Measuring TUWRAP's Influence: Final Report

Prepared for the U.S. Environmental Protection Agency and Oregon Department of Environmental Quality

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Contents

Appendices (Included Separately)

Introduction

Sponsored by EPA and developed by a team of Oregon DEQ and EPA staff, the TUWRAP[1] evaluation focused on answering five guiding questions:

1. What impact does TUWRAP have on hazardous waste handler compliance in Oregon?
2. What are TUWRAP's environmental outcomes?
3. What are the costs (range, per "unit") associated with TUWRAP and compliance inspections?
4. How should TUWRAP effectiveness be measured?
   - With currently collected, available data (including underutilized data)?
   - If new performance measures were to be introduced that required different data?
5. How can Oregon DEQ and EPA Region 10 strategically integrate TUWRAP with the authorized hazardous waste enforcement program to achieve EPA's Goal 5 compliance improvement objectives?

These five questions draw a focus on utilizing existing data to discuss TUWRAP's influence on hazardous waste generator compliance and environmental performance, to understand the relative level-of-effort associated with technical assistance and compliance inspection activities, to assess how DEQ can better produce a state-wide, objective, and reproducible picture of TUWRAP outcomes, and to examine opportunities for enhancing DEQ's and EPA's ability to more explicitly recognize TUWRAP's contribution to the authorized hazardous waste compliance assurance program.

In this context DEQ's interest in improving the degree to which EPA Region 10 recognizes DEQ technical assistance as contributing to its overall compliance assurance strategy has led to the exploration of TUWRAP's performance outcomes relative to EPA's compliance strategy. As a result, EPA's perspective on "relevant" has been an important consideration in crafting project efforts and results. Discussion with EPA Region 10 staff indicated that, first and foremost, EPA was interested in the degree to which technical assistance efforts have an impact on improved compliance rates.

Compliance rates have two dimensions: (1) "direct" or "unit" compliance, the impact technical assistance has on the facility receiving the technical assistance; and (2) "indirect" or "population" compliance, the impact technical assistance activity has on facilities that do not receive direct technical assistance. In the case of inspection activities, this indirect compliance impact is referred to as the "deterrence effect" of inspection and enforcement activities. Additional dimensions of "relevant performance outcomes" of interest to both DEQ and EPA included the scope of compliance-related impacts, the durability of impacts, and the consistency of the service delivery.

The available data clearly indicate that technical assistance has a strong influence on compliance for the direct/unit population of technical assistance recipients. The data routinely collected by DEQ field staff indicate that, at those sites that have received site visits, DEQ hazardous waste technical assistance site visits are having a positive impact on hazardous waste generator compliance for at least six months after site visits have been conducted. The available data did not support drawing conclusions on the compliance impacts of other technical assistance (including workshops, telephone assistance, best practices manuals, etc.).

[1] Toxics Use and Waste Reduction Assistance Program

The results from another DEQ study, the draft deterrence report[2], supplement the conclusions drawn from the routinely-collected data. The draft deterrence report found that DEQ's agency-wide technical assistance work has resulted on average in 2.2 changes to manufacturing and operating processes per company at those facilities that received technical assistance. (Inspections and penalties were found to have resulted in 1.6 changes per company.) The results of the draft deterrence report also help to draw conclusions about the indirect/population impact of technical assistance on those companies that did not directly receive technical assistance. Companies made on average 1.1 changes as a result of hearing about technical assistance received by other companies and, on average, 2.6 changes made by companies that heard about inspections and/or penalties.

Technical assistance's impact on hazardous waste generator compliance has been demonstrated both in terms of direct/unit impact and indirect/population impact, and the evidence of service delivery support the claim that TUWRAP's impact is fully consistent with the program's goals and intent. Cost and level-of-effort data provide a further sense of TUWRAP's value in producing compliance outcomes. Budget data and DEQ staff interviews indicate that the total amount of direct time spent on inspections relative to technical assistance is roughly 2 to 1 excluding the indirect costs of program management, planning, and support. These general conclusions are reflected at a high-level in the budget data provided by DEQ.

Limited data were available with regards to the measurable environmental outcomes of technical assistance. While technical assistance site visits appear to result in environmental improvements, the consistency, scope, and nature of these improvements is not known with certainty, in large part because information collection about these outcomes is not routinely conducted. DEQ does, however, have plans to routinely collect this kind of information in the future.

Overall, looking across DEQ's measurement activities, DEQ has most, if not all, of the ingredients in place to address the identified relevant performance outcomes. These ingredients include: a mail back follow-up survey provided to technical assistance recipients; direct, on-site follow-up with technical assistance recipients; case study write ups; the draft DEQ deterrence report and other studies that have examined technical assistance; and some calculations of environmental performance improvements associated with technical assistance.

Even so, opportunities do exist for translating DEQ's technical assistance measurement efforts into a more cohesive strategy that will generate a state-wide, statistically more robust picture of direct and indirect technical, short- and long-term compliance impacts and environmental outcomes. Current measurement and reporting activities depend heavily on high-level activity reporting and case-specific and/or region specific data and anecdotes, leaving the program's overall influence measures vulnerable to questioning. The conclusions in this report, for example, would not have been possible or defensible had only the currently-reported and easily-accessible information been used for the evaluation.

DEQ's current plans to improve performance measurement will help significantly to reduce, though not eliminate, this vulnerability. The opportunities offered in this report supplement DEQ's current plans with the objective of improving the basis for recognizing the contribution technical assistance makes to DEQ's (and EPA's) overall compliance assurance objectives. In certain instances, the measurement opportunities will necessitate the need to shift resources from direct service delivery to measurement (e.g., in those DEQ Regions that currently conduct little or no on-site follow-up[3]). In other instances, the

[2] Oregon DEQ, Office of Compliance and Enforcement. *General Deterrence of Environmental Violation: A Peek Into the Mind of the Regulated Public*. March 2004 Draft. For information on this report, contact Les Carlough, Ph.D., J.D., Senior Policy Advisor, Office of Compliance and Enforcement. (503) 229-5422.

[3] Oregon DEQ has three Regional offices—West, East, and Northwest.

opportunities will allow for lowering investment in measurement (e.g., the DEQ Western Region, which currently revisits up to 90 percent of technical assistance recipients).

All programs face the need to balance direct delivery with follow-up measurement. Quite naturally, DEQ's consideration of the opportunities for improvement must be compared to the benefits they can expect to derive from the investment. This will depend, at least to some degree, on EPA's ability to also embrace the identified opportunities and translate them into an ability to further recognize and support DEQ's technical assistance efforts.

The evaluation's final focus area relates to the question how to demonstrate TUWRAP's role as part of an integrated compliance strategy and, in so doing, provide the basis for additional support for technical assistance from EPA. First, it is apparent that TUWRAP and, in general, DEQ's overall compliance assurance strategy, are consistent with the intent of EPA's Strategic Plan Goal 5, "Compliance and Environmental Stewardship," and vice versa – EPA's Goal 5 is consistent with TUWRAP and DEQ's overall compliance approach. Discussions with EPA staff indicated that, in addition to effective measurement of relevant performance outcomes, DEQ's ability to incorporate and articulate proposed technical assistance activities within the broader context of an overall compliance assurance strategy related to a sector, geographic area, or environmental problem would substantially assist recognizing and attributing explicit value to such activities. In addition, EPA could further acknowledge and support DEQ's overarching compliance assurance strategy, including the integral role that technical assistance plays as part of that strategy. This report therefore concludes by outlining several opportunities for DEQ and EPA to further support each other's integrated compliance strategies and goals.

Measuring TUWRAP's Influence: Final Report

Executive Summary

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Executive Summary

Background

The TUWRAP evaluation relied on three general sources of information: (1) Readily-available reports and budget data; (2) detailed data on 101 technical assistance site visit recipients that had not previously been consolidated or summarized at the regional or state levels; and (3) information gathered during interviews with DEQ staff. Many of the conclusions in this report are based on the interviews and previously-underutilized information on the 101 technical assistance site visit recipients. One other report, the draft DEQ deterrence report[4], was highly related to the TUWRAP evaluation and its conclusions were used to more completely answer the five evaluation guiding questions. The importance of the draft deterrence report is its relevance to the question of indirect influence of technical assistance on the overall population of companies, which to some is considered as important, if not more important, than direct influence. The deterrence report's conclusions are applicable to the findings in this report despite the caveats outlined herein.[5]

This final report is written with the understanding that organizations need to balance the resources they devote to service delivery with the resources they set aside for measuring performance. One of the evaluation's objectives has been to identify opportunities for a performance measurement approach that would further support DEQ's ability to learn from its program's results, plan strategically, and make definitive, objectively-defensible statements regarding program performance. The report has identified what can objectively be said about TUWRAP's performance today and what the data imply about different approaches and measurements that could be taken to make stronger statements about TUWRAP's performance in the future. DEQ will want to weigh the benefits of doing more measurement against the costs of doing so.

Results

Impact of Technical Assistance on Compliance

The results on this topic are divided into four categories:

- Direct, short-term impact of technical assistance site visits;
- Direct, short-term impact of all other technical assistance activities;
- Direct, long-term impact of all technical assistance activities; and
- Indirect/population impact of all technical assistance activities.

Direct, Short-Term Impact of Technical Assistance Site Visits on Compliance

The data strongly suggest that technical assistance (TA) site visits are helping to markedly improve recipients' compliance for at least six months after the site visit. The evaluation focused on detailed data

[4] Oregon DEQ, Office of Compliance and Enforcement. *General Deterrence of Environmental Violation: A Peek Into the Mind of the Regulated Public*. March 2004 Draft. For information on this report, contact Les Carlough, Ph.D., J.D., Senior Policy Advisor, Office of Compliance and Enforcement. (503) 229-5422.

[5] The draft deterrence report (1) explored changes made as a result of the direct and indirect influence of agency-wide DEQ technical assistance activities, inspections, and penalties; (2) did not clarify whether the changes made were compliance-specific or explore the magnitude/impact of the changes; (3) identified a different pattern of influence for small companies, but did not include much specific data on this pattern; (4) examined changes made "in the past three years" (between 1999 and 2002), whereas the TUWRAP evaluation's conclusions are largely drawn upon information collected within six months after technical assistance was conducted between 1999-2003.

from a sample group of 101 TA site visit recipients, 27 of which had also received a prior compliance inspection. Most recommendations (approximately 74 percent) made during TA site visits are compliance recommendations. According to the technical assistance follow-up data, at least 90 percent of those recommendations on average are implemented within six months of the site visits. For the 27 facilities that received both a technical assistance visit and an inspection, the specific types of recommendations are made during the site visits were similar to or the same as violations noted during inspections with the same facilities.

Direct, Short-Term Impact of Other Technical Assistance Activities on Compliance

DEQ conducts a substantial number of technical assistance activities besides site visits, including sector-specific trainings, on-line college courses, best practices manuals, and extensive telephone assistance. In fact, the time estimates provided by DEQ staff suggest that roughly the same amount of time is spent on all other technical assistance activities as it is on technical assistance site visits alone. With the exception of the draft deterrence report's conclusions which cover all kinds of technical assistance and are summarized below, the available data do not allow for drawing conclusions about the impact of other technical assistance activities on compliance. The limitations of the available data stem from the fact that follow-up is not routinely conducted to determine whether the lessons and recommendations covered during these technical assistance activities are actually implemented back at the facility. In the context of measuring these "other" technical assistance activities' outcomes, it is also important to recognize that one of the objectives of these activities is to entice companies to request technical assistance site visits rather than exclusively to impact compliance.

Direct Compliance Impact of all Technical Assistance Activities in the Long Term

Information on the long-term influence of the site visits and other technical assistance activities is not collected. The draft DEQ deterrence report did examine the influence of all technical assistance on changes that companies made to their operating and manufacturing processes and found that, over a three year time period, companies on average made 2.2 changes to their manufacturing or operating processes as a direct result of DEQ (agency-wide) technical assistance and 1.6 changes as a result of inspections-plus-penalties. These draft deterrence report results offer reason to believe that technical assistance is having an impact on compliance for up to three years after the technical assistance.

Population Compliance/Total Impact on Entire Population of Facilities

The existing information collected by DEQ TUWRAP technical assistance staff relates exclusively to direct or "unit" effectiveness. The draft DEQ deterrence report did explore the impact DEQ compliance inspections (and penalties) and technical assistance had on motivating other facilities to improve their compliance practices. The report found that, on average, companies made 1.1 changes as a result of hearing about technical assistance received by other companies and 2.6 changes made by companies that heard about inspections and/or penalties.

The draft deterrence report also found that technical assistance and enforcement efforts were less likely to have an effect on small companies, especially very small companies, which are less likely to have heard about other companies' technical assistance, inspections, or penalties. This is relevant to the TUWRAP evaluation because technical assistance is primarily conducted with small companies. This information implies not only that the indirect influence or deterrence effect of both inspections and technical assistance on these companies would be less than the averages cited above for this population, but also that increased awareness of technical assistance and (also perceived threat of) inspections would be needed to increase the indirect or deterrence influence of these activities on small companies.

TUWRAP's Environmental Outcomes

Case studies and limited technical assistance follow-up information indicate that technical assistance site visits are resulting in positive environmental outcomes. However, the available data do not support drawing conclusions about the range, scope, or regularity of the environmental improvements. DEQ has detailed plans to routinely track technical assistance and inspection environmental outcomes when the next phase of Oregon Hazardous Waste Information Management Exchange (OHWIME) database implementation is complete. Implementing these plans will significantly improve DEQ's ability to measure and report on the environmental outcomes. In the interim, the Western Region's technical assistance staff have been tracking environmental outcomes of both technical assistance site visits and inspections to some extent.

Costs Associated With TUWRAP and Compliance Inspections

According to the data, the direct time spent by DEQ on inspections per facility relative to the time spent on technical assistance site visits ranges from between 1.75 to 1 on the low end to 8 to 1 excluding travel time, time spent by enforcement staff, and inspections that result in Class 1 violations. With the same exclusions, the state-wide weighted average of direct time spent on inspections relative to time spent on technical assistance site visits is approximately 3.8 to 1.[6] The time spent on technical assistance site visits varies from DEQ Region to Region, ranging in total time commitment from the planning to the visit to the follow up from a an average of nearly six hours in the Northwest Region to 17 hours in the Western Region, to 24 hours in the Eastern Region.

When other technical assistance activities are included, the total amount of direct time spent on inspections (with the same exclusions) relative to technical assistance is roughly 2 to 1 excluding the indirect costs of program management, planning, support, etc.[7]

These general conclusions are reflected at a high-level in the budget data provided by DEQ, which show that, in FY2003, the total direct expenditures for the inspection/compliance program and the technical assistance program were approximately $0.82 million and $0.43 million, respectively. When indirect costs including management were included, the expenditures were $1.44 million for the inspection/compliance program and $0.52 million for TUWRAP.

When one considers the number of recommendations implemented by technical assistance recipients, the number of changes being made (directly and indirectly) as a result of technical assistance (from the draft deterrence report's findings), and the lower cost of conducting technical assistance on the whole, technical assistance appears to provide "good value". It is important to note, however, that the company responsiveness examined for both the TUWRAP evaluation and draft deterrence report was measured over the course of a few years when there was a particular "mix" of inspection and technical assistance activity. It is commonly understood that companies are motivated to seek out and respond to technical assistance at least in part because of the presence of the inspection and enforcement "alternative." The particular "mix" of technical assistance and inspections provides a combined set of variables that have produced the demonstrated results. Short of an analysis that would show otherwise, the same results

[6] Weighted hours (FY2003) = (sum of total number of hours spent in all regions on inspections (7,330) divided by the total number of inspections (147)) divided by the (sum of the total number of hours spent in all Regions on technical assistance (3,500) divided by the total number of technical assistance site visits (265)).

[7] This ratio is based on state-wide time estimates that were derived from regional estimates. Although some adjustments were made for regional variations, the ratio is not completely weighted to account for detailed regional variations in both the time spent and the activities conducted.

could not be ensured if changes in the technical assistance and inspection mix were made – for example by significantly altering the frequency of either of those activities.

Measuring TUWRAP's Influence

Although a substantial amount can be said about TUWRAP's influence, changes in measurement of technical assistance would strengthen the claim that TUWRAP has a marked influence on both compliance and environmental outcomes. DEQ already has plans to expand and improve upon its technical assistance performance measurement, and these plans will make a significant difference in moving DEQ beyond activity tracking and case-specific examples to make the broader case for overall program performance. Even the planned improvements, however, will not make the strongest case possible for TUWRAP's influence unless some additional changes are made.

The opportunities for improvement are designed to move DEQ in the direction of producing more objectively-defensible and reproducible measures. The offered changes provide options for surgical, statistically-valid, reproducible approaches that would strengthen the demonstration of TUWRAP's value, and thereby increase the ability of DEQ to work with EPA on an integrated compliance strategy while still keeping the focus on service delivery to Oregon companies.

The opportunities are divided into two categories: process and measures and are not repeated in detail in this executive summary. The process opportunities include ways to strengthen and make more consistent the compliance-orientation of technical assistance and conducting revisits at a statistically-valid, representative subset of technical assistance site visit recipients to provide a very strong basis for gauging technical assistance site visit results and "test" whether the information on recommendations implemented provided in written forms from technical assistance recipients is trustworthy. An initial estimate, based on certain assumptions, is that 97 revisits chosen randomly would be needed to verify the results of the 265 site visits conducted in FY2003.[8]

Particular measurement opportunities cover activity tracking for management and accountability purposes, measures would relate to EPA OECA's proposed five-year compliance targets and the EPA Strategic Plan, and several additional measures that could be incorporated into the plans for the Oregon Hazardous Waste Information Management Exchange (OHWIME) information system.

Integrating TUWRAP into DEQ's Hazardous Waste Compliance Assurance Program to Achieve EPA's Compliance Improvement Objectives

As already noted, DEQ will want to decide whether the work that it could undertake to further integrate TUWRAP into its hazardous waste compliance assurance program[9] will be worth the benefits of doing so. The benefits could include improving the coordination, collaboration, and overall impact of DEQ's technical assistance and compliance assurance programs, strategizing with EPA Region 10 on how to take the integrated compliance "plus" package to the next level – and getting the Region's support for doing so, and helping to contribute more, or, in some cases, more overtly to EPA national and regional compliance goals and objectives.

[8] See Appendix 6.

[9] To clarify the intent of this section, the project team modified this question and the discussion as follows. Language on "integrating TUWRAP into DEQ's authorized hazardous waste *enforcement* program" was changed to, "integrating TUWRAP into DEQ's hazardous waste compliance assurance program." DEQ's compliance assurance program is the overarching program that includes both technical assistance and enforcement. (The intention is not to include TUWRAP into the enforcement program.)

The opportunities to further integrate TUWRAP can be viewed from three perspectives: DEQ, DEQ and EPA Region 10 (as partners), and EPA as an entire agency. Three opportunities for DEQ to consider are: (1) Implementing the measurement opportunities outlined in this report to bolster the compliance focus and results of technical assistance as well as the ability to measure those results; (2) instituting a plan for tracking and measuring the environmental outcomes of compliance inspections and enforcement activities; (3) committing to the guidelines described in the 1994 Field Activities Handbook, which provide a strong integrated technical assistance-inspection package that is more coordinated and integrated than the technical assistance practices in place today.

DEQ and EPA Region 10 may together want to take advantage of a few opportunities: (1) use the findings in this report (and the draft deterrence report) as the basis for discussions on the flexibility or support needed to more fully integrate DEQ's technical assistance and compliance assurance programs; (2) EPA Region 10 can make it clear that it sees technical assistance is an important and effective compliance tool that is a fundamental component of DEQ's integrated compliance strategy; and (3) if DEQ finds that it needs additional support (in the form of flexibility, additional funds, and/or limited disinvestments) from EPA to implement a more fully-integrated program, and it has provided a strong proposal for the additional support, EPA Region 10 can "go to bat" for DEQ.

To meet EPA's national compliance goals and objectives, DEQ can (1) provide annually (probably in the PPA/PPG) the three technical assistance measures offered in this report that relate to OECA's proposed five-year targets and the EPA Strategic Plan, (2) identify and offer additional reporting measures that are associated with DEQ's other (non-TUWRAP) work and are directly related to EPA's other compliance objectives; and (3) can work with EPA discuss during the summer of 2004 on how it could further assist EPA as Region 10 and EPA Headquarters to establish EPA's annual performance commitments that define how Region 10 will be contributing to all of the national compliance objectives. In turn, EPA can provide support to DEQ's integrated compliance assurance strategy with capacity building tools such as manuals, in-kind assistance, or grants; program funding or increased flexibility with current funding to accommodate the needs of the integrated strategy; and/or simply vocalization of strong support for TUWRAP and, in general, DEQ's "package" of compliance tools.

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TUWRAP Program

Oregon's Toxics Use Reduction and Hazardous Waste Reduction Act

In 1989, Oregon passed the Oregon's Toxics Use Reduction and Hazardous Waste Reduction Act (TUHWR) to enact a collaboration between DEQ and business to reduce (or eliminate) the use of toxic chemicals and the generation of hazardous wastes. TUHWR requires large users of toxic chemicals, large quantity generators of hazardous waste (LQGs), and small quantity generators of hazardous waste (SQGs) to evaluate their chemical use and waste generation by developing Reduction Plans, monitor their progress towards in-house goals, and report toxic substance use to the DEQ (only LQG and large users of toxic chemicals report).

TUHWR requires DEQ to provide technical assistance to businesses, coordinate its business assistance efforts with trade associations and local colleges, follow-up with toxics users who receive business assistance, and work with local agencies. The TUHWR Act prohibits DEQ from conducting inspections or taking enforcement actions when doing this business assistance unless there is a clear and immediate danger to human health or the environment.

Toxic Use and Hazardous Waste Reduction Assistance Program

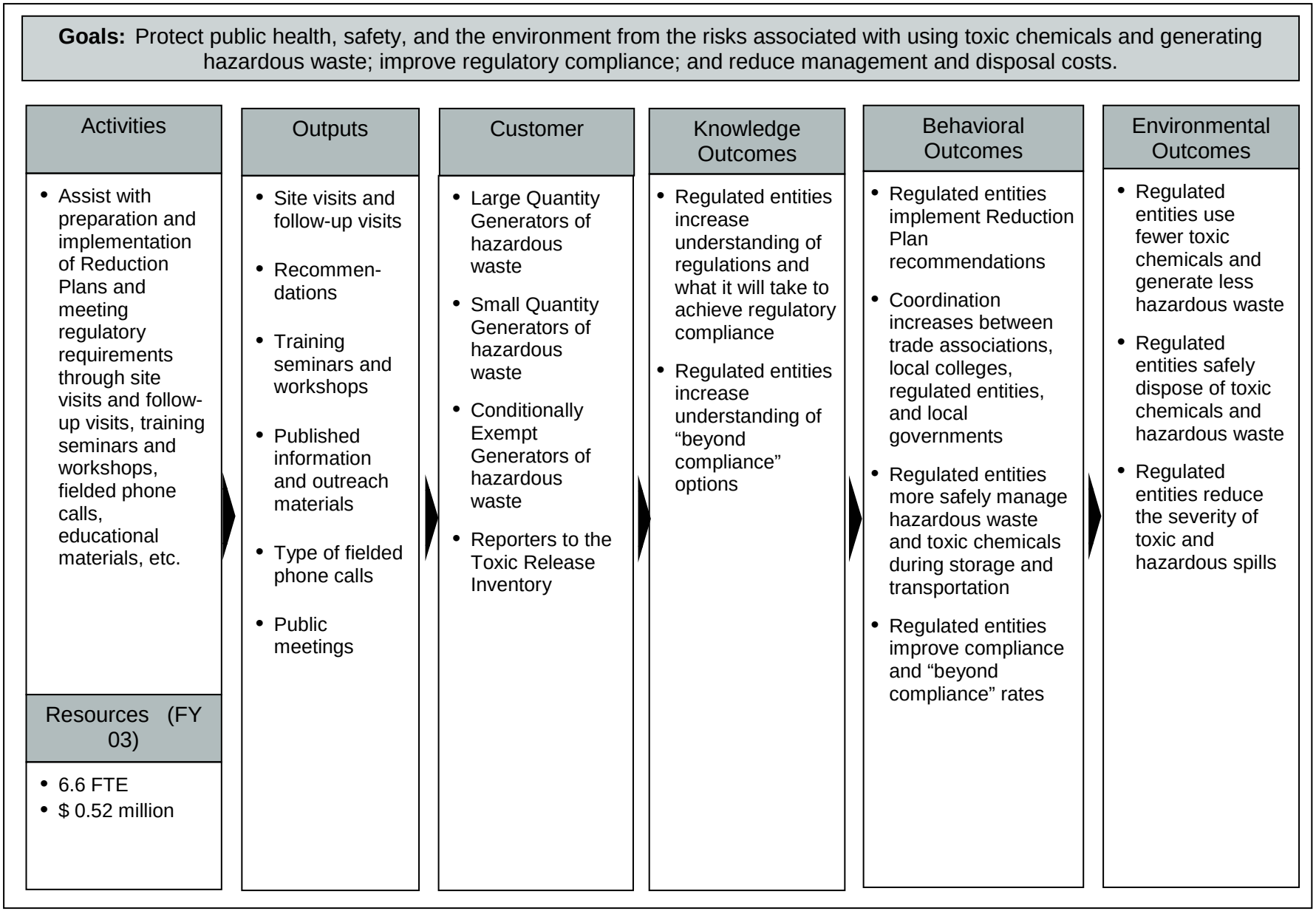
The DEQ Toxic Use and Hazardous Waste Reduction Program (TUWRAP) employs a set of tools used to implement TUHWR as part of an integrated compliance strategy. The program is enacted through a combination of the activities including the following:

- Direct, on-site technical assistance to facilities that use toxic chemicals or generate hazardous waste (priority given to facilities implementing a Toxic Use Reduction and Hazardous Waste Reduction Plan)
- Telephone assistance
- Fact sheets and other educational documents, some of which are available on the Web
- Training workshops
- Development of a system to measure effectiveness of reduction measures
- Industry-specific manuals on best management practices
- Working with local colleges, governments, watershed groups, environmental organizations, trade organizations, and Community Awareness and Emergency Response Groups

Based on the time estimates provided by DEQ staff, roughly half of DEQ technical assistance time is spent on technical assistance site visits and the remainder is devoted to all other technical assistance activities.

The logic model in Figure 1 provides an overview of TUWRAP's goals, activities and resources, outputs, behavioral outcomes, and environmental outcomes. As illustrated by the types of outputs and outcomes, TUWRAP is designed to deliver a continuum of results ranging from increased compliance rates to improved (and less expensive) environmental management to reductions in hazardous waste generated and toxic chemicals used.

Figure 1. TUWRAP Logic Model



DEQ's "Traditional" Compliance Assurance/Compliance Monitoring Program

DEQ's hazardous waste compliance assurance/compliance monitoring program is implemented through a combination of compliance monitoring inspections focusing on LQGs and some SGQs; complaint investigations; investigations of non-registered businesses suspected of being generators, transporters, or management facilities; targeted initiatives (e.g., to address environmentally-sensitive areas); criminal investigations; and EPA inspections (which are coordinated with DEQ). Decisions about the type and frequency of inspections reflect both EPA and DEQ priorities and are made through the Performance Partnership Agreement annual planning process.

TUWRAP Effectiveness Evaluation Methodology

Background

The TUWRAP effectiveness evaluation is being sponsored by EPA's Office of the Chief Financial Officer (OCFO) and Office of Policy, Economics, and Innovation (OPEI). In 2003, Region 10 and DEQ submitted a proposal to receive a competitive grant to fund the evaluation. This project was one of ten grants awarded. It is intended to identify ways to improve documentation of TUWRAP effectiveness and to align TUWRAP both with EPA Strategic Plan's performance measures and with an overall compliance assurance strategy for DEQ's authorized hazardous waste program. Specifically, the evaluation is focused on answering five guiding questions:

1. What impact does TUWRAP have on hazardous waste handler compliance in Oregon?
2. What are TUWRAP's environmental outcomes?
3. What are the costs (range, per "unit") associated with TUWRAP and compliance inspections?
4. How should TUWRAP effectiveness be measured?
    - With currently collected, available data (including underutilized data)?
    - If new performance measures were to be introduced that required different data?
5. How can Oregon DEQ and EPA Region 10 strategically integrate TUWRAP with the authorized hazardous waste enforcement program to achieve EPA's Goal 5 compliance improvement objectives?

Methodology

The methodology employed for the TUWRAP evaluation is summarized here and described in more detail in Appendix 1. The DEQ and EPA project leads made a few decisions early on in the evaluation that shaped the data collection approach:

› Only existing information would be used in order to not burden TUWRAP recipients with additional surveys (following other studies that involved outreach to this community) and to stay within a limited project budget and timeline. Instead, a limited number of interviews with DEQ staff and existing information that had previously had not be utilized would be used to supplement readily-available TUWRAP data.

› Data collection and evaluation would focus primarily on a carefully-selected sample of results of technical assistance site visits and, to the extent that results information is available, on other voluntary technical assistance activities.

› Case studies would not be a focus because they represent a small percentage of all technical assistance recipients and are not likely to be reproducible or representative.

- The assistance geared to help companies develop their toxic use and hazardous waste reduction plans (for LQGs and SGS which are required to develop toxic use reduction plans, but represent only approximately one quarter of technical assistance recipients) would not be a focus of the evaluation.
- In general, the evaluation would focus on information that could objectively demonstrate TUWRAP's influence or results rather than descriptions of TUWRAP activities.

The evaluation relied on three general sources of information: (1) reports and other written information provided at the onset of the project that could support the TUWRAP influence measurement approach, (2) collection of information that DEQ already had, but which had not previously been consolidated or summarized at the regional or state levels, and (3) interviews with DEQ staff. Table 1 shows how each of the three information sources related to the guiding questions. Many of the conclusions in this report are based on the interviews and previously-underutilized information (e.g., data collected after conducting technical assistance that was in paper files but had never been translated into a database or summarized at the regional level). In addition, one other report, the draft DEQ "deterrence report" (described below in more detail) was highly related to the TUWRAP evaluation and its conclusions were used to more completely answer the five evaluation guiding questions.

Table 1: TUWRAP Effectiveness Evaluation—Data Collection Relative to Guiding Questions

Question	Review of provided data	DEQ Data Collection	Interviews with DEQ & EPA Staff
1. What impact does TUWRAP have on hazardous waste handler compliance in Oregon?	X	X	X
2. What are TUWRAP's environmental outcomes?	X	X	
3. What are the costs (range, per "unit") associated with TUWRAP and compliance inspections	X		X
4. How should TUWRAP effectiveness be measured?	X		X
5. How can Oregon DEQ and Region 10 strategically integrate TUWRAP with the authorized hazardous waste enforcement program to achieve EPA's Goal 5 compliance improvement objectives?	X		X

The previously-released DEQ and EPA reports provided roughly one-third of the information used for the evaluation. These reports, outlined in more detail in Appendix 1, included joint DEQ-EPA documents, namely the 2002-2004 Performance Partnership Agreement between the Oregon Department of Environmental Quality and the U.S. Environmental Protection Agency Region 10; DEQ documents and data, particularly the DEQ PPA end-of-year reports for FY2000-FY2003; and EPA documents, including the 2003 EPA Strategic Plan[10] and the Office of Enforcement and Compliance Assurance draft 2005-2007 National Program Manager Guidance.[11]

Collection of previously "untapped" DEQ data took place in two steps. In Step 1, DEQ regional staff provided basic facility information on companies that had received technical assistance site visits, follow-

[10] U.S. Environmental Protection Agency. *EPA Strategic Plan 2003-2008: Direction for the Future.* September 2003 Available: http://www.epa.gov/ocfo/plan/plan.htm [Viewed April 19, 2004]
[11] http://www.epa.gov/ocfo/npmguidance/index.htm

up (in one form or another) to the technical assistance site visits, and also compliance inspections in some cases. For Step 1, information was only provided on facilities for which follow-up information (that gauged the outcomes of the technical assistance site visit) was available, but no information on the outcomes of the technical assistance or inspections was provided. In total, DEQ submitted basic information on 254 facilities for Step 1. These facilities had received technical assistance site visits between 1999 and 2003.

Based on the demographics (e.g., generator status, whether the facility had also received an inspection) of the facilities described in the Step 1 data pool, the consultant team chose a subset of facilities to assess more closely as part of Step 2. Step 2 data include a substantial amount of information on the outcomes of the technical assistance site visits including, where available, environmental outcomes. It also included the results of inspections for the 27 facilities that had received both technical assistance and an inspection. As shown in Table 2, DEQ provided detailed Step 2 information on 101 facilities that received technical assistance site visits; 24 from the Eastern Region, 16 from the Northwest Region, and 61 from the Western Region.

Because the DEQ regional staff found the Step 2 data collection to be excessively time consuming and burdensome, additional time and some allowances were made to reduce the burden experienced by DEQ. In addition, the consultant team reduced number of facilities originally requested for the Step 2 data request. The Western Region staff subsequently decided, however, to submit more facility data than was requested.

The Northwest Region was not able to provide either Step 1 or Step 2 data until shortly before the report's conclusions were being gathered. At that time, the Northwest Region was able to gather both Step 1 and Step 2 data (at one time) for 16 facilities that had received technical assistance in the past few years. These were the only facilities for which technical assistance follow-up information were available, and it was decided that it was better to include this information than to not include comparable information for the Northwest Region at all. Ideally, given the significant number of facilities in the Northwest Region and the fact that the Northwest Region has conducted approximately 40 percent of the technical assistance site visits over FY 2000-2003 time period, it would have been desirable to receive more information from this Region. Given the constraints on DEQ staff resources and the rigorous project schedule, this was not possible, and therefore, the limitations to the size of the dataset for this Region in particular should be considered by readers of this report.

Data Caveats

Three other considerations about the collected data are worth noting: (1) The generator status of the focus Step 2 companies; (2) the time frame for which data were collected; and (3) the quality and general validity of the data received.

(1) Caveats concerning generator states and population comparisons

The generator status of the Step 2 facilities is shown in Table 2. To enable more of an "apples to apples" comparison between populations, the consultant team tried to match the demographics of the sample population more to the demographics of the overall inspection population than to the technical assistance site visit population, which has a much higher number of Conditionally Exempt Generators (CEGs). CEGs as a general rule do not receive inspections unless the inspections are complaint investigations or in the case that a facility designated as a SQG or LQG is determined during in inspection to really be a CEG.

Three limitations prevented the population demographics from being an exact match. First, the Step 2 data group was chosen based upon the available information about the demography of the two populations, but the available information was not complete. Second, there were not facilities to choose from in the Step 1 data collection that would have allowed a perfect demographic match (e.g., relatively few LQGs receive technical assistance site visits, period). Third, the Northwest Region's data were simply the data available – there was very little room to choose particular types of facilities. Despite these caveats, the demographics of the two populations (inspections and Step 2 sample group) are roughly similar. Given the similarities between the issues encountered by these two populations – as described throughout this report – the consultant team believes that these two populations can be compared to each other.

However, due to the sample sizes alone, the comparison to total population is stronger for the technical assistance data (101 total) compared to the sample inspection *plus* technical assistance population (27 total). Therefore, the few conclusions drawn on this small group of facilities (that received both technical assistance and inspections) have been appropriately noted with caveats.

On the left-hand side of the inspection and technical assistance site visit columns in Table 2 are the numbers of facilities that received inspection in FY2003 and the DEQ staff estimate for the generator status of technical assistance site visit recipients in FY2003[12], respectively. On the right-hand-side of the columns are the facilities that were represented in the Step 2 data group, which spanned approximately four years of inspections and technical assistance site visits. The imperfect match both in terms of timing and generator status of the step 2 data group and the "real" population of inspections and technical assistance recipients is not ideal, but does not prevent the general conclusions that have been drawn in this report from being made.

(2) Caveats concerning the data collection and activity time periods

In some instances, the activity time periods that are examined and compared in this report are not the same. For instance, the Step 2 data sample covers technical assistance activities conducted between 2000 and 2003, whereas the draft deterrence report explored the result of activities conducted between the summer of 1999 and the summer of 2002. This does not affect the overall conclusions of the report for two reasons: technical assistance and inspection practices have not changed substantially during these time periods, and the conclusions are high-level and not likely to be swayed by the modest changes that have occurred over the course of a few years. The one exception may be the technical assistance conducted in the Northwest Region, which has varied in emphasis from year to year. More than the other Regions, the Northwest Region has undertaken technical assistance projects that focus on particular geographic areas and/or industrial sectors. The variation in the emphasis areas has resulted in variation in the extent to which hazardous waste generator compliance has been a focus area. To overcome this variation, the Northwest Region's Step 2 data sample intentionally spans a few years (and across multiple focus projects) of the Region's technical assistance activities. However, as previously explained, the small data sample for the Region does leave some question open as to the extent to which the breadth of the Northwest Region's technical assistance effectiveness has been explored.

Another noteworthy activity-timing data issue is the inspection time period for which data were provided by DEQ. Although the Step 2 data request asked for information on inspections conducted up to five years before the technical assistance site visits, the information received included inspections that were, in a few cases, more than 10 years prior to the technical assistance site visits. The Step 2 data request also requested information on all inspections conducted after the technical assistance site visits, and although

[12] This estimate was necessary because this information is not tracked.

it was clear that inspections had occurred following the technical assistance site visits, detailed information on the outcomes of these inspections was not provided.

Table 2. Focus Sample Group: Inspections and Technical Assistance Visits by Hazardous Waste Generator Status and Region

	Inspections		Technical Assistance Site Visits	
	Total Population[1]	Step 2 Sample (TA plus inspections)[2]	Total Population[3]	Step 2 Sample[2]
Total Number	**147**	**27**	**246**	**101**
Generator Status				
LQG	42%	33%	3%	12%
SQG	35%	48%	19%	46%
CEG[4]	23%	19%	78%	43%
Total	**100%**	**100%**	**100%**	**100%**
Region				
Eastern Region	16%	48%	16%	24%
Northwest Region	52%	15%	42%	16%
Western Region	32%	37%	42%	60%
Total	**100%**	**100%**	**100%**	**100%**

[1] Based on the draft DEQ PPA FY 2003 end of year report.
[2] Based on inspections received between 1991-2001 and technical assistance received between 2000-2003.
[3] Based on DEQ estimates for provided to the consultant team upon request.
[4] The number of CEGs in this table is equal to the total number of inspections minus the number of inspections conducted at LQGs and SQGs.

These time-activity considerations do not, however, alter the overall conclusions because there were too few facilities in total that received both technical assistance site visits and inspections to draw strong conclusions about the influence of the combined activities.

(3) Caveat concern the quality and overall validity of the data received

In many instances, the follow-up data on recommendation implementation relied on facilities' self-reporting. Because facilities have an incentive to report that recommendations were implemented (in order to suggest compliance) there is concern with the quality of follow-up data in the Northwest and Eastern Regions. However, site revisits were the primary source of technical assistance visit follow-up conducted in the Western Region and the results from the follow-up site visits closely match the results from self-reporting follow-up, which substantially increases the confidence in the results information.

As for the resources data, this report focused on interviews, which provide a "sketch" rather than a thorough accounting of time spent. While using interviews as the primary data source in this instance caused some concern, high-level results about general level of effort corroborate the budget and FTE information provided in DEQ staff interviews.

Interviews

The consultant team conducted interviews with DEQ staff from each of the regions and Headquarters. The interviews were organized as three hour group discussions covering TUWRAP activities and resources. Other topics of conversation included technical assistance comparisons to compliance activities and resources, overall compliance strategies, and TUWRAP effectiveness measures. In some

cases, information from the interviews helped create data tables, such as the time profiles (see Tables 9, 10, and 11). In other cases, the interviews supported and supplemented previous conclusions from data. See Appendix 2 for additional information about the interviews.

Use of the Draft DEQ "Deterrence Report"

As previously explained, the TUWRAP evaluation was designed to rely on existing data and interviews of DEQ staff rather than new data from surveys or outside research. The available information collected by DEQ focuses on the direct influence of technical assistance, primarily technical assistance site visits, on the facilities that receive technical assistance. It became clear early during the evaluation that the direct influence of technical assistance, while very important, is not the only important gauge of technical assistance's overall effectiveness. Assessing total TUWRAP effectiveness would require evaluating the overall population influence of technical assistance on both the group of companies that receive technical assistance directly and on those companies that may be indirectly influenced by technical assistance (e.g., by hearing about the technical assistance received by other companies).

To supplement the existing data and DEQ staff interviews, the consultant team used previous reports for additional information, including the draft DEQ deterrence report.[13] The purpose of the draft DEQ deterrence report is to evaluate the effectiveness of a range of tools for indirect deterrence. EPA's preceding effort with the National Performance Measures Strategy (NPMS) sought to compare different kinds of enforcement and non-enforcement tools, but did not measure deterrence. The draft DEQ deterrence report's primary objectives are to determine whether and what aspects of inspections, penalties and other enforcement tools are most important in creating general deterrence, and whether general deterrence is the critical factor in stimulating overall compliance.

For the deterrence report, surveys of randomly-selected Oregon residents and DEQ registered Oregon companies generated the primary data for the draft DEQ deterrence report to evaluate deterrence effectiveness. The public opinion information characterized the cultural norms that companies work within. Company surveys evaluated motivations for compliance compared to perspectives on risk on noncompliance. Overall, the report concluded that compliance inspections, technical assistance and penalty programs all exhibit effects of stimulating compliance at facilities that were not themselves inspected, assisted or penalized.[14] (Additional information of the methodology used for the draft DEQ deterrence report is included as Appendix 3 of this report).

The draft DEQ deterrence report's conclusions supplement the conclusions drawn by this report, both in terms of its findings on the direct influence of technical assistance and inspections and, more so, in terms of its findings on the indirect/population influence of technical assistance and inspections. Readers should be aware of the following caveats when considering how the draft deterrence report's findings relate to the TUWRAP evaluation's findings:

- The report's conclusions do not differentiate between changes made as a result of *hazardous waste technical assistance or inspections* versus technical assistance or inspections conducted by other programs. The Hazardous Waste Program's technical assistance program has a significantly larger field presence, is typically more compliance oriented, and is more well established than are the other media programs' (water and air) technical assistance programs.

[13] Oregon DEQ, Office of Compliance and Enforcement. *General Deterrence of Environmental Violation: A Peek Into the Mind of the Regulated Public*. March 2004 Draft. For information on this report, contact Les Carlough, Ph.D., J.D., Senior Policy Advisor, Office of Compliance and Enforcement. (503) 229-5422.

[14] Carlough, Les (Oregon Department of Environmental Quality). *General Deterrence of Environmental Violation: A Peek into the Mind of the Regulated Public*. 2003.

For these reasons, it is reasonable to think that the deterrence report's findings on technical assistance would be at least as strong if the hazardous waste program's technical assistance had been isolated from the other programs' technical assistance.

- The report did not explore regional variations in its findings.
- The report did not specifically clarify whether the changes made were compliance-specific, nor did it explore the magnitude of the types of changes that were made (some changes would have much greater compliance and environmental outcomes than others).
- The report's conclusions clearly identified a different pattern of incentives and influence for small companies, but did not include much specific data on this pattern.
- The report examined changes made "in the past three years" (between 1999 and 2002). This time period does overlap with the time period of the technical assistance and inspection activities examined as part of the TUWRAP evaluation. However, the TUWRAP evaluation's conclusions are largely drawn upon information collected a short time (within six months) after technical assistance was conducted.

These caveats do provide cause for hesitation when relating the deterrence report's findings to the TUWRAP evaluation's findings, but do not seriously restrict their relevance to the TUWRAP evaluation's conclusions for two reasons. First, the TUWRAP evaluation's conclusions compliment and support the deterrence finding's conclusions – there would be more cause for concern if they came to contradictory conclusions. Second, both reports' conclusions pertain to high-level programmatic findings – comparing and building upon both reports' findings at this high-level is still defensible. However, once the reports diverge from the high-level findings to the detailed level (as outlined in the caveats above), there are important differences that prevent detailed comparisons.

Use of Other Studies

Ideally, an evaluation of the long-term influence of technical assistance relative to compliance outcomes would examine both the influence of technical assistance and the influence of inspections (for comparison purposes). Unfortunately, these kinds of studies (as they would relate to the TUWRAP evaluation's questions) have not been conducted. DEQ has conducted studies that have evaluated TUWRAP's overarching strengths and weaknesses, and to the extent that the results of these studies are relevant to the TUWRAP influence evaluation, they are referenced.[15] One DEQ survey explored customer preferences for particular types of technical assistance, and although this survey is indirectly related to the guiding questions for this report, its general conclusions are cited in the discussion of the influence of technical assistance activities beyond site visits.[16] One somewhat-related study conducted by the Washington State Department of Ecology[17] did test the question of long-term results of both compliance inspections and technical assistance, and its results are cited in this report. Finally, several EPA, state, consultant, and non-governmental organization reports, articles, and fact sheets have been cited in the discussions on measurement and integration opportunities.

[15] 1994 Ross & Associates study, *Evaluating Technical Assistance Activities and Pollution Prevention Initiatives at DEQ*; 1994 DEQ Field Activities Handbook and accompanying Summary of Major Policy and Procedural Decisions Underlying the Field Activities Handbook, also prepared by Ross & Associates; 1999 "ODEQ Outreach Assessment and Recommendations" Survey by Dave Kunz., DEQ.

[16] 2002 Technical Assistance Review by Rich Grant, DEQ.

[17] Washington State Department of Ecology, Hazardous Waste and Toxics Reduction Program. *Office of Enforcement and Compliance Assurance (OECA) Project Summary Report: A Consolidated Overview of the Analysis Of Change In Generator Compliance Using Regulatory Compliance Indicators.* Publication # 02-04-014. April 2002. Available: http://www.ecy.wa.gov/pubs/0204014.pdf

TUWRAP Population and Activity Overview

The following overview of technical assistance activities as they relate to the evaluation of TUWRAP's influence covers:

- Toxic users and hazardous waste generator populations
- Generator status of inspection and technical assistance populations
- Technical assistance and compliance inspection population
- Type of technical assistance follow-up activities

Toxic Users and Hazardous Waste Generator Populations

The TUWRAP program addresses hazardous waste generators and handlers in Oregon. There are three levels of generator status for RCRA hazardous waste generators in Oregon: Large Quantity Generator (LQG), Small Quantity Generator (SQG), and Conditionally Exempt Generator (CEG). In Oregon, there are:

- 220 LQGs (< 1% of all generators, but the largest contributor of hazardous waste)
- 360 SQGs (< 1% of all generators, likely contribute a small percentage of total hazardous waste)
- The number of CEGs is very difficult to estimate. One estimate is as high as 41,000 or nearly 99% of total (total contribution of total hazardous waste is unknown)
- 300+ TRI Reporters[18]

Generator Status of Inspection and Technical Assistance Populations

Technical assistance and inspections serve somewhat different populations of generators. Technical assistance site visits serve a much larger number of CEGs (nearly 80% of total), fewer SQGs (roughly 20% of total), and far fewer LQGs (roughly 3% of total), whereas compliance inspections served 44% of LQGs, 37% of SQGs, and 19% of CEGs in FY 2003. (As described in the discussion on the evaluation methodology, the focus sample group of technical assistance recipients used for the TUWRAP effectiveness evaluation purposefully reflected a population that was closer in terms of generator status breakdown to the inspection population than the overall technical assistance recipient population in order to compare results of like groups of facilities with each other.)

Some facilities receive both technical assistance and inspections within a year or two of each other. The sample population focused upon for the TUWRAP evaluation identified several of these facilities, but it is unclear how often this is the case for the larger population because the sample purposefully aimed at identifying and learning from these examples.

Technical Assistance and Compliance Inspection Populations

Table 3 provides summary activity information on the number of DEQ technical assistance site visits, other technical assistance activities, compliance inspections, and complaint investigations conducted each year between FY2000 and FY2003.

[18] TRI reporters were not evaluated separately for this evaluation because doing so would have required more time and resources than were available.

Table 3. Technical Assistance and Inspection Activity Totals by Region, FY 2000-2003

Fiscal Year	TA Site Visits	Other TA Activities[1]	Inspections	Complaint Investigations
Eastern Region				
2000	86	25	38	44
2001	45	6	36	50
2002	40	14	30	46^
2003	39	2	24	45
Northwest Region				
2000	289	6	96	44
2001	83	37	103	41
2002	139	6	52	40^
2003	120	2	76	34
Western Region				
2000	232	7	47	9
2001	157	18	38	6
2002	258	6	37	51
2003	106	6	47	8
State Total				
2000	**607**	**38**	**181**	**97**
2001	**285**	**61**	**177**	**97**
2002	**437**	**26**	**119**	**137**
2003	**265**	**10**	**147**	**87**

* Data not available

Source: DEQ End of Year Accomplishment Reports, FY 2000-2003

[1] Other technical assistance activities include waste collection events and training events

^ Based on average number of complaint investigations covered during the other three years

On average during the four-year time period, technical assistance site visits were conducted at nearly twice as many facilities as inspections on average, or 1.5 times as often as inspections and compliant investigations combined. In addition to site visits, other kinds of technical assistance activity reach hundreds of additional facilities each year. Note that these totals reflect the "direct" recipients of technical assistance and inspections, rather than the total number of companies that may be exposed directly and indirectly (e.g., by word of mouth) to these activities. The variation in the number of technical assistance site visits has largely been a function of two factors: decreased state funding (in FY2003) and fluctuations in the number of technical assistance "blitzes" or focus projects that blanket particular industry sectors or geographic areas.

Type of Technical Assistance Follow-Up Activities

The measurements of technical assistance impacts are based on information collected by DEQ Regions during technical assistance follow-up. Across the three Regions, the most common form of follow-up is facility submission of the "DEQ Waste Reduction Assistance Program (WRAP) Site Visit To Do List" – the yellow carbon copy outlines which of the recommendations made during the site visit have been implemented. (Appendix 4 is a copy of this form.) The number of facilities these forms are collected from varies from Region to Region from 30% in the Northwest Region to 90% or more of the facilities that receive technical assistance site visits in the Eastern and Western Regions. The follow-up from other kinds of technical assistance activities is less clear. Trainings, workshops, and presentations often end

with a survey of the value of the training, but typically do not involve subsequent follow-up that tracks how many changes the recipients actually made.

It is possible that "self selection bias" is an issue with regards to the facilities that submit the To Do forms outlining which recommendations they have implemented: Those companies that have implemented more recommendations may be more likely to submit the form back to DEQ. This is least likely to be the case with regards to the Western Region's data which was verified through site revisits that confirmed whether the recommendations had actually been implemented. The Eastern Region's could be affected by self selection bias to some degree, but because only 10 percent of the facilities typically do not return the forms, this bias is likely to be small. The Northwest Region's form return rate (30 percent) is potentially more problematic with regards to the probably that self-selection is at play. It is reasonable to believe that the rate of recommendation implementation in this Region is at most as high as was described in the 16 Step 2 dataset cases where the forms were returned to DEQ.

The Western Region is the only Region that routinely conducts site re-visits within six months to verify whether the recommendations made during the initial site visit have been implemented. Over 90% of the technical assistance site visit recipients receive a follow-up site visit, with the remainder consisting of phone-call follow-up or letter exchanges. For the Western Region, the confirmation of change that these site re-visits have enabled has corroborated for the Western Region the written follow-up information received by the other Regions. Without this on-site confirmation of changes made, support for the findings regarding compliance and environmental outcomes would not be as confident. Interestingly, the site revisits could also be prompting facilities to implement more recommendations than they would if no further contact with DEQ were anticipated, although a separate analysis would be needed to determine whether this is the case.[19]

In the Eastern and Northwest Regions, nearly all follow-up focuses on exchanging letters with occasional phone or site revisit follow-up. In the Eastern Region, follow-up starts when the technical assistance staffer writes and sends a detailed letter with recommendations (see example provided in Appendix 5) along with the yellow copy of the technical assistance "To Do" form; the form is subsequently received filled-out from over 90% of the technical assistance recipients. In the Northwest Region, follow-up typically involves receiving the filled-in yellow copy of the "To Do" form when facilities choose to send the form, about 30% of the time. However, when a particular technical assistance initiative is a priority, such as in Portland Harbor, the Northwest Region makes a concerted effort to receive the yellow forms and thereby better understand how many recommendations have been implemented.

[19] This understood, one of the recommendations made on how to measure TUWRAP effectiveness is that site revisits are only needed for a small, representative sample of facilities that received technical assistance site visits. In other words, the Western Region staff has gone beyond what is necessary in their revisit efforts.

Results

Measuring TUWRAP's Influence: Final Report

Impact of TUWRAP on Hazardous Waste Handler Compliance

Approach

The evaluation looked at this question from multiple angles.

- Direct, short-term impact of technical assistance site visits on compliance.
  - To what extent do the topics covered during technical assistance site visits focus on compliance? To what extent are compliance recommendations implemented?
  - For those facilities that received both technical assistance and compliance inspections, does information suggest that there was a cumulative influence of both visits?
- Direct, short-term impact of other technical assistance activities on compliance.
- Direct, long term impact of all technical assistance activities on compliance.
- Indirect/population compliance: total impact (short and long-term) of technical assistance on the total population of facilities.

Direct Short-Term Impact of Technical Assistance Site Visits on Compliance

The data indicate that technical assistance site visits are having a positive impact on hazardous waste handler compliance. First, most (over 70 percent, on average) recommendations made during technical assistance site visits are compliance recommendations. There is also some regional variation in both the number of compliance recommendations made and the percentage of those recommendations that are implemented. Second, 90 percent or more of those recommendations appear to be implemented within six months of the site visits. Third, the specific types of compliance recommendations made during technical assistance site visits are similar to the compliance violations noted during inspections with the same facilities. Altogether, these data suggest that technical assistance site visits are helping to improve recipients' compliance for at least six months after the site visit. The following paragraphs outline these conclusions more specifically.

To what extent do the topics covered during technical assistance site visits focus on compliance? To what extent are compliance recommendations implemented?

Compliance-specific topics are the primary focus of the recommendations made during technical assistance site visits both state wide and regionally. As shown in Table 4, technical assistance site visits involve an average of between four and five compliance-related recommendations per visit or 71 percent of all recommendations made. Follow-up information indicates that, on average, recipients implemented approximately four of the compliance recommendations, or over 90 percent of all of the compliance recommendations.[20] For comparison purposes, the number of "beyond compliance" or non-regulatory recommendations and their rate of implementation is also included in Table 4. As described earlier in the

[20] The draft deterrence report (page 42, footnote 95) cited three previous DEQ studies measuring how many facilities accept and adopt compliance recommendations given through technical assistance (1996 Action Form Pilot Project, 81%; 1997 A-3 Channel SWAMP which is available at www.deq.state.or.us/wr/LocalProjects/A-3%20Channel/A-3%20Results.htm, 79%; 1998-2000 Calapooya and Sutherlin Creek Watershed Project, 80%) as reported in *Field Activities Tracking Study (FATS), Final Report*, Western Region, DEQ, unpublished manuscript.

report, confidence in this implementation rate data is supported by the site revisits conducted in the Western Region, which had similar implementation rates as the other Regions.

Table 4. Type of Technical Assistance Recommendations and Percentage of Recommendations Implemented (State-Wide Average)

Numbers reflect state-wide averages per technical assistance site visit. Data vary by Region (see Table 5)

Recommendation Type	Number	% of Total	Number Implemented	% of Recs Implemented
Compliance recommendations	4.68	71%	4.47	96%
Non-regulatory performance improvement recommendations	1.93	29%	1.75	88%
Total # of Recommendations	**6.61**	**100%**	**6.22**	**94%**

The data provided in Table 5 illustrate the regional variation in the number of compliance-specific recommendations made and implemented. These variations are likely to reflect the different approaches that each Region, and in some cases, each staff person, takes to conducting technical assistance site visits. On the individual staff, regional, and site-specific visit levels, there is some variation in the extent to which compliance topics are emphasized. Some facilities have more compliance needs than others, and some technical assistance staff have more compliance expertise than others. Despite the variations in these areas, the data indicate that, on average, between three and six compliance-specific recommendations were implemented following technical assistance site visits.

Even though the Eastern Region appears to have slightly fewer compliance recommendations on average than the other Regions, the main reason why the Eastern Region's *percentage* of compliance recommendations is substantially lower on average when compared to the other Region's is because the Eastern Region's staff are making more non-regulatory recommendations and therefore more recommendations on the whole.

Table 5. Type and Number of Technical Assistance Site Visit Recommendations and Number of Recommendations Implemented (by DEQ Region)

Recommendation Type	Region	Ave # of Recs	% of Total Recs in the Region	Avg. # Recs Implemented	% of Recs implemented
Compliance-specific	East	3.35	48%	3.35	99%
	Northwest	3.54	75%	3.23	91%
	West	5.43	81%	5.16	95%
Non-regulatory performance improvement	East	3.58	52%	3.37	94%
	Northwest	1.17	25%	1.00	85%
	West	1.26	19%	1.07	84%
Total	**East**	**6.93**	**100%**	**6.72**	**97%**
	Northwest	**4.71**	**100%**	**4.23**	**90%**
	West	**6.69**	**100%**	**6.23**	**93%**

Given that the emphasis of any particular site visit can vary depending on which DEQ staff is conducting the visit, one question is who conducted the site visits in the sample group. With this in mind, the sample group consciously included a "mix" of technical assistance staff and other considerations, such as generator status, to look at more closely.

Another question, however, is whether technical assistance staffing changes often, and if so, the extent to which the topics covered during technical assistance visits changes when different staff are conducting the visits. Technical assistance staffing has changed in each of the DEQ Regions in the past few years; several changes meant former technical assistance staffers who had many years – and in some cases decades – of experience in compliance have been replaced by newer staffers who do not have as much compliance experience.

The number of compliance recommendations made in each technical assistance site visit varied by generator status. As shown in Table 6, on average, the number of compliance recommendations was the highest for SQGs (7.0 per visit), followed by LQGs (5.5 per visit). CEGs had far fewer compliance specific recommendations. On the other hand, all categories of generators had a similar number of non-regulatory recommendations per visit.

The data alone do not explain the variation in the number of compliance-specific recommendations. Technical assistance and inspection staff, as well as reports on the topic, often surmise that large companies already are aware of compliance requirements and have the staffing and processes in place to adhere to those requirements. The motivators for these companies to receive technical assistance may be less to learn about compliance and more to confirm that they are "doing fine" in the compliance department and/or to learn about non-regulatory improvements that they can make. While these observations may explain the difference in the number of recommendations made between LQGs and SQGs, they do not explain the large drop off in number of compliance recommendations made for CEGs.

One explanation for the drop off in the number of recommendations could be the fact that CEGs have fewer requirements that SQGs and LQGs. Fewer requirements could mean that fewer compliance problems would be present and therefore fewer recommendations are needed.

Table 6. Average Number of Recommendations Made During Technical Assistance Site Visits

Gener-ator Status	Compliance –specific	Compliance Recommen-dations Implemented	Non - regulatory	Non-Regulatory Implemented	Total # Recommen -dations	Total Imple-mented	Total Number of Visits
LQG	5.7	5.5	1.5	1.1	7.2	6.6	43
SQG	7.3	7.0	2	1.7	9.3	8.7	12
CEG	1.6	1.5	2	1.5	3.6	3.0	46
Average	**4.7**	**4.5**	**1.9**	**1.7**	**6.6**	**6.2**	**101**

To examine this question in one more way, as shown in Table 7 the number of compliance violations noted during compliance inspections was examined according to the status of the generator that was inspected. It is important to remember that this data set was small – only 27 inspections – relative to the 101 facilities in the sample group that received technical assistance. Therefore, these data are less conclusive. What they show is that more violations were noted on average for LQGs than SQGs and that CEGs had the fewest number of violations.

Table 7. Average Number of Violations Per Inspection

Generator Status	Number of Violations	Total Number of Inspections in Sample
LQG	5.8	9
SQG	3.8	13
CEG	3.0	5
Average	**4.4**	**27**

Again, the data alone do not explain these differences, and it is uncertain whether these differences hold true for the larger population of facilities that receive inspections. The question still remains as to

whether generator status alone is a primary indicator of the extent to which companies will be out of compliance.

What types of recommendations are made during technical assistance site visits? Are they similar to the violations noted during compliance inspections? Is there a pattern of interaction between the technical assistance recommendations and compliance violations?

Table 8. Top 5 Technical Assistance Recommendations and Compliance Violations

Recommendations	Violations
Label/date hazardous waste containers	Failure to properly label and date containers
Perform hazardous waste determination	Failure to perform hazardous waste determination
Keep hazardous waste containers closed to avoid spill or release	Satellite accumulation violation
Manage waste properly	Contingency/Emergency plan incomplete
Label used oil containers	Used oil violation

For the 27 companies that received both technical assistance site visits and compliance inspections, the specific types of compliance recommendations made during technical assistance site visits and the violations discovered during previously-completed compliance inspections overlap substantially. The most common violations (failure to perform a hazardous waste determination and failure to properly label and date containers) were also the most common recommendation topics during technical assistance site visits. Several other types of violations were also similar to or the same as the types of recommendations made during technical assistance visits, including those surrounding incomplete contingency/emergency plans, the need for hazardous waste training plans, and used oil problems. The similarities and overlaps between technical assistance recommendations and inspection violations are a sign that both types of activities uncover and address similar compliance problems.

Interestingly, the overlap also raises a question about why the same compliance problems are occurring at facilities that first had a compliance inspection and later had a technical assistance site visit. The data do not provide enough information answer this question because, in nearly three quarters of the cases, the inspections had occurred more than three years before the technical assistance site visit, and in nearly half of the cases, the inspection was at least seven years prior to the technical assistance site visit.[21] The significant time lags, small data set, and additional questions (e.g., in some cases an additional technical assistance site visit was conducted in between the inspections and the later technical assistance site visit, but information on these "interim" technical assistance activities was not provided) together prevented conclusions from being drawn about this relationship.

In four instances, facilities that received technical assistance site visits had also received more than one compliance inspection. In each case, the inspections occurred prior to the technical assistance visit. In all cases, there was at least one recurring compliance problem from one visit to another (including from inspection to inspection) but other problems were not repeated. However, there was significant time lag between the visits received by these facilities, and that, together with the very small sample, makes drawing conclusions from this information suspect.

[21] DEQ was asked to submit information on inspections that had occurred up to five years prior to the technical assistance visit. Some additional information was provided on earlier inspections.

The sample data indicate that at least eight other facilities received both technical assistance visits and then, later, inspections – in some cases multiple inspections.[22] The results of these inspections at these facilities were not provided. DEQ may wish to examine this relationship at a later date.

Direct Short-Term Impact of Other Technical Assistance Activities on Compliance

In addition to technical assistance site visits, DEQ conducts a number of other technical assistance activities, ranging from sector-specific trainings to on-line college courses. Although recipients of these "other" types of technical assistance sometimes fill out questionnaires at the end of the technical assistance session or training, these questionnaires focus on overall satisfaction with the assistance received that day. Follow-up is not conducted to determine whether the lessons and recommendations covered during the technical assistance were actually implemented back at the facility. For this reason, the impact of these activities on compliance is not known.

One survey conducted in 2002 found that Oregon businesses and municipalities prefer technical assistance conducted by phone, written information, and Web-based information over site visits. The reasons for this preference and respondents past history with technical assistance were not explored, however, and it is possible that respondents saw "hands off" approaches as less threatening.[23] Another report, the March 2004 *DEQ Evaluation of the Toxic Use and Hazardous Waste Reduction Act*, also found that companies find a variety of technical assistance useful.[24] These studies do not directly address the measurable influence of the variety of technical assistance activities. Instead, they draw attention to the need to explore how to measure the influence of these activities so that customer preferences and tool effectiveness can both be factored into technical assistance planning.

Direct Compliance Impact of all Technical Assistance Activities in the Long Term

In all three Regions, technical assistance site visit follow-up activity is typically conducted once – within six months – after site visits. Information currently available, as well as "rules of thumb" about the durability of compliance inspection impact, indicate that inspections and other direct compliance interventions cause compliance levels to improve substantially, but that these improvements tend to fall off over time. The general "rule of thumb" in the inspection and compliance world is that facilities should be inspected once every five years to keep them in compliance. In April 2002, the Washington State Department of Ecology (DOE) released a study that corroborated this general rule. DOE found that the positive affects of compliance inspections of LQGs and MQGs [Medium Quantity Generators, which are equivalent to SQGs in Oregon] tend to wear off over time, and that after about five years, non-compliance becomes more pronounced and the potential for environmental impact appears to increase.[25]

Given the similarity between the compliance topics covered during technical assistance site visits and violations noted during compliance inspections, it is reasonable to expect that facilities' compliance improvements do "fall off" over time after technical assistance site visits. However, because information

[22] These facilities are: BPA Celilo, Tyco Electronics, Env. Protective Services, Sony Disc, Country Coach, Skyline Products, Adec, Gerome Mfg., and NW Industries. All except BPA Celilo are located in the Western Region.

[23] Oregon DEQ, Rich Grant. *2002 Business and Municipality TA Survey*. The survey had responses from 124 hazardous waste basic training participants and 366 NPDES permit holders. This study did not focus particularly on hazardous waste generators and did not ask whether the recipients had previously received technical assistance.

[24] Oregon DEQ, Land Quality Division. *Evaluation of the Toxic Use and Hazardous Waste Reduction Act. March 2004*. Available: http://www.deq.state.or.us/wmc/tuwrap.html

[25] Washington State Department of Ecology. *OECA Project Summary Report: A Consolidated Overview of the Analysis of Change in Generator Compliance Using Regulatory Compliance Indicators*, April 11, 2002

about the long-term impact technical assistance has upon compliance is not currently available, conclusions can not be drawn to answer the questions about the extent or timing of the drop off.

The draft DEQ deterrence report concludes that technical assistance, compliance inspections, and penalty activities all have a direct influence on companies. The report suggests that the compliance impact of technical assistance compares favorably with traditional compliance enforcement tools. On average, technical assistance resulted in 2.24 changes in behavior compared to 1.62 changes in behavior from inspections and penalties (1.47 changes resulting from inspections and 0.15 changes resulting from penalties). Therefore, on the whole, the draft deterrence report found the technical assistance activities of DEQ as a whole had a larger direct influence on the number of changes a facility would make to its manufacturing or operating processes than did DEQ's inspections and penalties. These changes were made at some within three years after the technical assistance/inspection-plus-penalty, and therefore can be considered "mid-term" changes. Again, as previously noted, the draft DEQ deterrence report's findings should be understood in light of the previously mentioned caveats, including the fact that the report did not evaluate the types of changes made and how vital the changes were to compliance.[26]

Population Compliance/Total Impact on Entire Population of Facilities

The TUWRAP evaluation employed existing information collected by DEQ technical assistance staff. This information relates exclusively to direct or "unit" effectiveness. However, the draft DEQ deterrence report explored the extent to which DEQ compliance inspections (and penalties) and technical assistance had the indirect effect of motivating other facilities to improve their compliance practices even when the facility had received neither technical assistance nor an inspection. The draft deterrence report's results are relevant to the question on TUWRAP's impact on population compliance. However, they should be understood in light of the caveats explained already explained (see previous page) in this report, including that they relate to the overall influence of all DEQ's technical assistance activities, not just those conducted by the hazardous waste program.

For the 450 Oregon companies surveyed for the deterrence study, inspections, technical assistance, and penalties all lead to a substantial amount of indirect change amongst facilities that were not direct recipients of those actions: 39% made changes as a result of hearing about DEQ inspections, 33% made changes resulting from hearing about DEQ technical assistance efforts, and 14% made changes resulting from hearing about DEQ penalties against other firms. Translated into the number of changes made, companies made at least one as a result of hearing about *technical assistance received by other companies.* Inspection and penalty actions combined directly generated an average of between two to three changes made by companies that later heard about the inspection or penalty. In short, technical assistance indirectly caused one change per company, and inspections and penalties indirectly caused between two and three changes per company.

The deterrence report found that small companies were less likely to assure compliance, make environmental changes, request technical assistance, or be aware of DEQ compliance assurance efforts. Current enforcement efforts were found to be less likely to have a deterrence effect with this population, in part because they typically do not have the personnel or time to devote to environmental compliance.

[26] The caveats are these: First, the deterrence report does not differentiate between hazardous waste technical assistance and other programs' technical assistance. Second, the deterrence report does not differentiate between on-site technical assistance and other kinds of technical assistance. Third, the deterrence report survey asked companies about changes they made to manufacturing or operating processes, but did not distinguish between changes in those areas that related to compliance specifically versus those that were non-regulatory changes or beyond compliance. Finally, the deterrence report looked at changes made within the last three years, whereas the technical assistance site visit follow-up measured recommendations implemented in the last six months.

TUWRAP's Environmental Outcomes

The Western Region's technical assistance field staff have been more regularly tracking environmental outcomes of both technical assistance site visits and inspections, but based on the data submitted on the environmental outcomes of the sample technical assistance site visit recipients, environmental outcome tracking is neither routine nor consistently implemented.

Environmental outcome information was provided on approximately one quarter (24) of the technical assistance site visits in the sample population. In those instances, best professional judgment found that marked improvements have been observed, such as "hundreds of pounds of hazardous waste diverted per year" or "250 pounds of toxic chemicals reduced." These data suggest that there are strong environmental improvements based on the recommendations made. The information on environmental outcomes is limited to these 24 cases which alone do not provide enough information to draw conclusions on the environmental outcomes of technical assistance site visits in general.

At the same time, the recommendations made across technical assistance visit are similar, so it does follow that if implementing them in one facility would have an environmental result than it would follow that implementing them in another facility could have a also result in environmental improvements, even though the scale of those improvements would vary substantially from site to site.

It is also important to note that there appear to be inconsistencies in the way that best professional judgment has been applied to interpret environmental outcomes, perhaps because guidelines have not been set about how to apply best professional judgment consistently. For example, it is possible that one technical assistance field staff interprets a particular result as X pounds "safely managed" where as another interprets the same result as X pounds "diverted." These potential inconsistencies leave the estimates on environmental outcomes that have been produced vulnerable to questioning.

The environmental outcomes of other technical assistance activities are also not currently routinely tracked. Thus, although environmental improvements are undoubtedly resulting from implementation of the recommendations made during technical assistance visits and via other technical assistance activities, the available data alone do not indicate a clear pattern on the range or regularity of those improvements.

Generating meaningful data when tracking environmental outcomes of these kinds of activities is a challenge that agencies across the country and across the world are facing. If solutions to this challenge were simple and readily available, they would have been implemented long ago. Recommendations for measuring TUWRAP's environmental (and other outcomes) are provided later in this report.

DEQ has developed plans to track environmental outcome data (for both technical assistance and inspections) in the Oregon Hazardous Waste Information Management Exchange (OHWIME) system. OHWIME will track a variety of outcome data, including the amount of hazardous waste reduced, eliminated, and safely managed; cost savings; and technical assistance site visit recommendations.

Although plans are in place to track routinely the environmental outcomes of technical assistance site visits through the next phase of OHWIME implementation, most current technical assistance results tracking focuses on technical assistance activities and, to some extent, recommendations. As previously described, the standard way of documenting technical assistance outcomes is with the site visit "To Do" list (see Appendix 4). This tracks recommendations by category and then tracks whether the recommendation has been implemented based on whether the technical assistance recipient circles "done" or "not done" next to each recommendation before returning the (yellow copy) form to DEQ. In other words, the environmental outcomes for each visit are not tracked on the To Do list.

Costs of TUWRAP and Compliance Inspections

This part of the evaluation examined the high-level value of technical assistance as a compliance "plus" tool by first gauging the overall level of effort associated with conducting technical assistance and inspections and then assessing the anticipated outcomes from technical assistance relative to the level of effort expended. Information on the level of effort was gathered during the interviews and then checked at a high-level against summary resource investment data provided previously by DEQ. The information provides general estimates for the range of time that these activities take. Although the information is not perfect (for example, it does not explore the variation between times spent by generator status) the information does provide ballpark estimates that help to assess the overall level of effort required by these activities.

Table 9, below, outlines the range in the overall level of effort employed on technical assistance site visits. The variations between Regions are likely a product of the different approaches taken by the Regions, and field staff within the Regions. The average amount of time being spent on technical assistance site visits from start to finish[27] ranges from nearly six hours (NW Region) to 17 hours (Western Region) to 24 hours (Eastern Region). Further variation is captured by the low-end (least intensive 20 percent of the visits) and high-end (most intensive 20 percent) range.

To understand the regional variations, it may help to note that the Northwest Region sometimes takes a different approach to technical assistance by focusing on major technical assistance efforts targeted for particular geographic areas or industries. In the past several years, the Northwest Region has undertaken technical assistance "blitzes" where it has visited hundreds of companies relatively quickly in order to reach the target community. For some of these initiatives in the Northwest Region, hazardous waste generator compliance was a focus, whereas others, such as water in the Portland Harbor area initiative, focused on other pressing issues (such as hazardous material storage in the case of the Portland Harbor).

The time spent on inspections also varies within and between Regions. The Western Region requested additional time to evaluate this question and provide what they thought to be the most accurate representation of the time spent on these activities. However, the overall conclusions about level of effort expended on inspections versus technical assistance are not changed by the regional variation in the time estimates provided.

Based on the information provided, the average amount of time spent from start to finish on inspections ranges from roughly 41 to 66 hours per facility, excluding cases where Class 1 violations are found. The majority of this time is spent on inspection follow-up activities, which include follow-up research and preparation of the inspection report (24 hours on average in the Eastern and Northwest Regions and 30 hours on average in the Western Region), and writing a Notice of Non-compliance (NON) or follow-up letter if no violations were found (four hours each in the Eastern and Northwest Regions and 16 hours in the Western Region).

Roughly 30 percent of inspections reveal Class 1 violations. These cases are referred to the enforcement staff for enforcement action and, if applicable, penalties. The time spent by the inspectors (excluding enforcement staff) on these facilities after the inspection ranges from at least 11 hours in the Eastern Region to 40 hours in the Western Region. In addition, substantially more time is required of the inspection staff if these cases are not closed in a timely manner.

[27] Excluding travel time.

Table 9. Technical Assistance Activity and Time Profiles by Region

	Eastern Region			Northwest Region			Western Region		
Activity	**Time (low)**	**Time (ave)**	**Time (high)**	**Time (low)**	**Time (ave)**	**Time (high)**	**Time (low)**	**Time (ave)**	**Time (high)**
Visit Preparation									
Schedule and arrange for visit	0.25	0.25	0.25	0.75	0.75	0.75	0.5	0.75	1
Research facility	0	2	16	0	0.5	8	1	2	3
Subtotal:	**0.25**	**2.25**	**16.25**	**0.75**	**1.25**	**8.75**	**1.5**	**2.75**	**4**
Conduct Visit:									
Introduction & facility overview	0	0.5	1	0.1	0.5	0.75	0.5	0.75	1
Facility tour	1	3	14	0.5	1.5	6	1	2	3
Reconvene and discuss tour	0	1	2	0	0	0	1	1.5	2
Record review	0	1	3	0	0.5	1	0.5	1	1.5
Fill out TA form	0	0	0	0.25	0.25	0.25	0.5	0.75	1
Closing interview	0.25	0.5	1	0.25	0.25	0.25	0.5	0.75	1
Subtotal:	**1.25**	**6**	**21**	**1.1**	**3**	**8.25**	**4**	**6.75**	**9.5**
Visit Follow-up									
Fill out TA form	0.25	0.25	0.25	0	0	0	0	0	0
Prepare and mail TA report	3	12	20	0	0	0	0	0	0
Additional topic research	0.25	0.5	3	0	0	0	1	2.5	4
Revisit	0	0	0	0	0	0	1	2	3
Calling - request yellow form	0	0.25	0.5	0	0.25	0.5	0	0	0
Subtotal:	**3.5**	**13**	**23.75**	**0**	**0.25**	**0.5**	**2**	**4.5**	**7**
Data Entry									
Enter data into OHWIME	1	2	3	0.25	0.25	0.25	1	1.5	2
Subtotal:	**1**	**2**	**3**	**0.25**	**0.25**	**0.25**	**1**	**1.5**	**2**
TOTAL:	**6.25**	**24.25**	**66.5**	**2.35**	**5.75**	**21.75**	**9.5**	**17.5**	**25.5**

Table 10, below, provides an estimate of the amount of time inspection staff spend on compliance inspections in each of the DEQ Regions. Table 11 provides the same information for those inspections that result in Class 1 violations (excluding enforcement staff time and cases that do not resolve quickly). As with the technical assistance site visit time estimates, the inspection time estimates do not include time for travel to and from the facilities, program management and planning, or general/clerical support.

Table 10. Inspection Activity and Time Profile by Region

	Eastern Region			Northwest Region			Western Region		
Activity	**Time (low)**	**Time (ave)**	**Time (high)**	**Time (low)**	**Time (ave)**	**Time (high)**	**Time (low)**	**Time (ave)**	**Time (high)**
Inspection preparation									
Schedule and arrange for inspection	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25
Research facility	0	2	16	0	2	16	1	4	24
Subtotal:	**0.25**	**2.25**	**16.25**	**0.25**	**2.25**	**16.25**	**1.25**	**4.25**	**24.25**
Conduct Inspection									
Waiting in lobby	0	0.25	0.25	0	0.25	0.25	0	0.25	0.25
Introduction and general overview	0	0.5	1	0	0.25	0.5	0.5	2	4
Facility tour	1	4	16	1	5	24	2	6	30
Record review	0	1	3	0	1	5	1	4	10
Closing interview	0.25	0.5	1	0.25	0.5	1	0.25	1	4
Subtotal:	**1.25**	**6.25**	**21.25**	**1.25**	**7**	**30.75**	**3.75**	**13.25**	**48.25**
Inspection Follow-up									
Prepare inspection report, including research	8	24	51	8	24	51	8	30	60
Where applicable, write NON or follow up letter (with no NON)	3	6	15	3	6	15	3	16	32
Subtotal:	**11**	**30**	**66**	**11**	**30**	**66**	**11**	**46**	**92**
Data Entry									
Enter data into OHWIME	1	2	3	1	3	4	1	2	3
Subtotal:	**1**	**3**	**4**	**1**	**3**	**4**	**1**	**3**	**4**
Total (No Class 1 Violations)	**13.5**	**41.5**	**107.5**	**13.5**	**42.25**	**117**	**17**	**66.5**	**168.5**

Table 11. Additional Inspection Staff Time for Class 1 Violations (Minus Additional Work if Case Not Quickly Closed)

	Eastern Region			Northwest Region			Western Region		
Referral and Follow-up Process	**Time (low)**	**Time (avg)**	**Time (high)**	**Time (low)**	**Time (avg)**	**Time (high)**	**Time (low)**	**Time (avg)**	**Time (high)**
If Class 1 violation, referral to enforcement	2	2	2	2	4	8	4	20	40
Enforcement assigns someone	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Inspector and manager reviews enforcement action	2	2	2	1	1	4	2	4	16
Enforcement staff drafts civil penalty and Notice of Violation (NOV)	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Regions review NOV	n/a	2	n/a	n/a	n/a	n/a	2	2	2
Senior enforcement person signs off on reviewed NOV	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Director (DA) reviews and signs final NOV	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
NOV sent to facility	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Informal enforcement discussions with respondent and enforcement staff	2	6	20	2	6	20	2	6	20
Ensures action has been taken	0.25	1	8	0.25	1	8	0.25	8	40
Additional work if case not closed (e.g., contested case hearings, criminal cases)	*	*	*	*	*	*	*	*	*
Subtotal:	**6.25**	**13**	**32**	**5.25**	**12**	**40**	**10.25**	**40**	**118**
Total for Class 1 Violations (if Case Closed Quickly)	**19.75**	**54.5**	**139.5**	**18.75**	**54.25**	**157**	**27.25**	**106.5**	**286.5**

* The time needed for this additional work can range from days to months.

Given this information, the general time spent on inspections per facility relative to the time spent on technical assistance site visits ranges from between 1.75 to 1 in the Eastern Region, 3.8 to 1 in the Western Region, and 8 to 1 in the Northwest Region (excluding travel time and Class 1 violations). The state-wide weighted average is approximately 4:1 direct time spent on inspections relative to time spent on technical assistance site visits.[28] These totals do not include the time spent on other technical assistance activities, management time spent planning technical assistance or inspection activities, or, as mentioned, the time spent on Class 1 violations. Therefore, at best, these estimates should be considered ballpark estimates of direct-contact level of effort for technical assistance and inspections on the whole.

[28] Weighted hours (FY2003) = (sum of total number of hours spent in all regions on inspections (7,330) divided by the total number of inspections (147)) divided by the (sum of the total number of hours spent in all Regions on technical assistance (3,500) divided by the total number of technical assistance site visits (265)).

Table 12. Other TA Activity and Time Profile per Region per Year

Activity	Time (avg)	Description
Training		
6-hour training	250	50 hours per session (5 per year) for preparation, planning, travel, setup, registration and certificates
Small presentations	96	16 hrs per presentation (6 per year) for planning, travel, set-up, etc.
Web-based training- certificates	8	Per year (does not include 250 hours for one-time program launch)
Subtotal:	**354**	
Marketing		
Success stories and fact sheets	210	23 hrs per success story; 6 per year. Can involve travel, meeting with facility for photos, etc.
Marketing Reports	120	60 hrs each; 2 per year
Website	20	5 hrs per quarter
Ad Hoc Reporting	160	4 hrs per week during session; session is 40 weeks per year
Designing OHWIME	24	2 hrs per month
Dealing with OHWIME issues	96	8 hrs per month
Subtotal:	**630**	
Partnering		
P2O (P2 Outreach Team)	70	Includes ECO Biz - 6 hrs per month
General partnering[1]	160	Meet with emergency planning groups, industry groups, environmental groups, etc. 32 hrs per month in NW Region.
Public phone calls	100	100 calls per month (average across Regions), 5 minutes per call
Subtotal:	**330**	
Reporting – Tracking		
Monthly tracking	18	1.5 hrs per month
Quarterly reporting	32	8 hrs per quarter
Subtotal:	**32**	
Total time per Region per year:	**1,346**	

[1] The Northwest Region may be the only Region that conducts a significant amount of general partnering (between 350-400 hour per year). Other Regions are likely to spend between 50-100 hours per year on this set of activities. The regional average for General Partnering was therefore reduced to 160 hours per year to reflect regional differences.

According to the provided data, the total amount of time spent on other technical assistance activities is roughly 1,350 hours per region or approximately 4,000 state-wide. Using FY2003 data, technical assistance site visits calculate to approximately 4,000 hour per year, bringing the grand total amount of time spent on technical assistance to about 8,000 hours per year. These totals reflect direct activities and do not include the management and overall planning time needed to implement the TUWRAP program.

Based on the data provided, the total number of hours spent by inspection staff on inspections is approximately 15,000 per year. This total excludes the time spent by the enforcement staff and other DEQ staff who may be involved in the planning, management, and execution of these activities. Nonetheless, the information do reflect an overall level of effort devoted to technical assistance is slightly less than half of what is devoted to compliance (by inspectors) state wide. As shown below in Table 13,

this ratio is corroborated by the information provided by DEQ about the total number of FTEs devoted to each of these activities; nearly three times the resources are devoted to compliance activities as to TUWRAP.

Table 13. Compliance and TUWRAP Expenditures FY 1999-2003

Expenditures shown in millions of dollars

	Compliance			TUWRAP			
FY	**Direct[1]**	**Indirect[2]**	**Total**	**Direct[1]**	**Indirect[2]**	**Total**	**Total**
1999	$1.02	$0.42	**$1.44**	$0.69	$0.22	**$0.91**	**$2.35**
2000	$0.99	$0.58	**$1.56**	$0.79	$0.21	**$1.00**	**$2.56**
2001	$1.02	$0.63	**$1.64**	$0.86	$0.26	**$1.12**	**$2.76**
2002	$0.73	$0.56	**$1.29**	$0.57	$0.12	**$0.69**	**$1.98**
2003	$0.82	$0.63	**$1.44**	$0.43	$0.09	**$0.52**	**$1.96**

Dollars rounded to the nearest $100,000.

[1] Direct = direct site visits (compliance inspections or technical assistance), excludes clerical and management

[2] Indirect = clerical and management

This general resource expenditure data provided by DEQ, shown in Table 14, indicate that the compliance program expenditures have averaged 1.7 times TUWRAP expenditures over the past four fiscal years. In FY2003, this relationship was 2.8 to 1 with the shrinkage in TUWRAP expenditures due largely to shrinking state resources. (Some additional hiring of technical assistance staff has occurred since the time frame for which these data apply.)

Table 14. Number of Hazardous Waste (Compliance and TUWRAP) Full-time Equivalents (FTEs) FY 1999-2003

	Compliance FTE			TUWRAP FTE			Total FTE
FY	**Direct[1]**	**Indirect[2]**	**Total**	**Direct[1]**	**Indirect[2]**	**Total**	
1999	12.9	5.7	**18.7**	9.3	2.9	**12.3**	**30.9**
2000	11.2	7.3	**18.5**	9.6	2.5	**12.2**	**30.7**
2001	11.2	7.9	**19.0**	9.8	3.0	**12.8**	**31.8**
2002	9.4	8.8	**18.2**	7.5	1.6	**9.1**	**27.3**
2003	9.6	8.9	**18.5**	5.5	1.0	**6.6**	**25.1**

[1] Direct = direct site inspections/visits, excludes clerical and management

[2] Indirect = clerical and management

The question then becomes whether it is possible to draw conclusions about the resources invested relative to the compliance and other recommended changes that resulted from technical assistance direct/unit influence and technical assistance indirect/population influence. How does the value of technical assistance compare to that of inspections? This question is complicated and cannot thoroughly be answered with the available information. Both the resources invested and the results of those investments must be assessed.

The TUWRAP effectiveness evaluation did not explore the direct/unit or indirect/population effectiveness of inspections alone. The draft DEQ deterrence report did make this direct comparison, and its conclusions, particularly when combined with the data collected for the TUWRAP effectiveness evaluation, do provide a basis for understanding these relationships. The draft deterrence report found

that, on average, companies made between two and three changes as a result of receiving technical assistance and between one and two changes as a result of having received inspections and in some cases penalties. Despite the clear caveats, the draft deterrence report's conclusions about direct influence of technical assistance on company behavior are generally supported by the data collected for the TUWRAP evaluation, which showed that, in the short term, companies that receive technical assistance site visits implemented approximately four compliance-specific recommendations per visit on average.[29] The data evaluated for the TUWRAP effectiveness evaluation do not provide reason to believe that the deterrence report *overstates* the direct influence of technical assistance on company behavior.

When the resource investment of technical assistance site visits is factored in, technical assistance appears to have be a "good value" given that, with a smaller resource investment, at least as many changes have been made by technical assistance recipients as by inspection recipients (according to the draft deterrence report's findings).

These technical assistance and inspection results have been measured at a time when there has been a particular "mix" of inspections and technical assistance. Given that one of the largest motivators for technical assistance recipients to seek and respond to technical assistance is the alternative of compliance inspection and the associated threat of penalties. Given the available information, there is no reason to believe that the documented influence of technical assistance would stay the same if the "mix" of technical assistance and inspections were to change. In other words, the changes found from by the draft deterrence report can only be expected given the inspection and penalty presence found in the study's time period (mid 1999-mid 2002).

With regards to the "population" or deterrence value equation, a few conclusions relevant to the TUWRAP evaluation question can be drawn based upon information provided from the draft DEQ deterrence report. As already noted, the draft report found that, on average, companies made approximately one (indirect) change as a result of *hearing* about DEQ technical assistance and between two and three changes as a result of hearing about DEQ inspections and penalties (combined).

Further, the draft deterrence report stressed that smaller companies were less likely to have heard about or responded to hearing about inspections and enforcement, and, in general, are less likely to perceive a threat from inspections or penalties. Therefore, small companies – the primary recipients of technical assistance – can not be expected to respond to the deterrence to the same extent as larger companies. In order to increase the indirect responsiveness of small companies to inspections and enforcement, the companies would need to become more *aware* of the threat of inspections and enforcement.

Although it is not certain whether more technical assistance would result in a greater indirect influence of technical assistance on other companies (non technical assistance recipients), this question becomes interesting solely because technical assistance reaches more facilities and costs less per facility when compared to compliance assurance.

[29] The caveats are these: First, the deterrence report does not differentiate between hazardous waste technical assistance and other program's technical assistance. Second, the deterrence report does not differentiate between on-site technical assistance and other kinds of technical assistance (for which the TUWRAP evaluation is unable to draw strong conclusions about effectiveness). Third, the deterrence report survey asked companies about changes they made to manufacturing or operating processes, but did not distinguish between changes in those areas that related to compliance specifically versus those that were non-regulatory changes or beyond compliance. Finally, the deterrence report looked at changes made within the last three years, whereas the technical assistance site visit follow-up measured recommendations implemented in the last six months.

Both the draft deterrence report's findings and the TUWRAP evaluation's findings were based upon a "snapshot" of the balance of technical assistance and inspections from the past few years. Further, DEQ staff agree that companies have the incentive to receive technical assistance in large part because of the inspection and enforcement "presence" and therefore, even if technical assistance provides "good value" both in terms of direct and indirect influence, the motivation to achieve compliance (through technical assistance or other means) have only been tested with the current mix of DEQ activities. Responsiveness to technical assistance and inspections could change if this mix were changed. As voiced by the DEQ staff, both approaches are critical to an integrated, multi-faceted, compliance "plus" package.

Measuring TUWRAP Effectiveness

The reasons for measuring the results for any TUWRAP-like program include understanding the program's knowledge, behavioral, and environmental outcomes.[30] Measuring results can also help to identify specific areas where programs are having greater or lesser influence, which in turn could help organizations to tailor programmatic efforts and create a strong basis for planning future strategies. Last but not least, measuring results can help to promote and ensure accountability to stakeholders, including the public, program funders, and other critical partners.

The results regarding TUWRAP's compliance impacts, environmental outcomes, and costs provide the basis for understanding what can confidently be said today about TUWRAP's influence and its influence relative to the level of effort put into the program. The fact that these determinations can be made today indicates that DEQ has been attentive to measuring TUWRAP results.

Although a substantial amount can be said today about TUWRAP's influence, and DEQ's plans for additional measurement through OWIME will institute substantial improvements, there are still areas where changes to how technical assistance is measured would further demonstrate TUWRAP's influence on both compliance and environmental outcomes. The opportunities draw in part from the difficulty in using the available data to draw robust conclusions about program impact, the variability encountered in the way Regions approach measurement, and the lack, in particular, of data on mid-to-long-term (i.e., 1-5 year) program impacts and indirect/population impacts.

The opportunities offered in this report are geared toward creating a surgical, statistically-valid, reproducible approach that reduces the vulnerability of the TUWRAP program to challenge, thereby increasing the ability of DEQ to work on its own and with EPA on an integrated compliance strategy while still keeping the focus on service delivery to Oregon companies.

Three contextual topics are important to note when considering the opportunities for increased measurement. First, regardless of whether DEQ decides to make changes to its measurement procedures, it already has the fundamental components of an integrated compliance assurance strategy that includes technical assistance. Improving program measurement would simply increase the strength of the integrated strategy and expand upon what can be said about the strategy's results. Second, improving program influence measurement – particularly in terms of environmental outcomes – is a longer-term effort that is being undertaken by many environmental agencies, including other state agencies and EPA. Acting upon the opportunities on top of DEQ's current plans for improved outcome measurement would set the bar high for DEQ and make DEQ's measurement approach one of the stronger approaches in the country. Third, acting upon the opportunities would create a program measurement system that surpasses that currently undertaken by the DEQ hazardous waste enforcement program.

The core measurement needs relate to the following current weaknesses:

1. Ensure that compliance-specific data about compliance impacts are used to answer questions about compliance impact.
2. Increase the reliability, validity, and state-wide applicability of current short-term impact measurement efforts including the mail out/mail in forms and revisits;
3. Create a basis for measuring the impact of other technical assistance activities;
4. Improve the consistency, validity, and state-wide applicability of the efforts to measure environmental performance improvements;
5. Plug the current hole in knowledge about the mid-to-long-term impact of technical assistance;

[30] See the TUWRAP program Logic Model on page 2 for a description of these intended outcomes.

6. Ensure a mechanism will stay in place to measure the population (or indirect) effect of technical assistance; and
7. Strengthen the argument for flexibility from EPA (if flexibility is desired), and strengthen the basis for DEQ to receive recognition for technical assistance as contributing to EPA's compliance goals and objectives.

The opportunities are divided into two categories: process and measures.

Process Opportunities

The process opportunities are divided into six opportunity areas:

1. Strengthening the measurement of technical assistance's compliance impacts by clarifying the expectations and consistency of compliance-focused technical assistance;
2. Strengthening technical assistance follow up;
3. Measuring the influence of other technical assistance activities;
4. Instituting a policy for evaluating and documenting environmental outcomes;
5. Developing a plan to measure long-term technical assistance influence; and
6. Developing a plan to measure the indirect/population influence of technical assistance.

Opportunity Area 1: Strengthening the measurement of technical assistance's compliance impacts by clarifying the expectations and consistency of compliance-focused technical assistance

The first opportunity for measuring technical assistance effectiveness would require a DEQ management decision about how to conduct technical assistance. This opportunity is explained in more detail. It also relates to the final question regarding integrating TUWRAP into DEQ's overarching compliance assurance program.

Consider distinguishing between compliance "plus" and other kinds of technical assistance site visits: Currently, technical assistance site visits vary in their focus on compliance and certain technical assistance site visits do not focus on compliance at all, but rather, by design, focus on other environmental management topics of interest to facilities. Unless this compliance-focus range of technical assistance visits is changed to ensure that all technical assistance site visits cover compliance, it would be unrealistic to expect that every technical assistance site visit will have compliance results. DEQ therefore has the option of clarifying which technical assistance site visits can be expected to have compliance results and then differentiate between the "compliance" visits and the "other" visits.

Making this distinction can substantially aid program impact measurement by ensuring that DEQ does not "water down" its compliance results with data from visits that do not focus on compliance assistance. Further, this distinction could strengthen DEQ's commitment to ensuring compliance outcomes from technical assistance and also help EPA to have confidence that technical assistance site visits (those that are compliance oriented) will lead to compliance results. Distinguishing between "compliance" and "other" technical assistance site visits would also provide the opportunity for DEQ to create a standard set of expectations for what a compliance-oriented technical assistance site visit would entail. Making this distinction would help ensure that compliance visits would be the only visits that would be expected to cover a full compliment of compliance topics and have real compliance results. This distinction could also strengthen EPA's confidence in the compliance effectiveness of DEQ's technical assistance site visits.

If this change were made, DEQ would want to consider setting a target for the number of compliance visits that will be conducted each year and, if desired, the other/limited scope visits. As part of this shift,

DEQ could establish a base set of expectations for what compliance "plus" visits will entail, such as a checklist of compliance topics to be covered.

Consider categorizing recommendations as compliance and other: When documenting site visits, DEQ could categorize the recommendations made into compliance and other recommendation categories. This information is not routinely tracked today and there are not plans to track information this way in OHWIME even though more detailed recommendation information is planned for inclusion in OHWIME. Tracking compliance and other recommendations was a fundamental part of this evaluation's findings on TUWRAP's influence and has been employed in some reports on technical assistance that DEQ has published in the past.

Making this distinction will simply help DEQ to quickly and routinely track the extent to which technical assistance site visits are focusing on and influencing recipients' compliance and also whether there are particular compliance problem patterns that could help to inform future emphasis areas for technical assistance focus. Other agencies (e.g., Thurston County in Washington State – see Appendix 7) have used this kind of information to decide upon a short list of compliance issues to focus routinely on when conducing technical assistance site visits.

Consider establishing a set of priority compliance recommendations: DEQ may want to consider categorizing recommendations (compliance or other) as priority recommendations. This could help to track the rate of more serious compliance and other environmental problems, provide a basis for where to follow up more actively, and enable tailoring technical assistance (future visits, trainings, etc.) to address these particular problems in the future (see also, recommendation 2).[31]

Opportunity Area 2: Strengthening technical assistance follow up

Consider setting a target for receipt of written forms: To more thoroughly assess technical assistance results and to have a stronger basis for technical assistance strategic planning based on those results, DEQ could set a target for receiving written confirmation of changes made from technical assistance site visit recipients. A reasonable target would be 75 percent of all technical assistance site visits. This target is already met, or close to being met, in two of the three Regions.

Consider ways to ensure the consistency of communication with technical assistance recipients: To ensure consistency from both a staff management perspective and a technical assistance recipient perspective, DEQ could clarify the expectations for how the written communication will be handled with the technical assistance site visit recipients. Currently, each Region has its own approach, ranging from very little written communication to extensive letters outlining issues found and recommendations made. The data on the sample population do not indicate that one approach is yielding dramatically different results than another, even though the total number of non-regulatory recommendations made and implemented does appear to be higher in Eastern Region, which often writes extensive follow-up letters. However, far less information on technical assistance follow-up is available in the Northwest Region, where less emphasis is placed on receiving written confirmation that the recommendations made during the technical assistance visits have been implemented.

Ensuring consistency of technical assistance practices – a theme throughout this report – has been recommended in at least four previous studies:

[31] DEQ could also consider whether to more actively follow up with those facilities that have not implemented priority recommendations, assuming that priority recommendations are being tracked.

- 1994 Ross & Associates study, "Evaluating Technical Assistance Activities and Pollution Prevention Initiatives at DEQ;"
- 1994 DEQ *Field Activities Handbook* and accompanying Summary of *Major Policy and Procedural Decisions Underlying the Field Activities Handbook*, also prepared by Ross & Associates;
- 1999 "ODEQ Outreach Assessment and Recommendations" Survey by Dave Kunz, DEQ; and
- 2002 Technical Assistance Review by Rich Grant, DEQ[32]

Consider conducting targeted site revisits: The level of confidence in the compliance impact data provided by DEQ for this evaluation was significantly higher because the Western Region had conducted revisits of roughly 90 percent of the sample site visits and in so doing verified the results reported on the To Do form by the facilities. The Western Region's compliance results also were fairly consistent with the compliance results shown in the other Regions, and therefore some increased confidence in the data from the other Regions was also achieved.[33]

DEQ will want to act on the opportunity to institutionalize site revisits if it wants to confirm that the information on recommendation implementation provided in the To Do form by technical assistance recipients is accurate. In this case, within the first six months after the technical assistance, DEQ would want to conduct revisits at a statistically-valid representative subset of technical assistance recipients in each Region. Based on the number of technical assistance visits conducted in 2003 and a few assumptions, revisits of 97 randomly-chosen facilities would substantiate those results within a 95 percent confidence interval and +/- 10 percent error.[34] Acting on this would mean that the Western Region could conduct far fewer revisits and that the Northwest and Eastern Region will need to conduct more revisits. DEQ would also want to schedule and conduct these visits after receiving the form on which the company has indicated whether it has made the recommended changes to truly test the accuracy of the information on the forms.

If, after a few years of conducting revisits, the information provided on the forms is determined through the revisits to be accurate, then DEQ could consider conducting revisits every few years instead of every year. If the information on the forms is found to be inaccurate, DEQ may wish to discontinue the use of the forms altogether. There is also the possibility that increasing the number of revisits will themselves become an incentive to implement more recommendations, which could also change the variables in the technical assistance influence "equation."

The Massachusetts Department of Environmental Quality is one agency that has instituted statistical analysis and random sampling techniques to measure the performance of its Environmental Results Program and has been using the results of their analyses to target facilities for inspections and compliance assistance.[35] Although the Massachusetts program is not exactly the same as DEQ's program, DEQ may benefit from learning from Massachusetts's experience in this area.

Consider taking advantage of the revisits to get feedback on technical assistance's utility: During or as part of the revisits, DEQ could ask the technical assistance recipients to give their overall feedback on its

[32] Oregon Department of Environmental Quality, "2002 DEQ Technical Assistance Review" Presentation made by Rich Grant, DEQ, to the Executive Management Team on Oct. 8, 2002.
[33] See also discussion the Background section on page 7.
[34] See Appendix 6.
[35] Kerr, Greiner, Anderson, and April, Inc. *Evaluation of the Massachusettes Environmental Results Program. Prepared for the National Academy of Public Administration.* Learning from Innovation in Environmental Protection: Research Paper Number 1. June 2000. Contact Tara Velazquez, MADEP, (617) 348-4040, to learn more about ERP. See also, http://www.mass.gov/dep/erp/about.htm

technical assistance experience. This feedback could include information on the overall utility of the visit, what was more and less useful to the company, whether technical assistance or other influences are more important when making operating decisions. Existing surveys could be used as a starter for this exercise. The purpose of gathering this information would be to learn about technical assistance's strengths and weaknesses, and then to feed the feedback back into the technical assistance planning and approach.

Opportunity Area 3: Measuring the influence of other technical assistance activities

Measuring the effectiveness of other technical assistance activities is important, particularly given that these wide-ranging activities represent roughly half of the time spent on technical assistance. These activities are expected to have an influence on compliance and other environmental outcomes even if they also serve other purposes such as simply "getting the word out" about technical assistance and providing opportunities and incentives for companies to request technical assistance site visits. DEQ may want to weigh the potentially-substantial amount of effort that could be expended on the results measurement of these activities with the overall objectives and anticipated results of these activities.

Consider how to take advantage of opportunities for feedback on technical assistance's market, satisfaction, and influence: Similarly, the surveys that are sometimes now completed by technical assistance workshop attendees could be changed to learn strategic information about technical assistance such as why participant came to the workshop, what kind of facility the participant is representing, what the participant thinks are the facility's greatest compliance and other environmental challenges, what kind of information provided during the workshop was most/least useful, what kind of technical assistance might the participant be interested in receiving in the future, etc.

Consider categorizing all technical assistance activities into two categories, compliance "plus" and "other": If DEQ decides to differentiate the technical assistance site visits into two categories, it could also categorize its other technical assistance activities into compliance and "other" categories. This would clarify when compliance topics are covered and compliance outcomes could be anticipated rather than expecting other kinds of technical assistance to have compliance results. DEQ could also decide whether to orient a certain number of these activities to the most common compliance areas.

Consider whether additional follow up would be worthwhile: Resources permitting, DEQ could conduct a follow-up survey (a statistically valid sample would be ideal) within six months to see if recommendations have been implemented. At the same time, DEQ could ask for feedback about how the technical assistance could have been more useful. If not enough surveys come back to be statistically valid, DEQ could supplement the surveys with phone calls. Given results of short-term follow up and priority given to these kinds of activities, consider doing additional follow-up again in the following years to gauge long-term results.

Opportunity Area 4: Instituting a policy for evaluating and documenting environmental outcomes

DEQ's plans for OHWIME include expanding technical assistance results measurement to include an ambitious set of environmental outcome measures. If these measures are accurately and consistently tracked, DEQ will make dramatic strides in this area. The key will be ensuring that these measures are in fact accurately and consistently tracked. Currently DEQ does not have guidelines, calculation support tools, or forms for environmental outcome tracking. DEQ could approach developing these kind of support materials using one of two approaches.

Currently, DEQ staff employ best professional judgment to gauge environmental outcomes that result from some technical assistance site visits. Guidelines for the application of best professional judgment in this context have not been established. DEQ could decide whether to use best professional judgment as

the standard practice for identifying outcomes. Best professional judgment is a common standard, but is also difficult to verify and can often be "picked apart" with careful scrutiny. Best professional judgment is, however, the more efficient and least expensive option. If best professional judgment will be the standard, then create guidelines for how to apply best professional judgment (e.g., what constitutes "safely managed").

Alternatively, instead of relying on best professional judgment coupled with guidelines for doing so, DEQ could develop an environmental outcome calculator that would be used either by the facility itself or by the technical assistance staff based on written information received or possibly site revisits (see below). A calculator would probably be used most effectively if it measured a few environmental outcomes per visit rather than an entire spectrum of environmental outcomes. Developing an accurate calculator that would be applicable to a range of common technical assistance recommendations is not likely to be easy or inexpensive. However, calculators like this have been developed before, and one of these could possibly be adapted for technical assistance site visit purposes. The advantage of using a calculator would be that it would provide more consistency and ease of interpretation than would best professional judgment.

Several other states agencies and organizations have been tracking environmental outcomes of their compliance assistance work for at a few years or more. For example, the New York State Department of Environmental Conservation[36] and the Minnesota Office of Environmental Assistance[37] have developed systems for this purpose. In addition, the National Pollution Prevention Roundtable (NPPR) has been working on the development of environmental outcome tracking mechanisms for use by a variety of partners including state agencies.[38] Currently, the NPPR's Information Technology Workgroup is focusing its efforts on developing guidelines/standards for the development of P2 databases and content exchange activities.[39] DEQ may wish to take advantage of the lessons learned and tools that may be available from these and other parties.

Regardless of which approach to documenting environmental outcomes is used, track in writing (in the "To Do" form or elsewhere) the environmental outcomes and the recommendations with which they are associated in order to more thoroughly understand and tailor the topics covered during site visits with their associated outcomes. (Some topics may have a bigger environmental result and therefore, if these were identified, they could become priority topics to look into in future site visits.)

Opportunity Area 5: Developing a plan to measure long-term technical assistance influence

If DEQ wishes to measure the durability of technical assistance's influence, DEQ could survey by phone or mail technical assistance recipients every one to two years (depending on available resources) after the site visit to assess the "drop off" rate relative to the drop off rate of inspections. Ideally, the goal would be statistically-valid, targeted sampling of longer-term results for up to five-to-six years after technical assistance visits.

Opportunity Area 6: Developing a plan to measure the indirect/population influence of technical assistance

[36] New York State Department of Environmental Conservation. Measuring Compliance Assistance Outcomes in New York State. January 2001. Available: www.dec.state.ny.us/website/ppu/p2oeca/html

[37] Minnesota Office of Environmental Assistance. *2004 Pollution Prevention Report.* January 2004 Available: http://www.moea.state.mn.us/publications/p2evaluation2004.pdf

[38] For example, see the presentation given at the Northeast Waste Management Officials' Association, "Pollution Prevention & Compliance Assistance Measurement." Ken Zarker, Chair, National Pollution Prevention Roundtable. Available: http://www.tnrcc.state.tx.us/exec/sbea/ems/MSWG/2.10_A_Zarker_P2Metrics.pdf

[39] See http://www.p2.org/workgroup/p2im/index.cfm

As part of a DEQ-wide strategic planning exercise to develop a stronger integrated compliance "plus" program, DEQ could conduct a follow-up survey every few years that builds upon the findings of the draft deterrence report. Follow up surveys could ask more specific questions about which media programs are creating the greatest influences and the longevity of influence (e.g., gauge whether the recommendations are still being followed 3-5 years after inspection or technical assistance). If at all possible, site re-visits or re-inspections would be preferable over surveys because they are the best way to verify what improvements, if any, are still in place. But this approach is very resource intensive.[40]

Measurement Opportunities

The opportunities to improve TUWRAP performance measures are summarized in Table 15, which outlines both the recommended measures and the audience that the measures are intended for. These measures are divided into four sections that each correspond with the TUWRAP Logic Model (see page 2): TUWRAP activities, knowledge outcomes, behavior outcomes, and environmental outcomes. The columns to the right of the measures highlight which parties the measures would be intended for, namely DEQ (and its stakeholders) and EPA. These measures are described in more detail in the following pages.

DEQ's ability to measure TUWRAP's effectiveness and learn and benefit from that measurement will be a direct function of the information it decides to collect and synthesize. As previously described, DEQ has detailed plans for incorporating a substantial amount of new tracking information into the OHWIME database, and this information will help tremendously to measure TUWRAP's influence. The opportunities around particular measures are therefore offered with OHWIME's plans in mind. Additional measures and changes to measures both would require changes to OHWIME and, conversely, changes to OHWIME would and will also result in changes to data collection, entry, and measurement.

The specific measures that DEQ will want to aim for, including possibly those outlined in Table 15, are best considered in light of their purposes and also the mechanics of how to collect the measurement data. The discussion of measurement opportunities is therefore divided into three opportunity areas:

1. Reporting to EPA;
2. Other reporting purposes and management/oversight; and
3. OHWIME-specific.

[40] DEQ may be interested in the re-inspection methods used by the Washington State Department of Ecology for its study: Washington State Department of Ecology, Hazardous Waste and Toxics Reduction Program. *Office of Enforcement and Compliance Assurance (OECA) Project Summary Report: A Consolidated Overview of the Analysis Of Change In Generator Compliance Using Regulatory Compliance Indicators.* Publication # 02-04-014. April 2002. Available: http://www.ecy.wa.gov/pubs/0204014.pdf

Table 15. Recommended TUWRAP Performance Measures

Type	Measure	Draft 2005-2007 OECA Guidance	Draft FY 05-07 PPA/PPG	DEQ TUWRAP Mgt &/or Publications
TUWRAP Activities	Number of compliance "plus" TA site visits		X	X
	Number of other TA site visits			
	Number of site re-visits		X	X
	Number of technical assistance seminars and workshops and number of companies attending the seminars/workshops		X	X
	Number of CEG collection events and amount collected at these events		X	X
Knowledge Outcomes	Number of additional regulated entities that have received a compliance "plus" technical assistance site visit or have participated in a compliance-oriented technical assistance workshop or training.	X	X	
Behavior Outcomes	Number of additional regulated entities that have received TA and have reduced, diverted, eliminated (100% reduction), or safely managed RCRA hazardous waste or toxic chemicals	X	X	
	Number of additional regulated entities that have received technical assistance site visits and have implemented at least three recommendations (compliance and other recommendations counted separately and together)	X	X	
	Average number of compliance recommendations implemented per technical assistance site visit		X	X
	Average number of other recommendations implemented per technical assistance site visit		X	X
Measures below would be lower priority for the PPA/PPG until a standardized measurement system has been developed and implemented.				
Environmental Outcomes	Hazardous waste reduced		X	X
	Hazardous waste diverted		X	X
	Hazardous waste safely managed		X	X
	Toxic chemicals reduced		X	X
	Toxic chemicals diverted		X	X
	Toxic chemicals safely managed		X	X
	Wastewater reduced		X	X
	Wastewater diverted		X	X
	Wastewater safely managed		X	X
	Quantity of hazardous waste collected at CEG collection events		X	X
	Mercury-containing products removed from service or quantity collected		X	X

Opportunity Area 1: Reporting to EPA

The following measures are intended to address the desire for DEQ to gain recognition from EPA for TUWRAP and its contribution to EPA's compliance goals and objectives. The measures listed in Table 15 and repeated below respond to the draft five-year targets for compliance assistance provided by OECA in its draft National Program Guidance.[41] Note that all three of these measures will require establishing a baseline – probably based on FY2003 data. Each of these measures relates to the EPA Strategic Plan Goal 5, Objective 5.1, Improve Compliance.

- *OECA draft 5-year target:* 5 percent increase in number of regulated entities with improved understanding of environmental requirements
- *Optional DEQ annual translation:* Number of additional regulated entities that have received a compliance "plus" technical assistance site visit or have participated in a compliance-oriented technical assistance workshop or training
- *OECA draft 5-year target:* 5 percent increase in number of regulated entities that reduce, treat, or eliminate pollution (5.1.1)
- *Optional DEQ annual translation:* Number of additional regulated entities that have received TA and have reduced, diverted, eliminated (100% reduction), or safely managed RCRA hazardous waste or toxic chemicals
- *OECA draft 5-year target:* 5 percent increase in number of regulated entities that improve environmental management practices
- *Optional DEQ annual translation:* Number of additional regulated entities that have received technical assistance site visits and have implemented at least three recommendations (with compliance and other recommendations counted separately and together)

DEQ may also wish to consider providing the following measures for annual reporting in the PPA/PPG with Region 10. These measures relate to technical assistance activities and the management accountability that these activities entail. Importantly, the bottom three measures begin to directly address compliance impacts and environmental outcomes more strongly than is routinely done today. Some of these measures will not be available until or unless the opportunities outlined in this report are implemented and OHWIME is up and running (and being used) and also until a few detailed changes to the current OHWIME database design are made.

- Number of compliance "plus" TA site visits;
- Number of "other" or "limited scope" TA site visits;
- Number of site re-visits;
- Number of technical assistance seminars and workshops and number of companies attending the seminars/workshops;
- Number of CEG collection events and amount collected at these events;
- Average number of compliance recommendations implemented per technical assistance site visit
- Average number of other recommendations implemented per technical assistance site visit;
- Environmental outcomes (as feasible).

DEQ may also benefit from examining what other requests for measures may be "coming down the pike" from EPA and, if applicable, elsewhere, and if necessary, make additional changes in OHWIME. Specific topics are likely to include data elements for RCRAInfo and TRI, and perhaps more importantly, the EPA Integrated Compliance Information System (ICIS), which may come "on line" in 2005 or 2006.

[41] Available April 30, 2004 at http://www.epa.gov/ocfo/npmguidance/oeca/2005/oeca_npmguidance.pdf

Also, EPA is likely to request that DEQ fill out the Case Conclusion Data Sheets and other forms related specifically to compliance inspections.[42]

Opportunity Area 2: Other Reporting Purposes and Management/Oversight

The following potential measures may further strengthen the information base from which to analyze technical assistance and inspection/enforcement influence. Exploring these areas would be a significant undertaking, but doing so would "tap" a vast amount of currently underutilized information that most likely could shed insights into the influence of both TUWRAP and compliance inspections as part of an integrated compliance strategy.

- The amount of hazardous waste generated by facilities that have received technical assistance and/or inspections in the past five years. A comparison against facilities that have not received technical assistance would be desirable;
- Amount of TRI chemicals released by those facilities that have received technical assistance and/or inspections in the past five years. Again, a comparison against facilities that have not received technical assistance would be desirable. The Massachusetts Department of Environmental Protection has done some interesting work in this area and would be interested in helping DEQ to explore similar opportunities[43];
- Tracking of the information in the annual Pounds Reports submitted by TUR reporters and analyzing that information against the other measures;
- Non-regulatory ("other") recommendations made during compliance inspections and subsequently implemented; and
- The environmental outcomes resulting from compliance inspections.

Opportunity Area 3: OHWIME-specific

The work DEQ has undertaken to develop the OHWIME system is significant and reflects a substantial effort to capture real environmental outcomes that result from technical assistance and other activities. This report does not recommend reducing the amount of data that DEQ plans to include in OHWIME, because what is planned for OHWIME can provide the basis for sound analysis of TUWRAP's influence. This report does, however, recognize that implementing the plans will require a substantial amount of data entry time that is not currently incurred and that it will be more important to have a few strong measures that everyone counts and enters consistently than to have several measures that not everyone counts or enters. With this in mind, DEQ may need to weigh the staff burden of data collection and entry against the relative importance of certain measures.

Regardless of which measures DEQ tracks, it will be important that the staff follow a consistent practice for interpreting and reporting. Measurement guidelines are needed. Tools are available for DEQ to consider when determining what new measures it may want to consider and how they could be implemented. For example, in June 2002, EPA's Office of Enforcement and Compliance Assurance issued a detailed *Guide for Measuring Compliance Assistance Outcomes*, which includes the following sections: "How to Plan and Design an Assessment," "How to Get the Most out of Your Survey," and "An Introduction to Statistical Methods."[44]

[42] See http://www.erg.com/portfolio/elearn/oeca/site/overview/

[43] Massachusetts DEP contact: Rick Reibstein, Office of Technical Assistance for Toxics Use Reduction, (617) 626 1062, Rick.Reibstein@state.ma.us

[44] U.S. EPA. Office of Enforcement and Compliance Assurance. *Guide for Measuring Compliance Assistance Outcomes.* Revised June 2002.

The following opportunities relate to modest changes to the data collected in OHWIME that would be necessary if DEQ were to act upon the opportunities outlined in this report. The following information could be tracked (or, in some cases, not tracked) in OHWIME:

- Type of technical assistance site visit (compliance, other).
- Whether technical assistance implementation tracking form has been received.
- Whether a technical assistance revisit will be/has been conducted.
- Type of other technical assistance activity (compliance, non-regulatory).
- Remove or at least clarify what is meant by "P2/BP" recommendations. It may be best to call all of the recommendations that are not compliance-specific by one name that is clearly understood and defined. The terms "best practice" and "pollution prevention" can mean different things to different people.
- Include a data dictionary or some other kind of definition of what is meant by terms such as reduced, diverted, and, in particular, safely managed. (It will be more important for the field staff consistently interpret these definitions when they are first calculating these numbers than when they have already been calculated and are being entered into OHWIME.).
- Make sure that the recommendations being entered are consistently categorized so that like recommendations are grouped together correctly.
- If possible, simplify the number of recommendation categories: it will be better to have fewer, clearer categories than many detailed ones as long as like recommendations are being grouped together.
- Categorize the recommendations by priority.
- Change the description of the "no follow up" option in the "implemented" field: because a recommendation has not been implemented would not automatically mean that the recommendation was not a priority recommendation.

Integrating TUWRAP into DEQ's Authorized Hazardous Waste Enforcement Program to Achieve EPA's Compliance Improvement Objectives[45]

"If you have a fork with only one prong, it's not a fork."
- DEQ Regional Technical Assistance Manager

As one regional interviewee put it, DEQ's overall compliance assurance program can be thought of as a fork with multiple prongs. A fork with only one prong is not a fork, and any prong that is missing makes the fork weaker and less functional. There is strong agreement that both inspections and technical assistance are an integral part of the overall DEQ compliance "plus" package and that the compliance assurance "prongs" of the package drive and strengthen the technical assistance prong. Conversely, strong technical assistance helps companies to achieve compliance before and without formal inspections.

The data available today suggest that technical assistance provides a good value from a compliance standpoint, both on a unit basis and on a population basis, and that the use of technical assistance can compare favorably with compliance activities. At the same time, technical assistance staff recognize that inspection field presence and the related threat of penalties provide an important deterrent influence and motivator for requesting and sincerely wanting technical assistance. There is a foundation of both theory and data to believe that many facilities do need compliance incentives or at least reminders over time, and that providing that incentive or reminder every five years is a reasonable goal. At this point in time, even though it appears as if technical assistance provides good compliance "plus" value, there is not a basis for assuming that dramatic changes in the level of either inspection and enforcement activity or technical assistance activity would yield the results that have been articulated in this report.

The question then becomes, given what is currently known about TUWRAP's effectiveness and overall costs, and the plans and directions in place both at DEQ and EPA, how can TUWRAP's role as part of DEQ's compliance assurance strategy be even more clearly identified? Clearly articulating the relationship between the strategic argument for technical assistance in certain and recognized instances and inspections in other instances is key for establishing a basis for substantially more support for technical assistance (e.g., funding or disinvestments in other areas) from EPA. One opportunity for this kind of support is to more regularly and clearly point to the real connectivity between TUWRAP and EPA's Strategic Plan Goal 5's first and second Objectives: Improve Compliance (Objective 5.1) and Improve Environmental Performance through Pollution Prevention and Innovation (Objective 5.2), which are described in Highlight 1, below. TUWRAP and, in general, DEQ's overarching compliance approach, support these objectives, and acknowledging this connection would be a good opportunity for EPA to give DEQ recognition for TUWRAP.

The opportunities to further establish a basis for recognition of TUWRAP are divided into three opportunity areas:

1. Articulating the strategic basis for technical assistance as part of an integrated compliance strategy;

[45] To clarify the intent of this section, the project team modified this question and the discussion in this section as follows. Language on "integrating TUWRAP into DEQ's authorized hazardous waste *enforcement* program" was changed to, "integrating TUWRAP into DEQ's hazardous waste compliance assurance program." DEQ's compliance assurance program is the overarching program that includes both technical assistance and enforcement. (The intention is not to include TUWRAP into the enforcement program.)

2. Making modest process and management modifications to bolster the integrated package; and
3. Enhancing DEQ and EPA collaboration.

Highlight 1. Summary of EPA Strategic Plan Goal 5: Compliance and Environmental Stewardship

Improve environmental performance through compliance with environmental requirements, preventing pollution, and promoting environmental stewardship. Protect human health and the environmental by encouraging innovation and by providing incentives for government, business, and the public that promote environmental stewardship.

Objective 5.1: Improve compliance

By 2008, maximize compliance to protect human health and the environment through compliance assistance, compliance incentives, and enforcement by achieving a five percent increase in the pounds of pollution reduced, treated, or eliminated. And achieving a five percent increase in the number of regulated entities making improvements in environmental management practices.

Objective 5.2: Improve Environmental Performance through Pollution Prevention and Innovation

By 2008, improve environmental protection and enhance natural resource conservation on the part of government, business, and the public through the adoption of pollution prevention and sustainable practices that include the design of products and manufacturing processes that generate less pollution, the reduction of regulatory barriers, and the adoption of results-based, innovative, and multimedia approaches.

Objective 5.3: Build Tribal Capacity

Through 2008, assist all federally-recognized Tribes in assessing the condition of their environment, help in building their capacity to implement environmental programs where needed to improve tribal health and environments, and implement programs in Indian country where needed to address environmental issues.

Objective 5.4: Enhance Science and Research

Through 2008, strengthen the scientific evidence and research supporting environmental policies and decisions on compliance, pollution prevention, and environmental stewardship.

- EPA 2003 Strategic Plan (available: http://www.epa.gov/ocfo/plan/plan.htm)

Opportunity Area 1: Articulating the strategic basis for technical assistance as part of an integrated compliance strategy

It is already clear that technical assistance is an important and influential part of DEQ's compliance program. If DEQ were to act upon the following approach, its "case" for technical assistance would be

even clearer and stronger, particularly to outside parties that are not "in the trenches" to see the results for themselves. This general approach has been articulated in different ways by parties – including EPA – that have written on the subject of integrated compliance strategies. In June 2003, EPA issued a relevant tool, the *Interim Draft Guide to Implementing the Integrated Strategies Framework*. Another useful resource is a report published in January 2003 by the Tellus Institute, Environmental Law Institute, and National Academy of Public Administration entitled, *Beyond Enforcement: Enforcement, Compliance Assistance, and Corporate Leadership Programs in Five Midwestern States*[46], which includes topics such as "Guiding Principles for Integrated Compliance Programs[47]," and "A Framework for Evaluating Integrated Compliance Programs." These tools represent only a handful of the tools available for strengthening TUWRAP's role in DEQ's integrated compliance program.

EPA Region 10 compliance managers have articulated that the kind of information outlined below would help EPA to support DEQ technical assistance as part of an integrated compliance strategy beyond an acknowledgement that EPA believes technical assistance is important and effective in general. This kind of strategic outline would be particularly important if DEQ wanted to ask EPA for additional support for technical assistance either through funding or disinvestments on other work. However, independent of EPA's interests in the strategic argument for technical assistance in Oregon, DEQ's technical assistance program will be strengthened by articulating the results of this kind of strategic thinking exercise to stakeholders both within DEQ (e.g., to further integrate technical assistance with the compliance assurance program) and elsewhere (e.g., to make the case for funding from the Oregon Legislature.)

DEQ may want to take advantage of this line of reasoning to articulate even more than it already has how technical assistance fits into its compliance approach. To this end, the following information could be articulated:

1. **Problem identification:** A description of the primary compliance and other environmental problems that the overall strategy is trying to address. These problems would include the major emphasis areas and special priority projects, which could include small communities, particular industrial sectors, particular geographic areas, and/or particularly common or severe compliance problems.

2. **Argument for technical assistance:** An explanation of why technical assistance – or better yet, a particular type of technical assistance – is the best available tool for addressing the problem. Citing past studies, data on the relative costs of employing the different options, and common understandings (e.g., technical assistance is well suited to small companies), will help to make the case that technical assistance is the preferred option.

3. **Expected results:** A discussion of what results can be expected if the technical assistance were to be employed and how those results relate to the DEQ (and EPA) goals and objectives. At a minimum, the anticipated compliance results (based on this and, as applicable, other studies) should be included to make the strongest case.

[46] Tellus Institute, Environmental Law Institute, and National Academy of Public Administration. *Beyond Enforcement: Enforcement, Compliance Assistance, and Corporate Leadership Programs in Five Midwestern States*. January 2003.

[47] The five guiding principles are: (1) The need for a strong planning process that sets and implements priorities, both generally and for the compliance program specifically; (2) adequate data and monitoring capabilities to support resources allocation planning and adaptive management; (3) a full range of compliance tools and processes not hindered by excessively cumbersome procedures; (4) a strong commitment to informing and interacting with the public; and (5) sufficient financial and human resources. Tellus et al. January 2003.

4. **Performance measures to be employed:** A plan for using particular performance measures that will be employed to assure accountability and that the results will be measured in accordance with the desired outcomes and the related DEQ (and EPA) goals and objectives.

5. **Required resources and, if applicable, disinvestments:** An overview of the resources that will be needed to employ the technical assistance and whether devoting the needed resources require disinvestments elsewhere or additional financial support. If disinvestments would be needed and those disinvestments would affect the work or funding agreed-upon through the DEQ-Region PPA/PPG, then negotiations with Region 10 – and possibly reopening the PPA/PPG – would likely be required.

Opportunity Area 2: Modest Process Modifications to bolster the integrated package

Decide whether to commit to the guidelines in the 1994 Field Activities Handbook. The 1994 *Field Activities Handbook* is one existing resource which outlines several guidelines for implementing a symbiotic technical assistance-inspection dual-tracked approach to achieving compliance. DEQ could revisit this handbook and decide whether it wants to use this handbook as the DEQ standard. The complimentary nature of technical assistance and inspections would be further advanced and the overall DEQ compliance "package" strengthened if DEQ made a commitment to the practices outlined in the Handbook. If DEQ decides to commit to these practices, expectations for following the guidelines in the Handbook should be established and followed. In addition, DEQ may want to simplify the handbook so that it is more "user friendly."

Prioritize consistency of service: If DEQ is going to commit to making some technical assistance visits explicitly compliance oriented, it should ensure that the technical assistance staff conducting the visits are well-versed in compliance and that, in general, the service delivery is consistent across the state. This recommendation has been made by previous studies of technical assistance as well.[48]

Consider how to bring the compliance staff together and ensure that everyone is "on the same page": DEQ could conduct a state-wide one-day workshop for technical assistance, inspection/compliance, and enforcement staff. During the workshop, topics covered could include the approaches and standard procedures such as new procedures on how to conduct technical assistance, coordination between activities (see the *Field Activities Handbook*), performance measurement, and overall approach to a more integrated compliance "plus" program. This workshop will not only help to set the stage for future work and collaboration, but also will help to dispel some of the myths between the regions about how these activities are currently conducted. The workshop will also set leadership and management "tone" and expectations for regional commitment to a standard set of procedures.

Consider evaluating the influence of the compliance enforcement activities: Next, DEQ may want to evaluate further the influence of its compliance enforcement activities to have a more complete knowledge base for further developing its integrated approach on the whole.

Commit to a continuous improvement/adaptive management approach: Both now an in the long term, DEQ will want to take the lessons learned this study and other projects that have measured program

[48] 1994 Ross & Associates study, "Evaluating Technical Assistance Activities and Pollution Prevention Initiatives at DEQ;" *1994 DEQ Field Activities Handbook* and accompanying *Summary of Major Policy and Procedural Decisions Underlying the Field Activities Handbook*, also prepared by Ross & Associates; 1999 "ODEQ Outreach Assessment and Recommendations" Survey by Dave Kunz, DEQ; and 2002 Technical Assistance Review by Rich Grant, DEQ.

effectiveness, and to feed those lessons back into its periodic strategic planning processes and program planning.

Opportunity Area 3: Enhanced DEQ and EPA collaboration

There are several opportunities for DEQ and EPA to further collaborate and support each other in ways that will help both agencies achieve their compliance "plus" goals and objectives.

EPA can more clearly articulate its support for TUWRAP: EPA Region 10 can make it clear that it thinks that technical assistance is an important and effective compliance tool that is part of an overall integrated compliance strategy. The mechanisms for communicating this support would include the DEQ-Region 10 PPA/PPG, and, as appropriate, communications between Region 10 and EPA HQ, EPA and the Oregon Legislature, and EPA and other parties as needed.

DEQ can determine whether it would like additional support from EPA: DEQ can work to determine what, if any, flexibility it may need from EPA to implement a more fully-integrated compliance program. If flexibility or financial support for TUWRAP from EPA is needed, DEQ could be prepared with the strategic rationale and backing for the flexibility requested, information about the required additional investments or disinvestments needed from EPA (if applicable), and the types of measurements that will be employed to ensure accountability. If this situation arises, DEQ and EPA Region 10 are probably going to need to formally document any new agreements and arrangements in the PPA/PPG.

EPA can "go to bat" for DEQ: If DEQ finds that it needs limited additional support (in the form of flexibility, additional funds, and/or limited disinvestments) from EPA to implement a more fully-integrated program, and it has provided a strong proposal for the additional support, EPA Region 10 can support the proposal, which may require "going to bat" for DEQ with EPA headquarters and/or helping to find creative funding opportunities. Again, this may require changes to the PPA/PPG.

DEQ can provide information (summary data from OHWIME) to EPA related to EPA's Strategic Plan compliance goals and objectives. Providing the three recommended performance measures listed in Table 15 that relate to the draft FY 2005-2007 OECA guidance would help Oregon (and thereby Region 10) to make its "contribution" to OECA's national performance measures and goals. OECA's goals are tied to the EPA Strategic Plan's Goal 5 and related objectives, which are shown in Highlight 1. Each of these three measures relate to Objective 5.1, "Improve Compliance."

DEQ would want to try to "hit" or exceed the five year targets of "a five percent increase in the number of facilities [doing/receiving X]…" that are outlined for each of the suggested measures (see previous discussion on measures). For DEQ, this would mean aiming to achieve at least one additional percent increase in the total number of regulated entities (doing/receiving X) each year, outlining this commitment in the PPA/PPG, and reporting on these measures in the PPA/PPG end-of-year reports. These measures will require DEQ to calculate a baseline from which to gauge the "increase" in facilities. It is highly unlikely that additional levels of DEQ activity will be needed to meet these proposed OECA targets.

As already discussed, EPA can acknowledge that DEQ's compliance assurance program, including technical assistance, is consistent with its Strategic Plan compliance goals and objectives.

EPA and DEQ can work together to explore additional opportunities for collaboration in 2004 and beyond: Because the 2004-2006 DEQ-Region 10 PPA/PPG has already been drafted, and the joint commitments of both parties are going to be finalized soon, it is more difficult to recommend additional ways that DEQ and Region 10 can commit to EPA's other Goal 5 objectives without re-engaging in new

PPA/PPG discussions or simply having informal conversations (without ensuing commitments) outside of the PPA/PPG. Some of the proposed DEQ hazardous waste measures already relate to other Goal 5 Objectives. For example, the proposed PPA/PPG DEQ measure "number of multimedia initiatives or site visits conducted on a multi-program basis" relates to Objective 5.2, "Improve environmental performance through pollution prevention and innovation", and several of the proposed measures and measurement processes relate to Objective 5.4, "Enhance science and research." Further integrating these connections between DEQ's work and the EPA Strategic Plan may be as simple as highlighting the existing connectivity in the final PPA/PPG.

A few additional work areas of opportunity exist for joint planning and collaboration in 2004 and beyond. The sampling of the opportunities described below highlights ways that DEQ can help to both support EPA's ongoing efforts and ensure that it's "voice" has been heard when those efforts will affect DEQ. Additional opportunities are undoubtedly available for EPA to further support DEQ's ongoing efforts (e.g., budgetary needs) as well.

Upcoming EPA developments that are likely to influence DEQ directly or indirectly and provide opportunities for further collaboration

In January 2004 EPA Region 10 had submitted a draft Regional Strategic Plan that outlines its preliminary thoughts on how it would work toward the other Strategic Plan Goal 5 objectives.[49] In May 2004, the Regional Plans are being finalized and submitted to EPA headquarters, which provides a timely opportunity to see how, if at all, DEQ's TUWRAP program can be further recognized and supported as part of DEQ's compliance assurance program, and, in general, how the overall DEQ hazardous waste program could help to contribute to the EPA's plans and goals and vice versa.

Similarly, and as already noted, OECA's draft guidance provides draft five-year regional targets for meeting the Goal 5 Objectives in the Regional Plan. Throughout the spring and summer of 2004, Region 10 will be defining what kind of annual commitments it will be making to OECA (and other EPA national programs) in order to meet the 5-year targets outlined in the OECA guidance.[50] DEQ could discuss its interests and, if applicable concerns, about how DEQ's integrated program, including TUWRAP, could be of use for meeting the annual commitments that Region 10 will be making to EPA Headquarters.

The existing measures outlined in the draft PPA/PPG, coupled with the few alternative (and streamlined) measures offered in this report, will already provide a strong reporting connection between TUWRAP and EPA's strategic planning systems. Any additional work that is done to further the connectivity will only reinforce and build upon an already strong foundation.

[49] http://www.epa.gov/ocfo/regionplans/region10/2004strategicplanreg10.pdf (see page 76)

[50] The draft annual regional targets are due on July 1. Final regional targets are due September 1 and will be posted on the Internet on September 15.