the use of the site-specific TEE, and development of a scope of evaluation in consultation with Ecology.*

Responses to the External Reviewers Forms

Responses to the External Reviewers Forms are summarized in Appendix B. Not all reviewers responded to all questions. Issues raised in the forms that were brought to the teleconferences or meetings are not repeated in this section.

1. In response to question 1 b., asking if the simplified evaluation helps select a remedial option if a cleanup is required, two reviewers answered "No". The process focuses on site conditions, contaminants of concern concentrations and (exposure) pathways, not on remedial alternatives.
- *The cited focus on contaminants of concern and exposure pathways is, in Ecology's opinion, critical to evaluating the effectiveness of remedial action alternatives, i.e., if a proposed remedial action does not address the contaminants of concern and exposure pathways, it is insufficient.*
2. Reviewers note in response to question 4, asking if a previously selected (human health) remedy was adequate when a TEE was applied to the site, that on at least three sites

where environmental evaluations would be required (PS-7, PS-9, PS-3) human health remedial actions drove previous remedies that would also be protective of or remove most or all risk to environmental receptors. Since at least two additional sites qualified for primary exclusions, it would seem that the need for additional work to satisfy TEE requirements above and beyond human health requirements would be small at most sites.

○ *Ecology agrees with the conclusion of reviewers, but acknowledges that human health remedies may not be sufficient to address environmental cleanup needs at all sites. This is particularly true where remediation levels that are protective of human health are above the levels needed to protect ecological receptors.*

3. Two evaluators responded to question 10, asking about the likely cost to satisfy TEE. They concluded that costs would be minimal at most sites, and predicted minor to significantly increased costs at PS-7.

○ *Ecology agrees with comments in response to Question 10, which indicate the opinion of reviewers that additional economic burdens posed by the need to conduct a TEE are minimal at most sites.*

4. In response to question 3, asking when use of screening levels as cleanup standards would be recommended, two reviewers responded. They indicated that where areas of contamination are small and/or when there is economic or public relations advantages, or when human health levels are lower, they would recommend that screening levels be used as cleanup levels.

○ *Ecology agrees with reviewer responses to Question 3 indicating that there are conditions under which it would be advantageous to use the screening levels in the regulation as remediation levels. However, the rule language has been revised to emphasize that the use of Table 8 values as cleanup levels is not a requirement and is solely at the discretion of the person conducting the site-specific evaluation.*

5. In response to question 5, asking the cost of conducting a TEE, one reviewer indicated that the cost would be greater only at PS-7, the other that the cost would be uncertain where a site-specific approach was required.

○ *Ecology agrees with reviewer responses to Question 5 indicating that costs for conducting a TEE under the draft regulation could be more at one complex site (PS-7), lower at simple sites. One comment suggests the cost difference would be difficult to estimate if the site-specific approach is selected or required. In this case costs could be determined only after conferring with Ecology. The implication is that Ecology determinations could affect costs.*

6. In response to question 6, asking what the cost of conducting a TEE would be compared to conducting a human health evaluation, the two reviewers who responded indicated the TEE cost would be similar to or less than (for simple sites) the cost of conducting a human health evaluation at a site.

○ *Reviewers responding to Question 6 indicated that the cost of a TEE would be similar to or less than (for simple sites) that to conduct a human health evaluation. Ecology believes, based on the time required for evaluation by external reviewers and VCP reviewers, that costs will be minimal at most sites. Reviewers familiar with the*

draft regulation generally required 20 minutes to one hour to conduct a primary exclusions evaluation. The VCP pilot study of typical sites indicates that the vast majority (90% in the VCP Pilot Study) of typical sites will require only that level of evaluation. In the External Pilot Study (Group A) over half of the sites were determined by one or more reviewers to qualify for primary or simplified exclusions. These results indicate that most typical sites and many complex sites will qualify for exclusions either in the primary exclusions or simplified evaluation level, thus a minimal regulatory burden will be associated with TEE at most sites.

7. In response to question 7, asking if the rule provided clear guidance on how to proceed with a food web analysis, the sole reviewer to respond said the process was well defined, the need to work with Ecology was clear, but documentation/reporting requirements should be clarified and “who” to contact was unclear.
 - *Ecology concurs with the response of the sole reviewer to question 7. who indicates that the rule provides clear guidance on how to conduct the food web analysis, the process is well defined, and the need to work with Ecology is clear. (The reviewer felt that additional guidance on reporting requirements, and who to contact, should be clarified. See 16. above in discussion issues for the Ecology response to this issue.)*

8. In response to question 8, asking if the TEE produces results that help evaluate cleanup action alternatives and/or select a remedy, one reviewer said the TEE indicates when action is needed, but doesn’t help establish cleanup levels. The second reviewer that responded to this question said the TEE should be helpful in evaluating adequacy of remedial action alternatives, but may be of limited value in determining if a remedial action is required.
 - *Ecology agrees with reviewers that the draft rule is helpful in evaluating remedial alternatives, as indicated in responses to question 8. One reviewer points out that the draft rule does not establish cleanup levels. This is intentional. The draft rule is designed to identify sites that need further evaluation or remediation, and to present a process for the development of cleanup (remediation) levels appropriate to the site conditions and PLP needs. Another reviewer feels that the draft rule may be of limited value in determining if a remedial action is needed. Ecology disagrees with this comment. If a site requires a simplified TEE, the options in the rule are clear. The PLP may use the simplified screening values as a remediation level or elect to conduct a site-specific evaluation. If a site-specific TEE is required or chosen as the best alternative by the PLP, the process for developing a site-specific scope and remediation levels in consultation with Ecology are also clear (see 7, immediately above).*

9. In response to question 9, asking if the draft rule/TEE provide the information needed to evaluate the environmental risks posed by a site to populations, the sole respondent to respond directly to this question said the draft rule does not directly address (provide numerical values for) population-level effects, and indicates that this limitation of the rule should be more clearly stated. She/he highlights the difficulty of making inferences or drawing conclusions about population effects from individual effects data. A second

reviewer responded to this question in responses to question 11, where the need was also raised by that reviewer to clarify the means of determining population-level effects.

○ *The draft rule provides numerical values for soil concentrations in Tables 7 and 8 that are based on population-level effects. Except for species where individuals are protected (e.g., threatened or endangered species), impaired reproduction, growth or survival are significant adverse effects. These are considered population-level effects. In practice this means that adverse health effects such as endocrine disruption or tissue contamination would not require any remedial action unless they can be linked to impaired reproduction, growth or survival.*

10. In response to question 11, asking if any technical problems are foreseen with the draft rule, the following responses were received:

A. Greater clarity about dealing with future land use should be included in the rule.

○ *Land use affects the ecological receptors to be protected. For industrial or commercial settings, only wildlife is protected, excluding plants and ecologically important functions of soil biota that affect plants or wildlife, while all three are protected in other settings. To qualify for the industrial or commercial category, the rule states that the property must be currently zoned as industrial or commercial. This precludes consideration of future zoning changes, which are beyond the control of Ecology or the PLP. A further requirement relates to whether the property is actually used for industrial or commercial purposes. If a PLP is not using the property for either of these purposes, but proposes to do so in the future, the rule states that "any terrestrial remedy...shall include a completion date for such future development acceptable to the department." In practice, this means that Ecology will want evidence that the future land use change will take place and within a reasonable time frame.*

B. The PAC preference for remediation over evaluation is not clearly expressed in the draft rule.

○ *It is Ecology's goal to proceed as expeditiously as possible to final remediation at all sites, including sites where a TEE is required, provided there is good scientific grounding of site evaluation(s) and decisions, and consistency with statutory and regulatory requirements. RCW 70.105D.010(4) explicitly states the interest in cleaning up contaminated sites well and expeditiously, and as an overarching principle embedded in the enabling statute, extends to the regulation in all its parts, including those governing TEEs. Ecology believes that the process provides a reasonable balance between the need for expeditious cleanup and the preference of representatives from regulated interest groups for flexibility in selecting TEE options.*

C. What a significant population effect is in the context of the rule should be stated more clearly.

○ *Please see 9. immediately above. An exposure pathway to a chemical that is expected to impair reproduction, growth or survival in protected species is*

considered to be evidence of a population effect unless the site qualifies for an exclusion. This is encompassed in the definition of a significant adverse effect.

- D. Small insignificant sites near undeveloped areas could be directed to site-specific evaluation under the draft rule.
- *When the scope of evaluation for site-specific TEEs is developed in consultation with Ecology, the problem of sites being inappropriately drawn into the site-specific TEE process should not be an issue. Ecology has the discretion to allow a simplified evaluation per 7493(2)(d)(ii).*
11. In response to question 12. a., asking for suggestions for making the rule easier to use, the following responses were received:
- A. Clarify whether riparian areas, creeks and wetlands protected for their habitat value should be considered in TEEs.
- *Any adjacent area that is managed to maintain or restore native or semi-native vegetation, and which otherwise meets the criteria in the regulation, would be included in considering whether a site-specific TEE is required. Note that the wording of this section (173-304-7491(2)(a)(i) also includes locally designated sensitive areas, which usually explicitly includes stream corridors, wetlands and water bodies. To focus too narrowly on "management or land use will maintain or restore areas of native or semi-native vegetation" may blind the evaluator to other land use or property designations with the same regulatory requirement. Ecology expects that some of the uncertainty in interpreting the rule language on this and other issues will be alleviated by clarifying the purpose of the regulatory requirements and criteria in supplemental guidance.*
- B. Clarify definition of "site", Area of Contamination, "facility" and how adjacent lands evaluation relates to TEEs.
- *See 4. Above, in (External Pilot Study Group A responses)*
12. In response to question 12 b., soliciting suggestions for guidance or supplemental assistance materials, one reviewer asked for additional guidance on how to deal with sites where future land use is uncertain and may be different from zoned use or historic use.
- *See response to 8.A. above.*
13. Responses to questions 13-15, asking how many sites were determined to qualify for primary exclusions, simplified evaluation, simplified exclusions or site-specific evaluation, responses are summarized in the table below.
- *The divergence of outcomes in external reviewer's decisions about the sites evaluated indicates the need for supplemental guidance on the draft rule sections regarding TEEs. The concern that Ecology might not agree with reviewer's choices may have some basis in the reviewer's collectively different opinions and choices. Obviously Ecology cannot agree with all reviewers in all cases. However, guidance (with flowcharts) and workshops should be helpful in promoting consistency. This approach also responds to the Ecology, internal reviewer's observation that it is*

sometimes difficult to track which exclusion applies to what stage of evaluation. Also see 14. above.

EcoRi Pilot Study Summary

Site #	Site Name	Primary Exclusions	Site Specific	Simp. Exclusions	Simplified Evaluation
PS-1	Western Farm Service	XE-3		XE-4, XE-6	XE-1, XE-2
PS-3	Martin Airfield	XE-4, XE-6	XE-2		XE-1
PS-7	Sternoff Metals/Renton	XE-4	XE-1, XE-2		
PS-9	Landsburg Mine	XE-1**, XE-4	XE-2, XE-3		
PS-11	Foss Shipyard	XE-1, XE-2, XE-3, XE-4			
PS-12	Jensen Property Parcel 6	XE-3		XE-2	XE-1*, XE-4*
PS-15	Tulalip Landfill ¹				
Notes	¹ Site not terrestrial	**if done at FS stage			*Parcel alone qualifies, whole site does not

Table 1: External Pilot Study Group A reviewer conclusions about site status under the draft rule
 Note: Not all reviewers participated in all site evaluations. See summary spreadsheet for reviewers' decision basis.

VCP Study Results

Voluntary Cleanup Program sites were selected for pilot study evaluation by choosing a block of time in which sufficient reports were received by Ecology to provide meaningful data (i.e., provide a large sample). VCP sites were selected because they generally represent sites typical of those submitted to Ecology for evaluation, and are generally a typical representation of the range of site types on Ecology's Confirmed and Suspected Contaminated Sites List. Sites within the sample group included sites owned by local governments, utilities, private sector corporations and private individuals. Facility types included gas stations, commercial mall properties (mixed use), gas and electric generation plants, hotels, a foundry, a restaurant, residential properties, several industrial services and equipment suppliers and a hospital. Sites were located in a variety of urban, suburban and rural settings both adjacent to and distant from surface waters, in both eastern and western Washington. Contaminants included petroleum of various types, chlorinated and non-chlorinated solvents, metals and pesticides/wood preservatives. Sites were evaluated on the basis of VCP Site Summary Reports/Applications, characterization and remediation reports submitted by PLPs and, in most cases, a site inspection or Initial Investigation by Ecology staff member. The majority of sites were evaluated by the Ecology staff person responsible for the VCP review of the site. For that reason, the results are likely to fairly accurately predict regulatory outcomes for the draft rule sections pertaining to Terrestrial Environmental Evaluation (TEE). Ecology staff conducting the evaluations were unfamiliar with the TEE process, thus making this phase of pilot testing an evaluation of the ease of use of the draft rule by persons unfamiliar with the rule. The evaluation consisted of

determining what outcome would result for each site evaluated on the basis of the draft rule. Possible outcomes are: Site qualifies for primary Exclusions; Site requires a Site-specific Evaluation; Site qualifies for exclusions under the Simplified Evaluation section; and Site requires a Simplified Evaluation. No attempt was made to conduct either Simplified or Site-specific Terrestrial Environmental Evaluations. Evaluation at this level initially required about .5 to 1 hour per site as evaluators became familiar with the rule and definitions. After the evaluator had become familiar with the process, most sites could be evaluated to the level of determining what action was appropriate in about .3 to .5 hours. On this basis, it seems reasonable to conclude that the regulatory burden posed by the proposed regulation pertaining to Terrestrial Environmental Evaluation at the majority of sites is *de minimus*, on the order of adding an additional 20 minutes to one hour to the overall site evaluation time.

User input: The primary comment made by Ecology internal reviewers was that tracking which part of the regulation applies to which primary, simplified or site-specific exclusion was somewhat difficult. It is anticipated that a worksheet in guidance documents would remedy this complaint, especially as users become more familiar with the rule. All Ecology reviewers found the primary Exclusions fairly easy to understand and apply. The scoring table (Table 6) was noted to facilitate primary Exclusion determination. It was noted that many VCP reports do not contain sufficient information to perform a TEE absent supplemental information. Report information was supplemented by site knowledge and site visit observations.

Proposed guidance.

In the context of the pilot study external reviewers and Ecology staff involved requested guidance or additional information on several parts of the draft rule. Ecology intends to provide the following elements in guidance documents and/or workshops after adoption of the finalized MTCA regulations, pertaining to TEEs:

- Exclusions Worksheet with guidance and examples
- Relevance of presumptive remedies to TEEs and associated remedial actions
- Relevance of contiguous lands managed for maintenance or restoration of native or semi-native vegetation
- Guidance and examples for petroleum standards in TEEs
- Inclusion of TEE considerations in selection of remedy
- References, guidance and examples for evaluating habitat quality
- Contaminants for which release reporting would be triggered for environmental reasons that might not be reportable based on human health criteria.
- Guidance on simplified and site-specific TEEs, including the food web model

Study Outcome Conclusions

The proposed Terrestrial Environmental Evaluation process in the draft rule provides a structured approach to determining whether a threat to the environment exists at a site. This was the goal of the PAC recommendation. Based on the input of reviewers, the draft TEE portions of the rule are usable and understandable for the most part. Modifications based on user input has been incorporated in the remedy selection section and in several places in the TEE sections of the draft rule to make the draft rule easier to use and understand. All reviewers were able to easily use

and understand the Primary Exclusions section. At most sites, the additional time and economic burdens are minimal, with 95% of typical sites qualifying for primary exclusions (formerly termed off-ramps). Ecology will evaluate reviewer requests to develop guidance that provide to PLPs, Ecology staff, consultants and the public additional information to make using and understanding the TEE process easier, and interpretations of the rule more consistent. The Pilot Study process has been completed with input from as broad a cross-section of participants as possible per PAC recommendations and completion occurred before formal public review of the draft MTRA rule amendments. Internal and external reviewers were very helpful in identifying rule refinements that were needed and where future guidance may be helpful.

Appendix A

External Pilot Study Group A Review Work Plan Pilot Study Materials Packet & Form

Ed. Note: This is the work plan provided to External Pilot Study Group A.

PRACTICABILITY AND ECONOMIC IMPACT

For this part of the Pilot Study, please read the proposed rule (sections 7490-7494; definitions from section 200) and the information provided on the case study sites. Then provide a response to the bullet questions below.

Assumptions: Unless a PLP chooses to conduct a voluntary cleanup without consulting with Ecology, it is expected that a Site-specific Evaluation (7493) will be planned with the advice and concurrence of the Department. As you consider how you would conduct a site-specific evaluation at a case study site, you may need to make some assumptions regarding Ecology's contributions to the planning. Areas where discussions with Ecology would be important include, for example, a proposal to use the Simplified Evaluation instead of the Site-specific Evaluation; a proposal not to proceed with a Site-specific Evaluation because there is already sufficient information to proceed with remedy decisions; developing a site-specific Problem Formulation; or developing an approach for addressing issues raised in the Problem Formulation.

For the Simplified Evaluation (7492), you will need to assume that Ecology will provide you with methods and criteria if you choose to conduct soil bioassay testing [see 7492(2)(c)(ii)].

Pilot Study Questions for Reviewers.

- ◆ If your site qualifies for a simplified evaluation, does the procedure give you an answer on whether you need to conduct a cleanup action? If a cleanup is needed does the simplified evaluation help in choosing a cleanup action alternative to evaluate? If not, what was the problem?
- ◆ If your site qualifies for the site-specific evaluation, does the problem formulation step help in ensuring that the evaluation will be focused on selecting a cleanup action alternative? If not, why not? What information is needed in the problem formulation step that would help to select a cleanup action alternative?
- ◆ Under what circumstances would you recommend that a screening level be used as a cleanup level and forgo the opportunity to develop a site-specific cleanup level?
- ◆ Does the terrestrial evaluation indicate that a previously chosen remedy (if there is one) was adequate or would another remedy have been more appropriate?
- ◆ What is the cost of conducting the appropriate terrestrial ecological evaluation relative to the existing terrestrial ecological evaluation approach under the Model Toxics Control Act?
- ◆ What is the cost of conducting the appropriate terrestrial ecological evaluation relative to a human health evaluation under the Model Toxics Control Act?
- ◆ If you decided that a site-specific food web analysis was an appropriate approach for any of the case studies you reviewed, were you able to decide from the rule language how to proceed?
- ◆ Does the proposed terrestrial ecological evaluation process allow you to get results that can be used to evaluate the effectiveness of cleanup action alternatives and to facilitate the selection of a remedy for the site?
- ◆ How well does this rule/process provide information you need to evaluate if a site does/does not pose a significant adverse effect to populations of ecological receptors?
- ◆ Based on the draft rule, what are the likely investigation/evaluation/remediation costs to satisfy the ecological risk?
- ◆ Are there any specific technical problems that you foresee with the rule?

- ◆ Do you have any suggestions on how the rule could be improved to make it easier to use? Do you have any suggestions for guidance or other types of supplementary assistance?
- ◆ How many of the sites you reviewed were eliminated based on the exclusions in 7491?
- ◆ How many of the sites you reviewed were eliminated based on the exclusions in 7492?
- ◆ How many of the sites you reviewed ended up in 7493 (Site-specific evaluation)?

(Since this is not a random selection of sites, answers to the last three questions should not be misinterpreted to make generalizations about the number of MTCA sites expected to fall in each of these categories. A separate analysis of randomly selected sites is being conducted under the Ease of Use and Comprehensiveness part of the Pilot Study.)

Ed. Note: Definitions provided to External Pilot Study Group A

NOTE: The following includes only the definitions relating to 173-340-7490 through 7494. Contact Curtis Dahlgren (360-407-7494) if you need the complete set of definitions.

WAC 173-340-200 Definitions For the purpose of this chapter the following definitions shall apply:

"Area background" means the concentrations of hazardous substances that are consistently present in the environment in the vicinity of a site which are the result of human activities unrelated to releases from that site.

"Commercial property" means properties that:

- Are currently zoned for commercial property use;
- Are characterized by or are committed to traditional commercial uses such as offices, retail and wholesale sales, professional services, consumer services and warehousing; and
- Are characterized by the ground being mostly covered by buildings, paved roads and parking lots, sidewalks and plazas, hard surfaced storage areas, and similar areas limiting access to soil by humans and wildlife.

"Environment" means any plant, animal, natural resource, surface water (including underlying sediments), ground water, drinking water supply, land surface (including tidelands and shorelands) or subsurface strata, or ambient air within the State of Washington or under the jurisdiction of the State of Washington.

"Exposure" means subjection of an organism to the action, influence, or effect of a hazardous substance (chemical agent) or physical agent.

"Exposure parameters" means those parameters used to derive an estimate of the exposure to a hazardous substance.

"Exposure pathway" means the path a hazardous substance takes or could take from a source to an exposed organism. An exposure pathway describes the mechanism by which an individual or population is exposed or has the potential to be exposed to hazardous substances at or originating from a site. Each exposure pathway includes an actual or potential source or release from a source, an exposure point, and an exposure route. If the exposure point differs from the source of the hazardous substance, the exposure pathway also includes a transport/exposure medium.

"Industrial properties" means properties that are or have been characterized by, or are to be committed to, traditional industrial uses such as processing or manufacturing of materials, marine terminal and transportation areas and facilities, fabrication, assembly, treatment, or distribution of manufactured products, or storage of bulk materials, that are either:

- Zoned for industrial use by a city or county conducting land use planning under chapter 36.70A RCW (Growth Management Act); or

- For counties not planning under chapter 36.70A RCW (Growth Management Act) and the cities within them, zoned for industrial use and adjacent to properties currently used or designated for industrial purposes.

(See WAC 173-340-745 for additional criteria to determine if a land use not specifically listed in this definition would meet the requirement of "traditional industrial use" and for evaluating if a land use zoning category meets the requirement of being "zoned for industrial use.")

"Lowest observed adverse effect level" or "LOAEL" means the lowest concentration of a hazardous substance at which there is a statistically or biologically significant increase in the frequency or severity of an adverse effect between a population and a control group.

"Native vegetation" means any plant community native to Washington as described in *Natural Vegetation of Oregon and Washington*, J. F. Franklin and C. T. Dyrness, Oregon State University Press, 1988, or other scientific botanical publications approved by Ecology.

"Natural background" means the concentration of hazardous substance consistently present in the environment which has not been influenced by localized human activities. For example, several metals naturally occur in the bedrock and soils of Washington due solely to the geologic processes that formed these materials and the concentration of these metals would be considered natural background. Also, low concentrations of some particularly persistent organic compounds, such as polychlorinated biphenyls (PCBs), can be found in surficial soils and sediment throughout much of the state due to global use of these hazardous substances. These low concentrations would be considered natural background. Similarly, concentrations of various radionuclides, present at low concentrations throughout the state due to global distribution of fallout from bomb testing and nuclear accidents, would be considered natural background.

"No observed adverse effect level" or "NOAEL" means the exposure level at which there are no statistically or biologically significant increases in frequency or severity of adverse effects between the exposed population and its appropriate control; some effects may be produced at this level, but they are not considered to be adverse nor precursors to specific adverse effects.

"Semi-natural vegetation" means a plant community that includes at least some plant species native to Washington State. Examples of vegetated areas not considered semi-native vegetation include areas planted for ornamental or landscaping purposes, cultivated crops, and areas significantly disturbed and predominantly covered by noxious, non-native exotic plant species or weeds (e.g., scotch broom, Himalayan blackberry or knap-weed).

"Soil" means a mixture of organic and inorganic solids, air, water, and biota which exists on the earth's surface above bedrock, including materials of anthropogenic sources such as slag, sludge, etc.

"Soil biota" means invertebrate multi-cellular animals that live in the soil or in close contact with the soil.

"Surface water" means lakes, rivers, ponds, streams, inland waters, salt waters, and all other surface waters and water courses within the State of Washington or under the jurisdiction of the State of Washington.

"Terrestrial ecological receptors" means plants and animals that live largely or entirely on land.

"Threatened or endangered species" means species listed as threatened or endangered pursuant to the Federal Endangered Species Act 16 USC Section 1533 or classified as threatened or endangered by the State Fish and Wildlife Commission under WAC 232-12-011(1) and WAC 232-12-014.

"Wetlands" means lands transitional between terrestrial and aquatic systems where the water table is usually at or near the surface or the land is covered by shallow water. For the purposes of this classification, wetlands must have one or more of the following attributes at least periodically: the land supports predominantly hydrophytes; the substrate is predominately undrained hydric soil; and/or the substrate is nonsoil and saturated with water or covered by shallow water at some time during the growing season each year.

"Wildlife" means any non-human vertebrate animal other than fish.

**MTCA Terrestrial Ecological Evaluation for Soil Contamination
Pilot Study External Reviewer's Form**

Name of person completing this form: _____

Company or employer: _____

Telephone number: (____) _____

Name of site: _____

Please check any of the following that apply to the site:

- Voluntary site cleanup
- Formal Ecology involvement (Consent Decree, Agreed Order, etc.)

Type of site:

- Underground petroleum storage tank Other industrial or commercial site
- Neither of the above

Site Description:

General location of property (e.g., city or region) _____

General Setting (e.g., rural, urban, industrial) _____

Approximate size of property _____ acres (1 acre = 43,560 sq. ft. A circle with a diameter of 235.5 ft. has an area of 1 acre.)

Size of area of contamination _____ (identify as square feet or acres)

What is the land used for (e.g., commercial, residential, industrial, agricultural, recreational)

Vertical extent (i.e., depth) of contamination _____ (ft.)

What types of contaminants are present (e.g., metals, volatiles, pesticides, PCBs, TPH)

A. Exclusions:

Does the site qualify for an exclusion from a terrestrial ecological evaluation? [WAC 173-340-7491]
() Yes () No

If you answered yes, which exclusion applies to the site? (You may check more than one of the following. However, if any one of these exclusions applies to your site you need not evaluate the site for other exclusions.)

- () Soil contamination is, or will be, six feet below ground surface.
- () Soil contamination is, or will be, covered by an exposure barrier.

Type of barrier: _____

- () Less than 1.5 acres undeveloped land (or 0.25 acres, if listed chemicals present.)

If you checked one or more of these boxes, go to Part D. Otherwise, go to Part B.

B. Is a site-specific evaluation required? () Yes () No
(Applies only if you answered no in Part A.)

If you answered yes, which condition requiring a site-specific evaluation applies to the site? [WAC 173-340-7491] (You may check more than one of the following.)

- () Land use plans will maintain or restore native or semi-native vegetation (e.g., greenbelt).
- () Threatened, endangered or other species of concern*.

What species are you basing this decision on?

-
- () Ten or more acres of native vegetation.

If you checked one or more of the above, go to Part D. Otherwise, go to Part C. If you can not decide whether one of the conditions applied to your site, put a question mark in the appropriate box and explain the problem on the back of this page.

* For the purposes of the pilot study, you may assume that these species are not present unless you have contrary information. (In practice, you can obtain help with this question by contacting the state Department of Fish and Wildlife [animals] and the Department of Natural Resources [plants]. Further information on this will be provided in an Ecology guidance document.)

C. Simplified evaluation
(Applies only if you answered no in Part B.)

Although you may be able to complete the simplified evaluation yourself, some assistance (e.g., from a consultant) may be required. If you choose not to attempt to answer this part of the survey form, please check here () and explain why below and then go to Part D.

Does the site meet any of the screening conditions? [WAC 173-340-7492 (2)(a)-(c)]

Yes No

If you answered yes, which condition applies to the site? (You may check more than one of the following. However, if any one of these conditions applies to your site you need not complete the remainder of the simplified evaluation.)

- Area of soil contamination is less than 350 square feet.
- Analysis from Table 6.
- No potential exposure pathways. Please explain on the back of this page.
- None of the contaminants listed in Table 7 are, or will be, present within six feet of ground surface.
- None of the contaminants listed in Table 7 present above indicated concentrations.

If you did not check any of these boxes, how would you choose to proceed, based on the information provided in the draft regulation? (Please explain on the back of this page.) If you cannot decide whether one of the conditions applies to your site, put a question mark in the appropriate box and explain the problem on the back of this page. Go to Part D.

D. Feedback on parts of the draft regulation you used to complete this form.

1. What parts were easiest to use?

2. What parts were hardest to use?

3. Do you have any suggestions on how to make the parts you used easier to understand ?

Appendix B

External Pilot Study Group A Response Summary External Review submissions from each reviewer



**EVALUATOR
PARTICIPATION
External Pilot Study Group A**

External Evaluator ID #	Nov	Dec	Jan	Feb	Site visit	Mar
XE-1	X	X	X	X	X	X
XE-2	X	X	X	X	X	X
XE-3	X	X	X	X	O	X
XE-4	X	X	X	X	O	X
XE-5	X	X	X	X	O	X
XE-6	X	O	O	O	O	O
XE-7	O	O	O	O	O	O

X = participated
O = not present

Questions on a particular site.			
No.		Environmental Evaluation Pilot Study Question Response(s)	COMMENTS on question, process, outcome(s)
1 a		<i>If the site qualifies for a simplified evaluation, does the procedure give you an answer on whether you need to conduct a cleanup action?</i>	
XE-1	PS-1	Yes. Chlordane conc. below screening level	Assume commercial designation. May fall out if 350 ft ² applies to AOC vs. site.
	PS-3	Yes. Small areas of contamination, activities at site and poor habitat quality place it in simplified.	Assume commercial designation. Ecology may not agree w/assumption based on rule language
	PS-7	N/A	Site doesn't qualify for simplified evaluation.
	PS-9		
	PS-11	N/A	
	PS-12	No. Parcel qualifies, overall site does not.	Clarify whether AOC or Site dimensions apply for area criteria.
	PS-15		
XE-2	PS-1		
	PS-3		
	PS-7		
	PS-9		
	PS-11		
	PS-12		
	PS-15		
XE-3	PS-1	N/A, primary exclusions should apply.	More information needed on ecology of site.
	PS-3	Not evaluated	
	PS-7	Yes, assuming a simplified cleanup is adequate	Site-specific may be needed if species of special concern or protected areas of sufficient area are present. Habitat quality questionable.
	PS-9	Not qualified for Simplified Evaluation.	
	PS-11	N/A, primary exclusions should apply.	
	PS-12	N/A, primary exclusions should apply	Parcel alone qualifies for primary exclusion. Clarification needed on this situation.
	PS-15		
XE-4	PS-1	Site qualifies for simplified evaluation and a secondary exclusion based on less than 35 ft. sq. contamination.	Soil removal is so obvious a remedy that the there is no need for evaluation, and rule should clearly allow an exclusion for pres. remedies.
	PS-3	Yes and exited using Table 6	Clarify regulation application to airports and Ag. support facilities w/large undeveloped areas
	PS-7	No, site meets -7491 exclusions	Site is covered w/exposure barrier and cap
	PS-9	Yes and exited using Table 6	cap is basis for exclusion
	PS-11	N/A Site meets -7491 exclusions	solidified soil and asphalt cap prevent exposure
	PS-12	Parcel 6 qualifies for exclusions, whole site requires site specific evaluation.	
	PS-15	N/A, site is a wetland so is not subject to TEE	See sec. 7490(1)(b)
XE-5	PS-1		

	PS-3		
	PS-7		
	PS-9		
	PS-11		
	PS-12		
	PS-15		
XE-6	PS-1	Site qualifies for simplified evaluation and a secondary exclusion based on less than 35 ft. sq. contamination.	Soil removal is so obvious a remedy that there is no need for evaluation, and rule should clearly allow an exclusion for pres. remedies.
	PS-3	Yes and exited using Table 6	Clarify regulation application to airports and Ag. support facilities w/large undeveloped areas
	PS-7		
	PS-9		
	PS-11		
	PS-12		
	PS-15	N/A, site is a wetland so is not subject to TEE	See sec. 7490(1)(b)
1 b		<i>If cleanup is needed, does the Simplified Eval. help choose a cleanup alternative to evaluate?</i>	
XE-1	PS-1	No response.	
	PS-3	Yes. Removal because of small areas of contamination.	
	PS-7	N/A	
	PS-9		
	PS-11	N/A	
	PS-12	No response.	
	PS-15		
XE-2	PS-1		
	PS-3		
	PS-7		
	PS-9		
	PS-11		
	PS-12		
	PS-15		
XE-3	PS-1	N/A, eco-risk not applicable.	
	PS-3	Not evaluated	
	PS-7	If helps identify chemicals of concern and provides cleanup goals, but doesn't help select appropriate remediation alternative	
	PS-9	N/A	
	PS-11	N/A, eco-risk not applicable.	
	PS-12	N/A, eco-risk not applicable.	
	PS-15		
XE-4	PS-1	No. The process seems to focus on describing the site, its exposure pathways and/or contaminant concentrations.	
	PS-3	N/A cleanup completed	
	PS-7	Yes, highlights a possible removal remedy	

	PS-9	Not for a site this complex. Need full RI data	
	PS-11	N/A cleanup implemented	
	PS-12	No	
	PS-15	N/A, site shouldn't be evaluated using TEE	Wetland site
XE-5	PS-1		
	PS-3		
	PS-7		
	PS-9		
	PS-11		
	PS-12		
XE-6	PS-1	No. The process seems to focus on describing the site, its exposure pathways and/or contaminant concentrations.	
	PS-3	N/A cleanup completed	
	PS-7		
	PS-9		
	PS-11		
	PS-12		
	PS-15	N/A, site shouldn't be evaluated using TEE	Wetland site
1 c		<i>If not, what was the problem?</i>	
XE-1	PS-1	No response.	
	PS-3	Might not be commercial, might go to Site Specific.	There could be 10 acres of native vegetation.
	PS-7	N/A	
	PS-9		
	PS-11	N/A	
	PS-12	Site definition question.	Should parcels not requiring eval. on their own be included in the larger site that does?
	PS-15		
XE-2	PS-1		
	PS-3		
	PS-7		
	PS-9		
	PS-11		
	PS-12		
XE-3	PS-1	Inadequate description provided of site ecology	
	PS-3	Not evaluated.	
	PS-7	See 1 b, above.	
	PS-9	N/A	
	PS-11	N/A	
	PS-12	Status of a separate parcel still part of a larger site needed.	
XE-4	PS-1	Problem formulation step should allow consideration of pres. Remedies that would eliminate need for eco. Eval.	An explanation of why the remedy obviates the need for eco. eval. should be required.
	PS-3	N/A	

	PS-7	N/A	
	PS-9	N/A	Contaminants up to 60' bgs, eco shouldn't be a focus, should be GW & SW protection
	PS-11	N/A	
	PS-12	Outstanding issue: Is site Parcel 6 only, or whole site?	
	PS-15	N/A, wetland site, shouldn't use TEE process	
XE-5	PS-1		
	PS-3		
	PS-7		
	PS-9		
	PS-11		
	PS-12		
	PS-15		
XE-6	PS-1	Problem formulation step should allow consideration of pres. Remedies that would eliminate need for eco. Eval.	An explanation of why the remedy obviates the need for eco. eval. should be required.
	PS-3	N/A	
	PS-7		
	PS-9		
	PS-11		
	PS-12		
	PS-15	N/A, wetland site, shouldn't use TEE process	
2 a		<i>If your site qualifies for a Site Specific Eval., does the problem formulation step help the eval. focus on selecting a cleanup action alternative?</i>	
XE-1	PS-1	N/A	
	PS-3	Yes. Focus on exposure pathways, habitat quality/use.	Airport maintenance, use & pesticides use would keep animals away, inhibit plant growth.
	PS-7	Not sure.	
	PS-9		
	PS-11	N/A	
	PS-12	It is unclear if a site-specific evaluation is required.	
	PS-15		
XE-2	PS-1		
	PS-3		
	PS-7		
	PS-9		
	PS-11		
	PS-12		
	PS-15		
XE-3	PS-1	N/A	
	PS-3	Not evaluated	
	PS-7	N/A	See assumptions in 1a, above.
	PS-9	Qualified for Site Specific. Problem formulation steps are fairly standard and should lead to selection of a cleanup action alternative.	Question should be rephrased to ask whether problem formulation step provides an effective method for selecting cleanup action alternative.
	PS-11	N/A	

	PS-12	N/A	
	PS-15		
XE-4	PS-1	N/A	Feel none of these sites requires site-specific evaluation. What if Ecology disagrees? How should evaluators determine agency interpretation of regulations?
	PS-3	N/A	
	PS-7	N/A	
	PS-9	N/A	
	PS-11	N/A	
	PS-12	N/A	
	PS-15	N/A	
XE-5	PS-1		
	PS-3		
	PS-7		
	PS-9		
	PS-11		
	PS-12		
	PS-15		
XE-6	PS-1		
	PS-3		
	PS-7		
	PS-9		
	PS-11		
	PS-12		
	PS-15		
2 b		<i>If not, why not?</i>	
XE-1	PS-1	N/A	
	PS-3	No Response.	
	PS-7	How to proceed beyond using screening levels not clear.	Future land use uncertain due to bankruptcy
	PS-9		
	PS-11	N/A	
	PS-12	See 2 a.	
	PS-15		
XE-2	PS-1		
	PS-3		
	PS-7		
	PS-9		
	PS-11		
	PS-12		
	PS-15		
XE-3	PS-1	N/A	
	PS-3	Not evaluated	
	PS-7	N/A	See assumptions in 1 a, above
	PS-9	N/A	
	PS-11	N/A	
	PS-12	N/A	
	PS-15		
XE-4	PS-1	N/A	

	PS-3	N/A	
	PS-7	N/A	
	PS-9	N/A	
	PS-11	N/A	
	PS-12	N/A	
	PS-15	N/A	
XE-5	PS-1		
	PS-3		
	PS-7		
	PS-9		
	PS-11		
	PS-12		
	PS-15		
XE-6	PS-1	N/A	
	PS-3	N/A	
	PS-7		
	PS-9		
	PS-11		
	PS-12		
	PS-15		
2 c		<i>What information is needed in the problem formulation step that would help select a cleanup alternative?</i>	
XE-1	PS-1	N/A	
	PS-3	No Response	
	PS-7	No Response	
	PS-9		
	PS-11	N/A	
	PS-12	See comment on 2 a.	
	PS-15		
XE-2	PS-1		
	PS-3		
	PS-7		
	PS-9		
	PS-11		
	PS-12		
	PS-15		
XE-3	PS-1	N/A	
	PS-3	Not evaluated	
	PS-7	N/A	See assumptions in 1 a. above
	PS-9	N/A	
	PS-11	N/A	
	PS-12	N/A	
	PS-15		
XE-4	PS-1	N/A	
	PS-3	N/A cleanup implemented	How are in-situ remedies considered? Exposure may occur while being implemented.
	PS-7	N/A	

	PS-9	N/A	
	PS-11	N/A	
	PS-12	N/A	
	PS-15	N/A	
			All these sites qualified for primary exclusions or simplified, so eco-remedy data don't apply.
XE-5	PS-1		
	PS-3		
	PS-7		
	PS-9		
	PS-11		
	PS-12		
	PS-15		
XE-6	PS-1	N/A	
	PS-3	N/A cleanup implemented	How are in-situ remedies considered? Exposure may occur while being implemented.
	PS-7		
	PS-9		
	PS-11		
	PS-12		
	PS-15		
		Does the terrestrial eval. indicate that a previously selected remedy (if there was one) was adequate, or would another remedy have been more appropriate?	
XE-1	PS-1	Remedy OK if 1' compacted gravel is an exposure barrier.	If not, chlordane exposures @ 2X screening level possible.
	PS-3	Yes, all impacted soils removed.	Human health for DDT drove cleanup beyond eco cleanup requirements.
	PS-7	Yes. Selected remedy not protective of eco-receptors.	PCBs and metals protective of human health above eco-screening levels.
	PS-9		
	PS-11	Yes. Exposure barrier is adequate.	Although some contaminants may be above screening levels, barrier(s) are adequate.
	PS-12	N/A, no remedy selected for this parcel.	
	PS-15		
XE-2	PS-1		
	PS-3		
	PS-7		
	PS-9		
	PS-11		
	PS-12		
	PS-15		
XE-3	PS-1	N/A	
	PS-3	Not evaluated.	
	PS-7	No remedial action was identified.	Main terr. Eco-risk concern is PCBs. Human health cleanup would eliminate most risk. Little added benefit would result from eco cleanup.

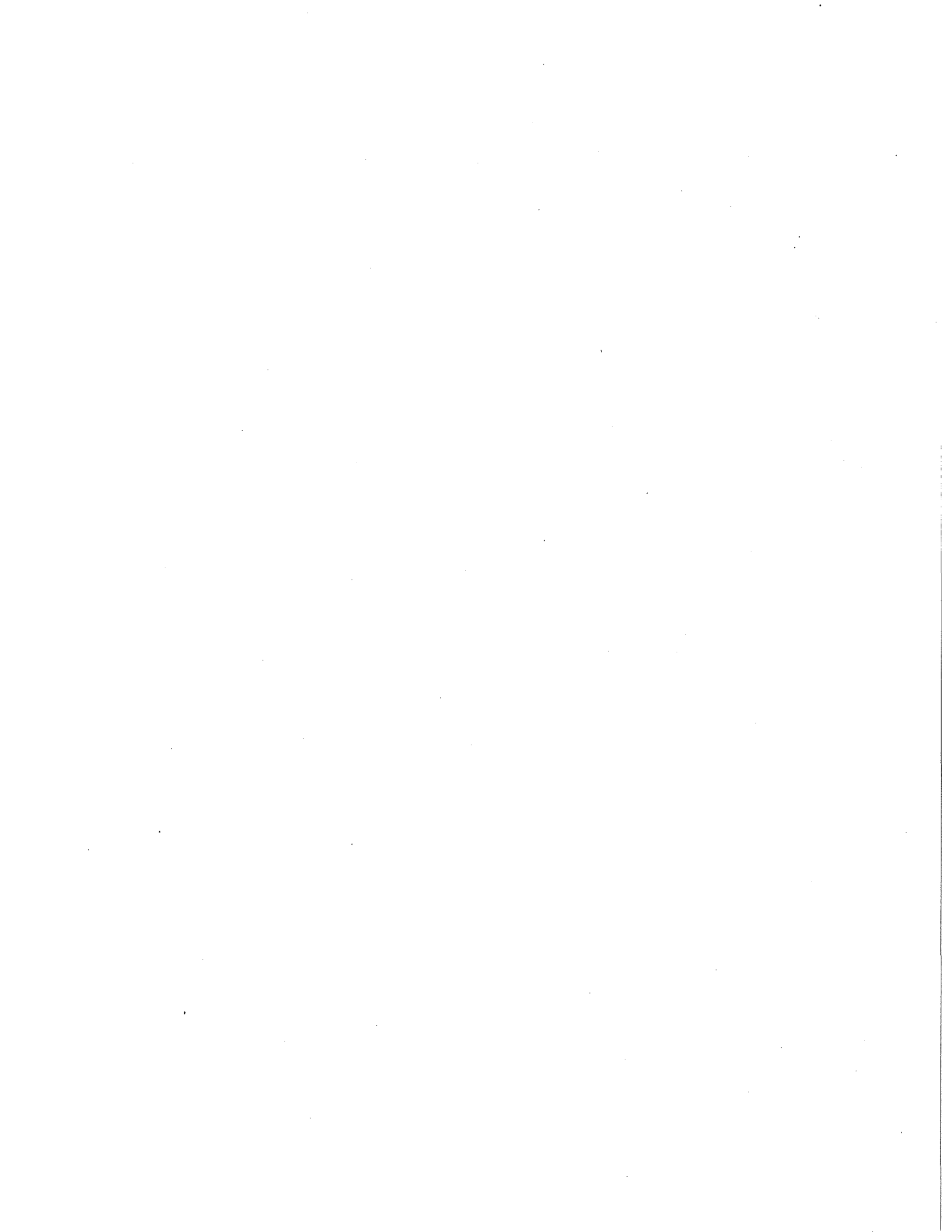
	PS-9	Low permeability cap remedy proposed would eliminate environmental exposures. Need for site-specific evaluation unclear in that situation.	Under 7493(3)(ii) env. risk evaluation could be terminated since the proposed remedy eliminates the exposure pathway. Also eliminates steep slope safety issues.
	PS-11	N/A	
	PS-12	No remedial action was identified.	Exclusion precludes need for evaluation.
	PS-15		
XE-4	PS-1	Site information (esp. contamination details) lead to the conclusion that soil removal is most appropriate.	An eco. eval. adds no particular ecological value or information.
	PS-3	Yes, removed exposure potential.	
	PS-7	Unknown	
	PS-9	Yes, capping and monitoring seem appropriate.	
	PS-11	Yes, soil stabilization & capping remove exposure.	Site offered limited habitat initially
	PS-12	in-situ treatment would be possible, but while good for economic & land use, may not be good for eco receptors	
	PS-15	Yes, landfill presumptive remedy of capping	
XE-5	PS-1		
	PS-3		
	PS-7		
	PS-9		
	PS-11		
	PS-12		
	PS-15		
XE-6	PS-1	Site information (esp. contamination details) lead to the conclusion that soil removal is most appropriate.	An eco. eval. adds no particular ecological value or information.
	PS-3	Yes, removed exposure potential.	
	PS-7		
	PS-9		
	PS-11		
	PS-12		
	PS-15		
		<i>Based on the draft rule, what are the likely investigation/evaluation/remediation costs to satisfy the terrestrial environmental risk evaluation requirements?</i>	
XE-1	PS-1	Based on the draft rule, the eco-risk related costs should minimal	
	PS-3	N/A	See 4, above.
	PS-7	Increased costs to satisfy eco-risk concerns at this site would be significant.	
	PS-9		
	PS-11	N/A	
	PS-12	Uncertain.	Depends on outcome of site definition.
	PS-15		
XE-2	PS-1		
	PS-3		
	PS-7		
	PS-9		
	PS-11		

	PS-12		
	PS-15		
XE-3	PS-1	N/A	
	PS-3	Not evaluated	
	PS-7	Small increases for eco-eval (T&E survey, site visit) evaluation (simplified) and additional remediation.	Remediation cost increase small due to small difference between human health and eco-standards/screening levels. Cost implications are unclear. For site-specific, investigation costs are high, but could greatly reduce remediation costs. Some Table 7 values are below human health numbers, so could result in increased remediation costs.
		Human health primary driver for PCBs.	
	PS-9	unknown	
	PS-11	Minimal cost due to exclusion.	
	PS-12	Minimal cost due to exclusion.	
	PS-15		
XE-4	PS-1	4-12 hrs. depending on familiarity w/rule	Assumes VCP; order would add to review time
	PS-3	4-12 hrs. depending on familiarity w/rule	
	PS-7	Site visit would add ~8 hrs. to 4-12 hr. estimate	
	PS-9	Site visit would add ~8 hrs. to 4-12 hr. estimate	Site complexity would require more review
	PS-11	4-12 hrs. depending on familiarity w/rule	
	PS-12	4-12 hrs. depending on familiarity w/rule	
	PS-15	4-12 hrs. depending on familiarity w/rule	
			Time assumes time for reviewer familiarization w/rule and TEE application. Exclusion & Simp. eval. Sites at low end, more time required if agency disagrees w/evaluator about site status
XE-5	PS-1		
	PS-3		
	PS-7		
	PS-9		
	PS-11		
	PS-12		
	PS-15		
XE-6	PS-1	4-12 hrs. depending on familiarity w/rule	Assumes VCP; order would add to review time
	PS-3	4-12 hrs. depending on familiarity w/rule	
	PS-7		
	PS-9		
	PS-11		
	PS-12		
	PS-15		
		General Questions about the draft rule process.	
		<i>Under what circumstances would you recommend that the screening level be used as a cleanup level and and forgo the opportunity to develop a site-specific cleanup level?</i>	
XE-1		Appropriate when areas of contamination are small.	
XE-2			

XE-3	When it more economical than conducting further study, when gains in public relations outweigh remediation costs, and when human health cleanup levels are more stringent	
XE-4	When it provides certainty of closure and will be cost effective (i.e. stops study, leads to remedial action)	
XE-5		
XE-6		
	What is the cost of conducting the appropriate terrestrial environmental evaluation relative to the existing terrestrial ecological evaluation approach under the Model Toxics Control Act?	
XE-1	No Response	For PS-7, cost could be greater. Current focus would likely be on surface water and wetlands.
XE-2		
XE-3	Don't know. For PS-9, use of cleanup goal in Table 8 for the RA for human health concerns would make the cost for env. eval. Low.	Where Ecology and the PLP develop a site-specific approach, costs are difficult to predict in a general way.
XE-4	"Appropriate" is a relative term and subject to judgement	Estimate \$300-3000/site, from 4-32 hrs. incl. travel time; add 4 hrs. for rule familiarization
XE-5		
XE-6		
	What is the cost of conducting the appropriate terrestrial environmental evaluation relative to a human health evaluation under the Model Toxics Control Act?	
XE-1	Estimate 8 hrs. for human health, 8 hrs. for eco.	
XE-2		
XE-3	Cheaper on simple sites (e.g. PS-01). For more complex sites, similar to human health screen.	For PS-9, using assumptions in 5, above costs should be similar.
XE-4	Depends on contaminants of concern (COCs) and screening/cleanup costs.	Costs additive, possibly greater if site is complex or fragmented
XE-5		
XE-6		
	If you decided that a site-specific food web analysis was an appropriate approach for any of the studies you reviewed, were you able to decide from the draft rule language how to proceed?	
XE-1		
XE-2		
XE-3	The site-specific eval. process is generally well defined. The requirement for consultation with Ecology is clear, but documentation requirements and contact(s) at Ecology are unclear.	
XE-4		
XE-5		
XE-6		
	Does the proposed terrestrial environmental evaluation process allow you to get results that can be used to evaluate the effectiveness of cleanup action alternatives and to facilitate the selection of remedy for a site?	

XE-1		Provides qualitative measures (e.g., exposure barrier, lack of habitat) but not cleanup levels. Screening levels and levels for selecting indicator chemicals generic and conservative.	It's not clear at PS-7 what to do if screening levels for eco-eval. are not acceptable.
XE-2			
XE-3		Yes, the capping option would eliminate exposure to terr. eco receptors. Further refinement of alternatives was based on other factors (e.g., cost). (PS-9)	Process generally provides means for cursory evaluation of remedial actions. Risk Eval. should answer 2 questions: Are contaminant risks below levels of concern, and what is the nature of risks. Answer to the first determines need for remedial action, second determines proper RAs. Draft rule should do second well, may be of limited value in determining if RA necessary.
			A strong statement that table values are for screening and NOT cleanup benchmarks should be clearer.
XE-4		It does for sites that are excluded or for obvious presumptive remedies.	It's not clear for sites requiring site-specific evaluations.
XE-5			
XE-6			
		How well does this draft rule/process provide information you need to evaluate if a site poses a significant adverse effect to populations of ecological receptors?	
XE-1		See 4, above.	For PS-7, no.
XE-2			
XE-3		Fine if my interpretation of the rule is correct. The rule doesn't directly address the effects of contaminant levels of populations. Rule should recognize this limitation.	The rule can't be translated to being a measure of adverse population effects. Populations are undefined and translation from individual effects to populations is not possible.
XE-4		I still don't know how well it works for sites where there are clear undisputed concerns like a site specific evaluation.	
XE-5			
XE-6			
		Are there any specific technical problems you foresee with the rule?	
XE-1		The PAC recommended allowing the option of remediating rather than evaluating further. I'm not sure this option is explicit in the rule. How population-level effects are determined should be clearer in the draft rule.	On this simple site (PS-1) with small areas of contamination, remediation would be less costly than evaluation. The difference between uncovered soil and functional habitat should be clarified.
XE-2			
XE-3		The future land use question is a major problem w/the rule. Small, insignificant sites near undeveloped areas could need site-specific, even in industrial areas with low env. value.	
XE-4		What does "significant" mean? How does the rule promote remediation over evaluation?	
XE-5			
XE-6			

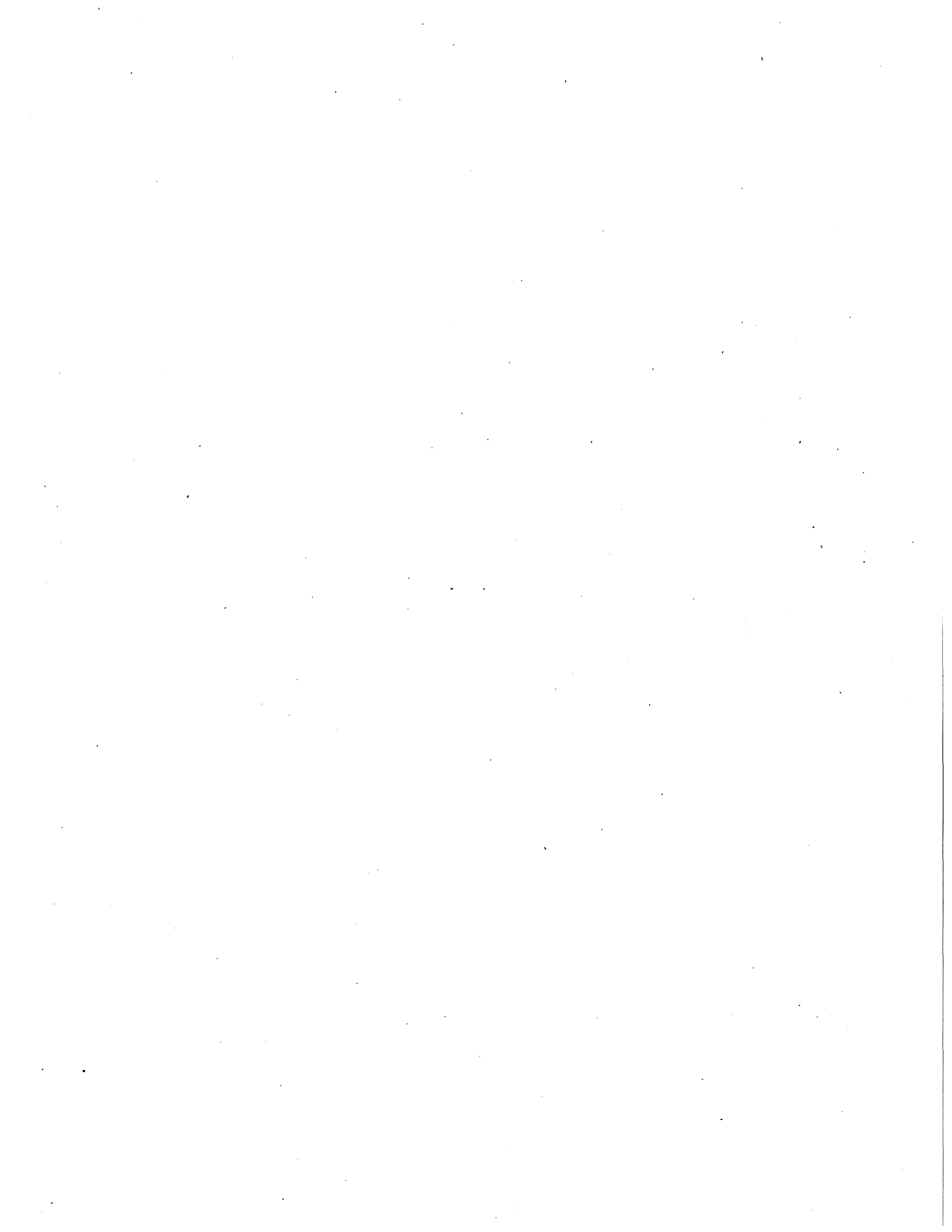
12 a		<i>Do you have any suggestions on how the rule could be improved to make it easier to use?</i>	
XE-1		Clarify whether creeks & wetlands protected for habitat value should be considered in terr. evaluations.	Wetlands and creeks should not be included in terr. evaluation criteria.
XE-2			
XE-3		See other comments.	
XE-4		Clarify definition of: "site", AOC, "facility" and how adjacent lands evaluation relates to TEE procedure	Clarify PLPs responsibility to distinguish valuable habitat from other insignificant features
XE-5			
XE-6			
12 b		<i>Do you have any suggestions for guidance or other types of supplemental assistance materials?</i>	
XE-1		More specific guidance should be provided for sites where future land use is uncertain & may be different than zoning.	
XE-2			
XE-3		See other comments.	
XE-4		See comments in 12 a above	
XE-5			
XE-6			
13		<i>How many of the sites you reviewed were qualified for the (primary) exclusions in Sec. 7491?</i>	
XE-1			
XE-2			
XE-3		3: PS-1, PS-11 and PS-12.	
XE-4			
XE-5			
XE-6			
14		<i>How many of the sites you reviewed qualified for (simplified evaluation) exclusions in Sec. 7492?</i>	
XE-1			
XE-2			
XE-3		None.	
XE-4			
XE-5			
XE-6			
15		<i>How many of the sites you reviewed required a site-specific evaluation required by Sec. 7493?</i>	
XE-1			
XE-2			
XE-3		2: PS-9 and possibly PS-15, if there was indeed terr. habitat present at the site.	
XE-4			
XE-5			
XE-6			



Appendix C

Internal VCP Review
Terrestrial Environmental Evaluation Pilot Study
Reviewer's Form

Table of Sites and Evaluation Outcomes



MTCA Terrestrial Ecological Evaluation for Soil Contamination Pilot Study Ecology Internal Review Form

Please return by <date> to:

Donna Foster

Department of Ecology

Toxics Cleanup Program

P.O. Box 47600

Olympia WA 98504-7600

Name of person completing this form: _____
(PLEASE PRINT)

Name of site: _____

Site ID: _____

Please check any of the following that apply to the site:

- IRAP report
- Voluntary site cleanup report
- Formal Ecology involvement (Consent Decree, Agreed Order, etc.)

Type of site:

- Underground petroleum storage tank Other industrial or commercial site
- Neither of the above

A. Exclusions:

Does the site qualify for exclusion from a terrestrial ecological evaluation? [WAC 173-340-7491]

- Yes No

If you answered yes, which exclusion applies to the site? (You may check more than one of the following. However, if any one of these exclusions applies to the site you need not evaluate the site for other exclusions.)

- Soil contamination is, or will be, six feet below ground surface.
- No exposure pathway.
- Less than 1.5 acres undeveloped land (or 0.25 acres, if listed chemicals present).
- Chemical concentrations do not exceed natural background concentrations.

If you checked one or more of these boxes, go to Part D. Otherwise, go to Part B.

B. Is a site-specific evaluation required? () Yes () No
(Applies only if you answered no in Part A.)

If you answered yes, which condition requiring a site-specific evaluation applies to the site?
[WAC 173-340-7491] (You may check more than one of the following.)

- () Land use plans will maintain or restore native or semi-native vegetation (e.g., greenbelt).
- () Threatened, endangered or other species of concern*.
- () Ten or more acres of native vegetation.

If you checked one or more of these, go to Part D. Otherwise, go to Part C. If you cannot decide whether one of the conditions applied to your site, put a question mark in the appropriate box and explain the problem on the back of this page.

* For the purposes of the pilot study, you may assume that these species are not present unless you have contrary information. (In practice, you can obtain help with this question by contacting the state Department of Fish and Wildlife [animals] and the Department of Natural Resources [plants]. Further information on this will be provided in an Ecology guidance document.)

C. Simplified evaluation
(Applies only if you answered no in Part B.)

Although you may be able to complete the simplified evaluation yourself, some technical assistance may be required. If you choose not to attempt to answer this part of the survey form, please check here () and go to Part D.

Does the site meet any of the screening conditions? [WAC 173-340-7492 (2)(a)-(c)]
() Yes () No

If you answered yes, which condition applies to the site? (You may check more than one of the following. However, if any one of these conditions applies to your site you need not complete the remainder of the of the simplified evaluation.)

- () Area of soil contamination is less than 350 square feet.
- () Analysis from Table 6.
- () No potential exposure pathways. Please explain on the back of this page.
- () None of the contaminants listed in Table 7 are, or will be, present within six feet of ground surface.
- () None of the contaminants listed in Table 7 present above indicated concentrations.

If you did not check any of these boxes, how would you choose to proceed, based on the information provided in the draft regulation? (Please explain on the back of this page.) If you could not decide whether one of the conditions applied to the site, put a question mark in the appropriate box and explain the problem on the back of this page. Go to Part D.

D. Feedback on parts of the draft regulation you used to complete this form.

1. What parts were easiest to use?

2. What parts were hardest to use?

3. Do you have any suggestions on how to make the parts you used easier to understand ?

Internal review version.doc

EcoRisk Pilot Study Summary (NWRO)									
Site #	Site Name	Exclusions	D*	A**	C***	Site-specific	Simp. Exc.	Simp. Eval.	
PSV-1	Elliott & Broad	X	X						
PSV-2	Former Seattle General Mail Facility	X		X					
PSV-3	Lake Stevens Taco Time	X	?	X					
PSV-4	Proctor Welding and Machine, Inc.	X	X						
PSV-5	Former C & S Cleaners - Greentree Plaza	X	X	X					
PSV-6	East Kent Chevron		0				0	0	X
PSV-7	Sedro Woolley Lumber	X	X						
PSV-8	Holiday Inn Express	X	X	X					
PSV-9	Bremerton National Airport-Burn Pit	X		X	X				
PSV-10	Bremerton National Airport-Avian Corp	X		X					
PSV-11	Bremerton National Airport-Soil Stock Pile Areas	X		X	X				
PSV-12	Bremerton National Airport - Three USTs	X	X						
PSV-13	Unocal #0355 Former	X	X	X					
PSV-14	Unocal #3242 (former)	X	X						
PSV-15	Shucks (former)	X	X	X					
PSV-16A	Monroe Pit	O				O	O		X
PSV-16B	Ferguson Terminals	X		X	X				
PSV-17	McConnell's Boat House	X	X	X					
PSV-18	Shuffleton Steam Plant Complex	X		X					
PSV-19	Paine Field Road Maintenance Shop	X	X						
PSV-20	Southland Facility #23525	X	X	X					
PSV-21	Unocal Bulk Plant #0138 (former)	X		X					
PSV-22	Casino Central Office Fuel Facility	X	X	X					
PSV-23	Sunset Foundry, Inc.	X		X	X				
PSV-24	Fostoria Park Industrial Center, Blds D&E	X		X					
PSV-25	K&L Distirbutors (former)	X	X	X					
PSV-26	Tosco #5472	X		X					
PSV-27	Chuck Olson Chevrolet (former)	X		X					
PSV-28	Frol Building/Pacific Science Center	X	X	X					
PSV-29	Brooklyn Plaza Apts	X	X	X					
PSV-31	Midway Equipment	X		X					
PSV-32	Southland Facility 18071	X	X	X					
PSV-33	Chevron 95056/Go Spot Go	X	X	X					
PSV-34	Tri-State Memorial Hospital	X	X	X					
PSV-35	Spokane Gas Manufacturing Plant	X		X					
PSV-36	Western Farm Service	X		X					
PSV-37	Colorado and North River Apartments	X		X					
PSV-38	WSU Irrig. Ag & Extension Center	X	X						

"X"= site qualifies for this sections criteria

"O" = site does not qualify for this sections criteria

**"D" indicates that the site qualified for an exclusion based on depth of contamination

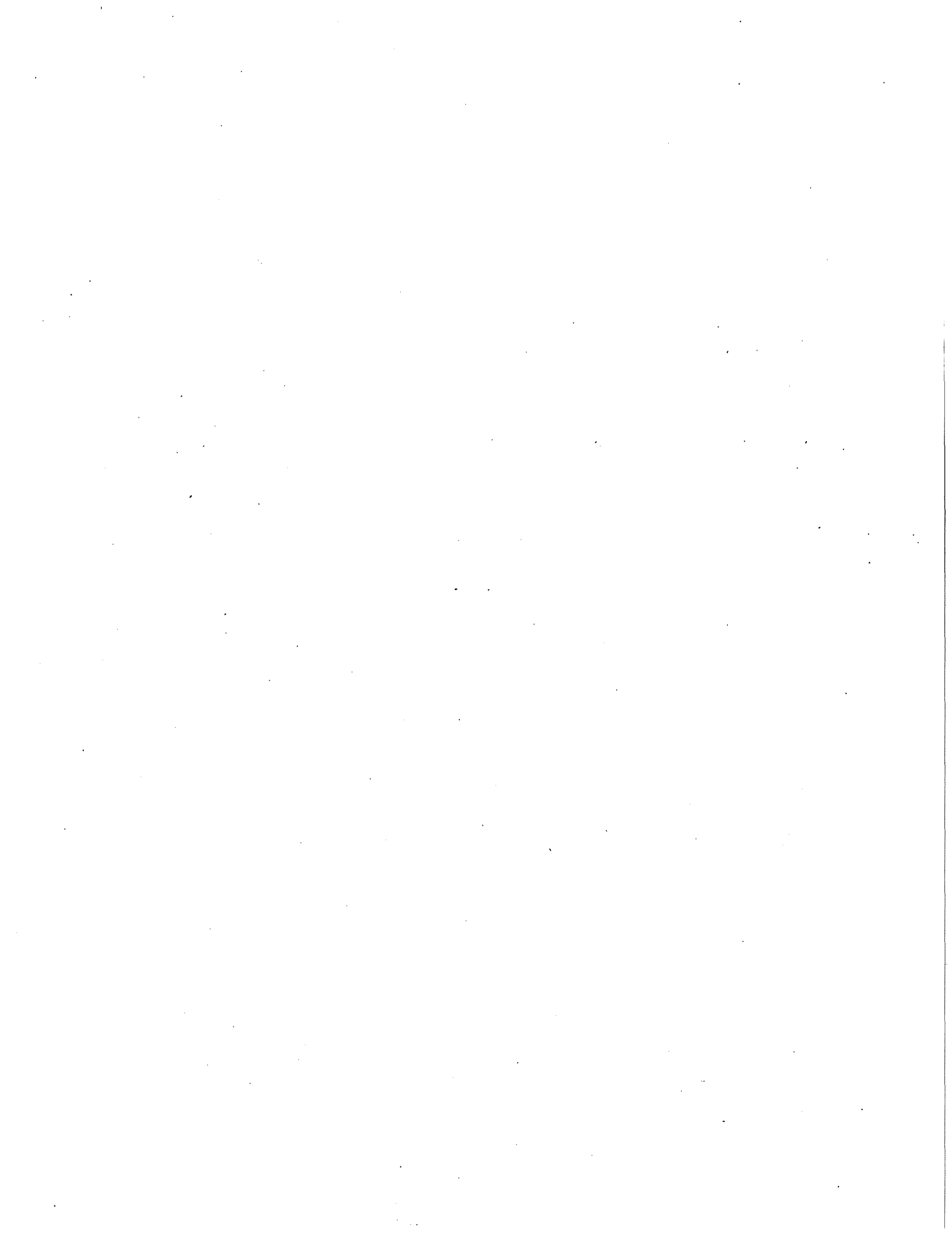
***"A" indicates that the site qualified for an exclusion based on area of contamination

****"C" indicates that the site qualified for an exclusion based on concentration of contaminant or contaminant type

Appendix D

External Reviewer Qualifications and Experience information External Reviewer Participation Summary

NOTE: Statements of Qualification and Experience are those provided by reviewers. Ecology has not verified information contained in these statements, and cannot certify their accuracy. Statements appear verbatim as submitted by reviewers and have not been modified by Ecology.



JOSEPH E. JOHNSON, PE

SENIOR REMEDIAL PROJECT MANAGER

The Boeing Company

Responsible for managing investigation and cleanup activities at contaminated soil, groundwater and sediment sites in Washington and across the United States. Duties include developing statements of work, supervising RI/FS assessments, determining human health and ecological cleanup levels, and implementing remedial solutions. Experienced in managing site cleanups under RCRA, CERCLA, MTCA and other state regulations. Internal consultant on health risk assessment to Boeing organizations.

EDUCATION

- MS, Environmental Health, University of Washington.
- BS, Engineering, Cornell University.

PROFESSIONAL REGISTRATIONS, MEMBERSHIPS

Registered Professional Civil Engineer (PE), State of Washington.

Qualified Environmental Professional (QEP), Air & Waste Management Association (A&WMA).

Director and Webmaster, A&WMA, Pacific Northwest International Section (PNWIS).

Vice Chair, A&WMA Puget Sound Chapter.

Member, Society of Environmental Toxicology and Chemistry.

Member, Seattle Public Utilities Water Systems Advisory Committee.

Member, Ecology Policy Advisory Subcommittee on Ecological Risk Assessment.

SELECTED PUBLICATIONS AND PRESENTATIONS

J.E. Johnson. Regulatory Approaches to Ecological Risk Assessment. *Annual Meeting of the Air & Waste Management Association, Pacific Northwest International Section.* December 1996.

J.E. Johnson and J.C. Kissel. Prevalence of Dermal Pathway Dominance in Risk Assessment of Contaminated Soils: A Survey of Superfund Risk Assessments, 1989-1992. *Human & Ecological Risk Assessment, Volume 2 (2).* June 1996.

J.E. Johnson. Implementation of NESHAP-Compliant Cleaning Solvents: Changing Solvents, Changing Minds. *Invited paper, Sixth International Conference on Solvent Substitution, Phoenix, AZ.* December 1995.

J.E. Johnson and J.C. Kissel. A Comparison of Parameters Used in Superfund Risk Assessments with Available Experimental Measurements. *Invited paper, Annual Meeting of the Society for Risk Analysis, Baltimore, MD.* December 1994.

J.E. Johnson and J.C. Kissel. Plausibility of Dermal Pathway Dominance in Risk Assessment of Contaminated Soils: An Examination of Selected Superfund Risk Assessments. *Fourth Conference of the International Society for Exposure Analysis, Raleigh, NC.* September 1994.

Ms. Patt O'Flaherty has over 25 years of experience as an environmental scientist and environmental/regulatory technical consultant. She directs and performs hazardous material, compliance audits, and environmental site investigations that are based on RCRA, CERCLA, and various State regulatory requirements. She has prepared environmental permitting applications for hazardous waste management and wastewater (NPDES) discharge requirements. She has directed chemical transport and fate studies of organic and inorganic contaminants in soil, sediments, surface water, and groundwater. She is a lead technical consultant on environmental cleanup regulations, hazardous waste management requirements and property transactions and compliance audits for CH2M HILL in the Northwest.

Employment History

- CH2M HILL, Bellevue, WA, 1988 to Present, Senior Project Manager
- Green River Community College, 1991 to 1998, Continuing Education Instructor of Environmental Sampling
- Science Applications International Corporation (SAIC), Bellevue, WA, 1980-1988, Senior Scientist.
- U.S. Fish & Wildlife Service Great Dismal Swamp National Wildlife Refuge, Suffolk Va., Wildlife Biologist and Public Participation Coordinator

Dana Houkal

Current position: Manager of the Environmental Risk Analyses Group for URS, Greiner-Woodward Clyde, Seattle, WA

Years of Experience: 22

Expertise: Dr. Houkal is a senior ecologist specializing in ecological risk assessment design and implementation. As the risk analyses group manager, he is responsible for the timely submittal of quality human health and ecological risk assessment and risk management products to a variety of private sector and government clients. The Seattle office is a corporate center for risk analyses and Dr. Houkal provides technical support to all URS Greiner Woodward Clyde offices. He leads a technically diverse group providing biological support for environmental impact statements, permitting, and a wide variety of other projects. As task manager on numerous assessments, his responsibilities have included work plan development, biotic surveys, multipathway risk assessments for terrestrial and aquatic habitats using both screening-level and detailed biological approaches, development of remedial action goals, and participation in risk management decision-making.

Education Ph.D., Forest Science, University of Idaho, 1976
 B.S., Forest Management, Southern Illinois University, 1970

Lisa Bauer Saban

Toxicologist

Education

M.S., Environmental Toxicology (Aquatic Ecology and Toxicology), Western Washington University, 1993

B.S., Biology (Wildlife Ecology), Virginia Polytechnic Institute and State University, 1987

Distinguishing Qualifications

- Masters Degree focused on sediment toxicology
- Extensive experience in designing ecological risk assessments and sediment investigations
- Primary expertise in aquatic and terrestrial ecological risk assessment, sediment toxicology, wetland delineation/restoration, and risk management
- Management experience in negotiating with clients, proposal development, developing and coordinating subcontracts, and budgeting and scheduling tasks and personnel
- Focused on managing environmental risks and evaluating cost/benefit options
- Project experience in Commencement Bay including habitat restoration, sediment investigations, ecological risk assessment
- Primary experience in metals, PCBs (both aroclor and congener approaches), and PAHs

Relevant Experience

Ms. Saban has over 13 years of experience as an environmental scientist specializing in ecological studies including aquatic toxicology, ecological risk assessment, sediment toxicity assessment, wetland assessments, and wildlife ecology. Ms. Saban has served as project manager or lead ecological risk assessor for a variety of ecological risk assessments and sediment investigations. She has reviewed, conducted, or provided supervision on over 30 ecological risk assessments, primarily focusing on sediment investigations and risk management strategies. Ms. Saban's background and expertise enable her to focus on risk management strategies to reduce potential exposure in a cost-effective manner. She is also a member of the ASTM subcommittees on risk management strategies and sediment toxicology.

Ecological Risk Assessment

Ecological Risk Assessment, Chevron Port Arthur Facility, TX. Task leader for a facility-wide RFI ecological risk assessment. Developed strategies to evaluate over 90 units for potential ecological risk. Using a tiered process and risk management strategies, was able to reduce initial costs of over 2.5 million dollars, while still ensuring a protective approach for ecological receptors.

AJ Mine Supplemental Environmental Impact Statement, Juneau, AK, EPA. Designed an ecological risk assessment as a method for evaluating ecological impacts under the SEIS process. This innovative approach was designed over traditional EIS methods because ERA's are less subjective, provide a basis for documenting decisions, focus on the critical issues, and provide a formal process for assessing uncertainties related to decisions. Worked closely with EPA in designing the framework for the ERA since it will be used as a template for any future ERAs under the NEPA process.

Ecological Risk and Sediment Investigation, Hickam AFB, Honolulu, HI. Task leader for an ecological risk assessment and sediment investigation. Developed initial framework for completing the risk assessment with clear endpoints to aid in expedited decision making. Evaluated appropriate toxicity tests for use in Hawaiian waters. Designed a streamlined risk assessment with clear decision points in collaboration with stakeholders to expedite decision making. As part of the design, restoration and net benefit analysis are considered for potential tradeoffs.

Ecological Risk Assessment, U.S. EPA, Hunters Point, CA. Key technical advisor and reviewer for the ecological risk assessment (ERA) under CERCLA for EPA Region IX. Evaluated the marine, wetland, terrestrial, and freshwater components of the ERA for compliance with regulatory guidelines, technical adequacy, quality, and completeness. Received the highest EPA contractor rating "outstanding performance" for this contract.

Ecological Risk Assessment, Region IX Guidance, U.S. EPA. Provided technical editing and guidance on the form and structure of the proposed EPA Region IX Ecological Risk Assessment Guidance.

Ecological Risk Assessment, U.S. EPA, Adak, AK. Key technical advisor and reviewer of an ecological risk assessment (ERA) under the Federal Facilities Agreement (FFA) for EPA Region X. Provided technical guidance on a risk assessment process for the island, including discussions on a background approach, prioritization of sites, and appropriate sampling and analysis methodologies. Provided oversight, in conjunction with the U.S. FWS and EPA, on the habitat assessment conducted by U.S. FWS volunteers. Participated in Biological Technical Assistance Group (BTAG) meetings to provide comments on the ecological risk process. Involved in ongoing negotiations with EPA and the Navy concerning RI/FS technical issues. Recognized by EPA RPM as key player and negotiated additional technical work for this project.

Ecological Risk Assessment, U.S. EPA, Pacific Sound Resources, Seattle, WA. Evaluated terrestrial habitat and provided EPA with a written report on the terrestrial risk assessment options. Prepared the technical approach to assessing risk to aquatic receptors.

Sediment Assessment, Confidential Client, Western Washington. Provided field oversight of the contractors collecting sediment samples in the Duwamish Waterway. Developed an approach under RCRA to evaluate the bio-availability of point source discharges to aquatic receptors via groundwater transport.

Drayton Harbor Watershed Study, Washington State Department of Ecology, Bellingham, WA. Managed a 2-year project investigating point and nonpoint sources of contamination in a

watershed and harbor. Ms. Saban incorporated the use of sediment bioassays to evaluate the toxicity of the sediments within Drayton Harbor, working closely with the oversight committee, comprised of local business people and regulatory personnel, to evaluate action alternatives.

Remedial Investigation/Feasibility Study, U.S. EPA, Old Manchester Dump, Manchester, WA. Project manager for the oversight of RI/FS activities at Manchester Dump and the adjacent Clam Bay. Management responsibilities include assigning technical personnel for appropriate review tasks, tracking budgets, preparing monthly reports, and coordinating activities with EPA. Lead technical advisor on the Clam Bay sediment investigation, wetland assessment and mitigation concerns, and the ecological risk assessment process. Participated in technical meetings between the EPA, Corps of Engineers, State of Washington, and the contractors.

Remedial Investigation/Feasibility Study (ERA and wetland delineation/functional assessment), U.S. EPA, Tulalip Landfill, Marysville, WA . Task manager for oversight of the PRP contractors implementing the work plan for the remedial investigation and technical lead for conducting the ecological risk assessment. Task management responsibilities included coordinating field work for the collection of chemistry and biological samples and staff management for the ecological risk assessment. Supported EPA as the technical advisor in EPA-PRP formal dispute resolution meetings. Involved in ongoing negotiations with the PRPs, PRP contractors, the Tulalip tribes, EPA, and other interested agencies on scoping, technical, and budgetary issues. Prepared an ecological risk assessment and conducted a wetland delineation and functional assessment for over 100 acres of wetland habitat. Recognized by EPA as a key player and as demonstrated by receiving the highest EPA contractor rating "outstanding performance" for this contract. Negotiated an increase in scope for additional moneys on this project.

Oversight Activities

Habitat Restoration Oversight Activities, U.S. EPA, Commencement Bay Nearshore Tideflats, St. Paul Waterway, Tacoma, WA. Oversaw post-remedial action of sediment cap. Evaluated the performance of the habitat restoration project, including evaluation of biological triggers and statistical power analyses.

Superfund Oversight Activities, U.S. EPA, Commencement Bay Nearshore Tideflats, Hylebos Waterway, Tacoma, WA. Oversaw remedial design, evaluation of sediment contaminant levels with respect to ARARs identified as sediment quality objectives and comparison to the sediment management standards (sediment quality standards and cleanup screening levels). Provided technical guidance to comply with Section 404 of the Clean Water Act (CWA).

Habitat Restoration Oversight Activities, U.S. EPA, Commencement Bay Nearshore Tideflats, Middle Waterway, Tacoma, WA. Provided technical review of the habitat restoration project involving the creation of an intertidal shoreline to cap existing contaminated sediment.

Habitat Restoration Oversight Activities, U.S. EPA, Commencement Bay Nearshore Tideflats, Asarco Sediments, Tacoma, WA. Participated in technical discussions and evaluation of

contaminant fate and transport model (WASP) to evaluate the extent of future potential sediment accumulation of contaminants.

Remedial Design Oversight Activities, U.S. EPA, Commencement Bay Nearshore Tidelands, Sitcum Waterway, Tacoma, WA. Provided oversight of remedial design sediment quality evaluation and decision process.

Membership in Professional Organizations

Society of Environmental Toxicology and Chemistry

Society of Wetland Scientists

ASTM member on Committee E-47 on Biological Effects and Environmental Fate, Subcommittees Sediment Toxicology and Assessment of Risk to Human Health and the Environment from Hazardous Waste Sites and Risk Management Subcommittee

Brad Grimsted M.S., M.B.A

Profile:

Environmental Project Manager with ten years of technical and management experience including:

Expert in the areas of risk assessment, toxicology, and environmental science.

Successful project and technical manager of small and large environmental projects throughout the United States.

Strong commitment to effectively manage projects to meet clients' needs and satisfy regulatory agencies and the public.

Professional Experience:

Toxicology/Risk Assessment

Senior Scientist responsible for managing and performing risk assessments, toxicological evaluations, and creating reports to facilitate environmental decision making.

Performed risk assessments for hazardous waste sites, incinerators, occupational exposure to chemicals and pollution prevention.

Evaluated, interpreted and applied toxicity information for a variety of chemicals and exposure situations to evaluate the impacts to human health.

Developed and applied new cutting edge techniques for pollution prevention/life cycle assessment and environmental management for a Fortune 500 chemical company. Approach allowed for the comparison of the relative environmental impacts of producing a product using two different approaches in two different countries.

Performed a cost effectiveness evaluation of the oxygenated fuel program in the Puget Sound region of Washington State for the Department of Ecology. Findings resulted in the State of Washington declining to expand the program to the rest of the State.

Project and technical manager for all phases of environmental projects including, managing staff, developing budgets, schedules, technical work plans, presentations, and reports.

Managed, trained, and led multi-disciplinary technical teams in performing risk assessments and other environmental projects throughout the U.S. for Roy F. Weston, Inc.

Co-owner of PIONEER Technologies Corporation which has been providing environmental consulting and environmental software development services to a variety of clients for six years. Responsible for all aspects of the business including managing projects, consulting, marketing, and business development.

Broad technical experience in Site Investigations.

Developed and led the soil, sediment, and surface water sampling program at a large Superfund site in Washington State.

Developed characterization and risk assessment work plans, remedial investigation reports, remedial alternative evaluations for large hazardous waste sites. Performed statistical and geostatistical evaluations at hazardous waste sites to develop exposure/remediation units and focus the remediation on problem areas.

Negotiated with regulatory agencies to develop protocols and plans for risk assessments to evaluate hazardous waste sites and proposed facilities.

Experienced in reviewing, interpreting, evaluating, and applying environmental regulations including, CERCLA, RCRA, MTCA, and NEPA/SEPA.

Actively participated in process to modify hazardous waste site regulations in Washington state.

Extensive computer expertise with statistical, word processing, desk top publishing, spreadsheet, database management, and statistical software.

Co-developer of SmartRISK™, SmartCLEAN™, SmartTOX™ and SiteSTAT™ software programs which are used by environmental professionals throughout the U.S. for performing risk assessments and analyzing and reporting analytical data.

Developed User's Guide's for SmartRISK, SmartCLEAN, and SiteSTAT software programs.

Organized and managed a large database of investigation results for a large hazardous waste site. Organized database into a useable format and provided data summaries for over 10 years of field sampling data.

Credentials:

- MBA Certificate in Environmental Management, Master of Business Administration, University of Washington, Seattle, WA, 1993.
- MS Master of Science, Environmental Toxicology, University of Washington, Seattle, WA, 1988.
- BA Bachelor of Science, Biology, George Fox College, Newberg, OR, 1986.

Employment History:

- 93 - Present PIONEER Technologies Corporation, Olympia, WA -- Principal.
- 88 - 92 Roy F. Weston, Inc., Seattle -- Assoc Project, Project, Senior Project Scientist