DATA QUALITY OBJECTIVES

CITY OF SOUTH BEND
DEPARTMENT OF COMMUNITY AND ECONOMIC DEVELOPMENT
SOUTH BEND, INDIANA

FORMER OLIVER PLOW WORKS
VRP #6001202
South Bend, Indiana

Envirocorp Project No. 80D2468
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Data Quality Objectives (DQO) Document
Former Oliver Plow Property

Developed March 11, 2002
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This document has been developed to provide an assessment of the Data Quality Objectives (DQOs) of the chemicals of concern (COCs) at the Former Oliver Plow site. The format of this document follows the process outlined in the United States Environmental Protection Agency (USEPA) "Soil Screening Guidance: A Users Guide", Second Edition, July, 1996.

Step One - State the Problem

A. Scoping Team

The team members responsible for defining the scope of the study includes the City of South Bend Community and Economic Development Commission, Envirocorp, Inc., and the Indiana Department of Environmental Management, Voluntary Remediation Program (VRP).

B. Conceptual Site Model (CSM)

See Attachment B of Confirmation Sampling Plan

C. Resources Available

This process will be subject to the time restraints and budgetary considerations of the City of South Bend Community and Economic Development Commission.

D. Brief Summary of Contamination Problem

The site, approximately 38 acres, has been partitioned into 12 different areas as part of the development of the CSM. The site was divided using information from previous site assessments, information from previous investigations, and other specialized knowledge. Each area was assigned a relative potential to contain selected COCs and the level of COCs. The last investigation did not indicate any COCs concentrations that would preclude the issuance of a covenant not-to-sue.

The investigations at the site have indicated that there are four areas (see CSM) that have been noted to be impacted by detectable levels of COCs. Area #1, the southwest corner of the site, has been found to have soils impacted by quenching oils, specifically volatile organic compounds (VOCs), semi-volatile organic compounds (SVOCs), and Resource Conservation Recovery Act (RCRA) metals. Area #2 has been found to be impacted by lead, VOCs, and SVOCs. Area #3 has been found to be impacted by lead and SVOCs. Area #5 has been the location of a polychlorinated biphenyls (PCBs) remediation effort due to a release from former transformers located in this area. Two areas, Area #6 and Area #11, may be impacted by lead. Two areas, Areas #4 and #12, have not been subjected to any surface or subsurface investigation.

The surface of the site has been used to store and dispose of foundry sand and other related materials. Groundwater sample results indicate the site may be inheriting a tetrachloroethylene problem from a source or sources outside the southwest corner of the site (MW-1). This area is the most upgradient location on the site in relation to groundwater flow. Low levels of degradation products have been noted in other wells at the site, but only the groundwater from MW-1 is above cleanup goals.

Step Two - Identify the Decision

A. Identify Decision

Does the site meet the Tier II non-residential cleanup goals (TTCG) to allow for a certificate of completion and covenant not-to-sue to be issued under the Indiana VRP program?

B. Identify Alternative Actions

The area will be qualified to receive the covenant not-to-sue under the VRP

OR

Plan and conduct further investigation/remediation of the area.

Step Three - Identify Inputs to Decision

A. Identify Inputs

The measured concentrations will be assessed against the TTCG for VOCs, SVOCs, PCBs, and RCRA regulated metals. Please see the Remediation Work Plan for a detailed list of COCs.

B. Define basis for closure sampling

The closure sampling will be performed using the techniques outlined in the VRP Guidance Document, the RISC Users Guide RISC Technical Resources Guidance Document, and the Confirmation Sampling Plan.

C. Identify Analytical Methods

The analytical methods to be used include SW-846 8260 (volatile organics), SW-846 8270 (semi-volatile organics), the applicable 6000 or 7000 series method for inorganics, and SW-846 8082 for PCBs. These methods apply to five samples submitted to the fixed laboratory only.

Step Four - Define the Study Boundaries

*A. Geographic Area of Interes*t

The area of interest is the former Oliver Plow Works Facility.

B. Areas of Interest

The surface soils (to 6 inches below grade), subsurface soils (to the seasonal high water table), and groundwater.

C. Divide site into strata

The site was divided in the CSM into 12 strata (areas) with similar COCs and similar concentrations.

D. Scale of Decision Making

The exposure area (EA) will be up to 40,000 square feet, depending on the size and shape of each strata and the sampling grids.

E. Temporal Constraints

The site cannot be assessed until the demolition of the buildings is completed and the RWP is approved by the VRP.

F. Practical Constraints

Sampling may be impeded by the location of new public utilities, new access roads, and other outcomes from the demolition and redevelopment of the site.

Step Five - Develop a Decision Rule

A. Parameter of Interest

We are interested in determining the true mean (∶) of each parameter in each EA.

B. Closure Levels

The site will be closed using the TTCG for volatile organics, semi-volatile organics and RCRA regulated inorganics in the VRP 1995 guidance.

C. The "if …then" decision rule

If any parameter is found to exceed the TTCG by 50% in any of individual confirmation samples obtained during the confirmation sampling event, or the true mean in any exposure area exceeds the TTCG , then additional investigation of that area will be conducted.

If the true mean for an exposure area is not found to exceed the TTCG, then the sampling in that exposure area will be considered to have met or exceeded the cleanup goal.

Step Six - Specify Limits on the Decision Rule (Using the Chen Test)

A. Null Hypothesis (Baseline Conditions) for Random Sampling using the Ranked Set Sampling Techniques

The calculated mean for the parameter of interest does not exceed the TTCG.

B. Define the "gray area", the area where a positive or negative decision error is acceptable

We are planning on obtaining a sufficient number of samples to allow for the "gray area" to be defined as the TTCG to twice the TTCG.

C. Type I and Type II Decision Errors

Type I Error - Investigate the area further when the true mean concentration is below the TTCG.

Type II Error - Do not investigate the site further when the true mean concentration is above twice the TTCG

D. Identify Consequences of Decision Errors

Type I Error - Unnecessary expenditure of resources to investigate the area and an increase in the time until the site can be redeveloped.

Type II Error - Exposure of construction workers and tenants to elevated levels of specific COCs.

E. Probabilities of Type I and Type II Errors

Our goals for the above errors are:

Type I Error - 0.20 (20%) probability of investigating the area further when the area mean is TTCG

Type II Error - 0.05 (5%) probability of not investigating further when the area mean is twice TTCG.

Step Seven - Optimize the Design

A. How to Best Estimate the Mean

An estimation of the true mean would require the collection and analysis of a large number of samples. We will use a simple/random sampling grid to obtain the samples to provide an accurate representation of the mean in each exposure area. The number of samples submitted for analysis and the assessment of the mean will be determined using The Chen Test.

The Ranked Set Sampling statistical technique will be utilized to increase the total number of samples assessed in each exposure area and reduce the number of total samples submitted for analysis through the use of an appropriate indicator parameter(s).

B. Expected Variability of Contaminant Concentrations

From the investigations that have occurred at this site in the past, we conservatively expect the efficient of variation to be 2.0.

C. Sampling Strategy Design

The sampling design will take into account the number of areas to be assessed, the number of samples, the cost of the samples, and the ability of the contaminant to be assessed using a indicator parameter. The above will be used to obtain acceptable decision rate errors from the site while minimizing the cost of the investigation and analysis of samples.

D. Planning Documents for Field Investigation

See the Confirmation Sampling Plan and the Quality Assurance Project Plan in the Remediation Work Plan.

References

"Soil Screening Guidance: Technical Background Document", United States Environmental Protection Agency, Office of Solid Waste and Emergency Response, EPA/540/R95/128, May, 1996.

"Soils Screening Guidance: Users Guide" United States Environmental Protection Agency, Office of Solid Waste and Emergency Response, EPA/540/R-96/018, July, 1996.

"Resource Guide" Indiana Department of Environmental Management, Office of Emergency Response, Voluntary Remediation Program, July 1996.

"EPA Observation Economy Series, Volume 2: Ranked Set Sampling" United States Environmental Protection Agency, Office of Policy, Planning, and Evaluation, EPA/230/R95/006, July, 1996.

"Risk Integrated System of Closure, Users Guide", Indiana Department of Environmental Management, February 15, 2001.

"Risk Integrated System of Closure, Technical Resource Guidance Document", Indiana Department of Environmental Management, February 15, 2001.