PUGET SOUND MONITORING CONSORTIUM
TECHNICAL ADVISORY COMMITTEE

PROPOSED PILOT PROJECT #3:

Intercalibration Study

Scoping Committee: Gary Gill (PNNL), Tony Paulson (USGS), and Jim Simmonds (King County)

Brief Description:

Intercalibration (or intercomparison) exercises are often initiated with monitoring programs where samples are to be obtained and analyzed by different groups. The purpose of an intercalibration exercise is to provide some level of assurance that the data produced by all parties are reliable and directly comparable. When problems are found, an intercalibration program can help to identify where in the process the problems exist and offer a path to corrective actions.

1. ***What problem(s) is being addressed by the proposal, and what would be the expected outcome(s) of the project?*** A variety of field sampling and analytical methods are available for the determination of elements and compounds in a given environmental matrix (water, sediments, and tissues). Some of the methods and procedures may not be appropriate, sensitive, or accurate enough for the needs of the program. An intercalibration exercise is one means to test the appropriateness of a sampling and/or analytical technique to meet the needs of the program as well as assess the ability of the individual laboratory and/or field crew to perform the work. It is very likely that programs with extensive experience in conducting low concentration level environmental sampling and analysis will do well for most constituents, but not necessarily for non-routine work. This pilot program will help identify where concern might exist and at what level scrutiny of the monitoring program, once it is in full swing, is appropriate.

2. ***What is the current status of the situation? In other words, is anything underway today to address or resolve the problem or are the "tools" needed to address it in place? Has there been some success, or is the problem getting worse?*** A number of intercalibration programs currently are in operation around the country, many in association with coordinated monitoring programs. These programs usually focus on components of specific concern (e.g. mercury or PCB's) where problems are known to be frequently encountered. Currently, there are no coordinated intercalibration or intercomparison programs among the entities that perform routine monitoring in the

Puget Sound. Implementation of a program is reasonably straight forward once its goals and scope has been defined.

3. ***Who should participate in the project, and why?*** Participants in the pilot intercalibration exercise should be drawn from those laboratories and field teams that currently are involved with sampling and analytical efforts for compliance monitoring. The scoping team anticipates this effort to involve approximately 6 laboratories. Identification of the laboratories to be involved will come from voluntary participation by the local government and private entities who are involved with storm water monitoring.

4. ***What process or steps would be needed to address the problem and achieve the expected outcomes?*** We propose for this pilot, that the initial focus be on storm water and limited to a few key inorganic elements such as copper, zinc, lead and mercury. A full blown intercalibration program associated with a coordinated monitoring effort should include additional matrixes (e.g. waste water, marine water, sediments) and additional components (e.g. nutrients and organics). A brief outline of the proposed efforts is given below.

    a. A laboratory with extensive experience in the determination of trace elements at natural environmental levels should run the program and serve as the coordinating laboratory. *NOTE: PNNL's Marine Sciences Laboratory in Sequim would be very excited to develop and run the intercalibration pilot program should the committee agree this is appropriate*.

    b. The coordinating laboratory will collect a large sample of water from an existing storm water discharge monitoring site. Both filtered and unfiltered water will be collected.

    c. The coordinating laboratory will homogenize and aliquot the sample into cleaned sample bottles for distribution. The standardizing laboratory will randomly select samples from the lot to test for sample homogeneity and to establish the "target" concentration for the trace elements of interest.

    d. A subset of both the filtered and unfiltered samples will be spiked with metal to raise the concentration to above the current water quality criteria for the given metal.

    e. The analytical laboratories participating in the study will receive four samples for analysis: A filtered and unfiltered ambient sample and a filtered and unfiltered ambient sample that has received a spike to raise its ambient concentration. The laboratories will be given basic guidance of the levels to anticipate in the samples so that they can choose an appropriate analytical method. The laboratory will be asked to analyze each sample a minimum of three replicate runs and report their results back to the standardizing laboratory along with a description of the method used for analysis, and their current method detection limits for the analyses performed. It is anticipated

that the laboratories will provide additional quality assurance information as part of their normal reporting, including matrix spike and/or standard reference material analyses as part of the normal analytical run.

f. The intercalibration exercise will be performed three times over the course of approximately a year. The sampling site will be the same each time, but different hydrologic conditions will be sought to determine whether varying composition has an effect on analytical results.

g. The coordinating laboratory will compile the information obtained from the effort and write a report detailing the results and outcome of the effort.

5. *What would be the approximate cost of the project? What portion of the costs would be paid out of the funding Department of Ecology received to launch this program? What portion if any, would be paid by others?*

Given in the table below are estimated costs for different scenarios of an intercalibtation pilot program. It is anticipated that 6 laboratories (plus the program laboratory) will participate in the intercalibration program and that the pilot project will need to cover the cost for analytical effort of the outside laboratories that participate; this may not be the case for all laboratories which will save costs. The various options outlined below include conducting the intercalibration two or three times during different periods of the year, varying the metals included in the program, and dropping the spiked sample from the program. Including mercury in the program is especially prudent at this time since the DOE has recently started requiring that discharge monitoring be performed using the low-level analytical methods (EPA 1631). The downside of including mercury in this program is that the analysis tends to be expensive ($85-125/sample) and very few laboratories have the capability to conduct the low-level technique. Including spiked samples in the program will help to identify laboratories that have the ability to accurately and precisely quantify at both ambient levels and at concentration levels that exceed water quality criteria levels.

Estimated Cost for Various Scenarios of a Pilot Intercalibration Program

Metals	Include Spiked Samples?	Number of Events	Approximate Cost	Notes
Hg Cu Zn Pb	Yes	2	$88,000	Full Program
Hg Cu Zn Pb	Yes	3	$130,000	Full Program
Hg Cu Zn Pb	No	2	$60,000	drop spikes
Hg Cu Zn Pb	No	3	$91,000	drop spikes
Cu Zn Pb	Yes	2	$60,000	drop mercury
Cu Zn Pb	Yes	3	$91,000	drop mercury
Cu Zn Pb	No	2	$47,000	drop mercury & drop spikes
Cu Zn Pb	No	3	$70,000	drop mercury & drop spikes

6. ***How would this project address interests, needs and concerns of rural communities?*** All communities that are involve in compliance monitoring would benefit equally as long as the laboratory that they use for analytical services is among those that participate.

7. ***How would the project meet the criteria agreed to by the Committee in October? Those criteria are:***

    a. *Builds the credibility of the program* Yes. Accurate and reliable information that can be trusted is a mandatory requirement of this effort.

    b. *Tests working relationships.* Yes. Entities involved in storm water monitoring will participate.

    c. *Provides credible and meaningful information that addresses the framework questions.* Providing trustworthy and comparable data is a primary goal of an intercalibration program.

    d. *Encourages leveraging of resources.* Probably not, unless the agencies/laboratories involved in monitoring agree to pay the cost of the analytical effort for the laboratory they use for analytical services.

    e. *Is voluntary ("a coalition of the willing") and attracts additional participants over time.* Participation in intercalibration exercises should be a mandatory program requirement for any laboratory or field monitoring effort that wants to demonstrate capability and comparability and be a participant in the coordinated monitoring effort.

    f. *Is simple.* The process is not real simple, but it is a well founded and well understood process that has proven very successful in other monitoring programs.

    g. *Can get going in less than one year.* Easily.