Appendix C

Template – Stormwater Source Control Evaluation Report

From: ***DEQ Guidance for Evaluating the Stormwater Pathway at Upland Sites***

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DEQ is a leader in restoring, maintaining and enhancing the quality of Oregon's air, land and water.

DEQ
State of Oregon
Department of
Environmental
Quality

APPENDIX C:
TEMPLATE FOR A
STORMWATER SOURCE CONTROL EVALUATION REPORT

A responsible party (RP) will prepare a Stormwater Source Control Evaluation (SCE) report to present their basis for determining that stormwater source control has been achieved at their site. This determination is based upon a weight-of-evidence evaluation involving both quantitative and qualitative information.

DEQ encourages RPs to use the template presented in this Appendix when preparing their report. This will help to ensure it includes information that the Oregon Department of Environmental Quality (DEQ) needs to prepare a final Stormwater Source Control Decision document.

In October 2010, a new appendix was added to stormwater guidance – Appendix E: Tool for Evaluating Stormwater Data. This tool can be used to help distinguish "typical" industrial stormwater and catch basin sediment from stormwater/sediments containing potentially elevated contaminant concentrations.

A critical component of the SCE report is a clear explanation of the steps taken and decisions made throughout the course of this evaluation, and the rationale behind them (e.g., identification of contaminants of interest, selection of sampling locations, determination that data objectives have been met, determination that sources have been controlled, etc.). The template is annotated to provide guidance on that matter.

Ultimately, the SCE report needs to be a stand-alone document to facilitate review by DEQ and other interested parties, such as local municipal authorities and members of the general public. For upland sites located within the Portland Harbor Superfund Study Area, the reports will also be reviewed by the U. S. Environmental Protection Agency (EPA) and taken into consideration as part of EPA's Record of Decision for Portland Harbor.

The SCE report will include information from a variety of other documents (e.g., workplans, investigation reports, Stormwater Pollution Control Plans, etc.). These documents may be included by reference if complete copies of the documents have been submitted to DEQ.

Stormwater Source Control Evaluation Report

This template presents a generic outline and format for a Stormwater Source Control Evaluation (SCE) report. The template may be modified to match site-specific considerations and/or stylistic preferences.

Table of Contents

The template has been annotated to provide guidance on the type of information to include in each section. However, it may be appropriate to deviate from this approach to accommodate site-specific issues or considerations.

SECTION 1: INTRODUCTION

1.1 Purpose

For example: This report presents the results of a stormwater Source Control Evaluation (SCE) for the *(site name)*, located at *(address)* in *(City)*, Oregon. This SCE was performed in response to a request by the Oregon Department of Environmental Quality (DEQ) to identify, evaluate, and control sources of contamination that may reach the *(waterbody)* in a manner consistent with DEQ's *Guidance for Evaluating the Stormwater Pathway at Upland Sites* (DEQ, 2009)[1,2].

1.2 Source Control Objective

For example: The objective of a stormwater SCE is to demonstrate that existing and potential sources of contamination at the site have been addressed and no additional characterization or source control measures are needed at the site.

1.3 Regulatory Framework

Reference the regulatory agreement or order the SCE Report was prepared to meet. This section should also describe how the stormwater SCE integrates with other environmental investigations or source control measures required at the facility.

1.4 Report Organization

SECTION 2: SITE BACKGROUND

2.1 Site Description

Provide a description of the physical features of the site, supported by appropriate maps and figures of current site conditions, including:

- Location
- Topography
- Depth to groundwater
- Physical description (size, building locations, type of surface cover (e.g., soil vs. asphalt)
- Utilities (types, locations, age, depth) and subsurface utility corridor maps

2.2 Stormwater Conveyance System

Provide a description, supported by appropriate maps and figures, of the stormwater conveyance system on the site.

Include any off-site conveyances that transport stormwater to the waterbody, and information on any camera work done to verify storm lines and connections (e.g., where work was done, what was found).

[1] DEQ's *Guidance for Evaluating the Stormwater Pathway at Upland Sites* can be found at http://www.oregon.gov/deq/FilterDocs/cu-StormwaterSites.pdf

[2] For Portland Harbor upland sites, you may also indicate that the evaluation was performed in accordance with the *DEQ-EPA Portland Harbor Joint Source Control Strategy (DEQ 2005).*

2.3 Site Ownership and Operating History

Present a summary of historic and current site ownership and operations, activities, uses, etc., supported by appropriate maps, figures, and tables. Include all known hazardous substance usage, storage areas and disposal practices (historic and current).

2.4 Regulatory History

Review and summarize the site regulatory history (e.g., pre-treatment requirements, permits, spills, inspections, enforcement actions, cleanup, remedial or source control actions) that has relevance to the stormwater pathway (e.g., defining pathways, sources, contaminants of interest).

2.5 Previous Investigations

Review and summarize the previous environmental investigations performed on the facility or nearby facilities that may have impacted the site.

SECTION 3: POTENTIAL SOURCES AND CONTAMINANTS OF INTEREST

3.1 Potential Contaminant Sources

Identify potential current and historic contaminant sources based upon the information provided in the section above. Using a tabular format, present pertinent information for each potential source (e.g., contaminant(s) associated with potential source, estimated volume, storage method, period used) and indicate locations on an appropriate site plan. Where appropriate, include information on containment or other control measures that may prevent the contaminants from getting into the stormwater system (e.g., secondary containment around ASTs, indoor storage, discharge to sanitary).

3.2 Outfall Sediment Data

Summarize available information on contaminants present at elevated concentrations in sediments in the vicinity of the stormwater outfall. [This information must be considered when developing the list of site COIs for a stormwater SCE. If no such information is available, indicate this in this section to demonstrate that outfall-related data was considered.]

3.3 Contaminants of Interest

Present the list of COIs for this investigation and the basis for their selection.

SECTION 4: ONGOING STORMWATER MANAGEMENT MEASURES

Summarize ongoing stormwater Best Management Practices (BMPs) being implemented at the site (e.g., employee education/training programs, debris removal, exposure reduction, runoff diversion, soil removal or capping, etc) and any mechanisms in place to document these practices and ensure their ongoing implementation and effectiveness. If regularly scheduled BMPs were implemented during the course of the investigation, provide the dates the measures were implemented.

THE SEQUENCE OF THE FOLLOWING SECTIONS WILL VARY DEPENDING ON THE STRATEGY SELECTED, AND SHOULD BE REORGANIZED ACCORDINGLY.

For example, if the next step is data collection, use Section 5;
if the next step is implementing SCMs, use Section 6.

SECTION 5: DATA COLLECTION AND INTERPRETATION

Briefly describe the types and numbers of samples/sampling rounds included in the sampling plan. If pre- and post-SCM sampling took place, clearly distinguish the two data sets.

5.1 Sampling

5.1.1 Catch Basin Sediment Sampling

Describe the objectives of the sampling efforts. If the SCE included soil sampling, describe those efforts using this same outline.

a. Sampling Framework
Discuss the following:
- number of samples collected;
- rationale for selecting sampling locations (and not sampling other locations);
- rationale for deciding what the samples would be analyzed for; and
- sample collection methodology.

b. Documentation
Briefly describe the sampling event and any deviations from the sampling plan.

Provide a summary of the quality assurance (QA) and quality control (QC) measures that were implemented during field and laboratory investigations to ensure high-quality data. Specifically discuss:
- Whether sampling objectives were met;
- If some objectives were not met (e.g., method detection limits significantly higher than SLVs), describe why data was determined to be acceptable and/or useable in the SCE; and
- Data uncertainty and/or gaps.

Discuss any factors that could affect the representativeness of one or more of the samples collected (e.g., activities occurring on the site preceding the sampling event; unusual characteristics of the sample, etc.)

5.1.2 Stormwater Sampling

Describe the objectives of the sampling efforts.

a. Sampling Objectives and Framework
Discuss the following:
- number of samples collected;
- target storm event criteria;
- rationale for selecting sampling locations;
- rationale for deciding what the samples would be analyzed for; and
- sample collection methodology.

b. Documentation

Provide a hydrograph[3] that charts rainfall per hour, starting a minimum of 24 hours prior to storm initiation, and indicates the time that stormwater began flowing at the sampling location and when the sample was collected. An example hydrograph and instructions for creating one is attached at the end of this document.

Include the following and any additional information that may be useful for the interpretation of results:

- Duration of the antecedent dry period for each sampled storm event;
- When stormwater flow was first observed at the sample locations, if known;
- Which sampling events represent "first flush" samples;
- In cases where target storm event criteria were not met but the sample was considered representative of runoff from the site, describe how this was determined; and
- Any deviations from the sampling plan.

Summarize quality assurance (QA) and quality control (QC) measures implemented during field and laboratory investigations to ensure high-quality data. Specifically discuss:

- Whether sampling objectives were met;
- If some objectives were not met (e.g., method detection limits significantly higher than SLVs), describe why data was determined to be acceptable and/or useable in the SCE; and
- Data uncertainty and/or gaps.

Discuss the presumed representativeness of the sampling results based upon variables such as:

- Activities occurring on the site preceding the sampling event;
- Antecedent dry period;
- Timing of sample collection during a storm event;
- Volume and intensity of rainfall; and
- Other relevant information.

5.1.3 Other (soil, inline sediments, sediment traps, dry weather flow, groundwater, etc.)

Document the work in a similar manner to the approach used above.

5.2 Data Summary

For each type of sampled media, briefly describe the data included in this report and reference the Figures showing sample locations and Tables where the data can be found. This should include all relevant historic data that may be pertinent to the evaluation (e.g., previous environmental investigations, NPDES monitoring data).

[3] Portland-area rain gages can be accessed at: https://or.water.usgs.gov/non-usgs/bes/raingage_info/clickmap.html. Note that rain gage times on this website are always in Pacific Standard Time (PST). If samples are collected during Daylight Savings Time (DST), field notes and sampling documentation should note whether sample times are in PST or DST. Additional Rain gage data for Oregon is available at https://waterdata.usgs.gov/or/nwis/current/?type=precip&group_key=county_cd.

Data summary tables should present sample location number, analyte, result, analytical method, method reporting limit, data qualifiers, etc. Use the Excel table provided in DEQ's *Guidance for Evaluating the Stormwater Pathway at Upland Sites*, found at: http://www.oregon.gov/deq/Hazards-and-Cleanup/env-cleanup/Pages/Stormwater-Guidance.aspx.

Include maps displaying data results and other types of figures designed to facilitate data interpretation.

5.3 Data Interpretation

Discuss the following, as appropriate, for all sampling results.

5.3.1 Method Detection Level and QA/QC Issues

Identify contaminants for which method detection levels exceeded SLVs. Describe other QA/QC concerns that could significantly influence the interpretation of the results (e.g., significant differences in duplicates or replicate pairs; dilution factors, etc.).

5.3.2 SLV Exceedances

Describe the contaminants that exceeded SLVs and the magnitude of the exceedance.

5.3.3 Discussion

Describe apparent data patterns or trends. Discuss factors that may contribute to or detract from the presumed representativeness of the data results.

SECTION 6: SOURCE CONTROL MEASURES (SCMs)

Describe in detail any stormwater source control measures implemented at the facility during the course of this evaluation. This may include containment or removal of contaminated media, additional or improved stormwater BMPs, changes in site operations, etc. For each SCM describe the following:

- Rationale for selecting the SCM;
- Objective and desired outcome;
- Overview of SCM implementation and timeline;
- Method for evaluating effectiveness at reducing contaminant concentrations and/or loads; and
- Mechanisms in place to ensure the ongoing implementation and effectiveness of stormwater SCMs and BMPs, and to document and/or report on these efforts.

SECTION 7: SOURCE CONTROL EVALUATION

This section presents evidence used to support the determination that stormwater source control is complete, and no additional stormwater characterization or source control measures are needed at the site.

7.1 Data Evaluation

Present an interpretation of relevant site-specific data, including any apparent trends, reductions in concentrations/loads, etc. Describe the drivers behind these changes and the measures in place

to ensure the reductions or trends will not be reversed. Discuss the basis for determining that source control measures have been effective. Using the screening tool provided in Appendix E, discuss how site stormwater data compares to stormwater data from other industrial sites.

Describe any notable data gaps and sources of uncertainty (e.g., factors that raise questions about the representativeness of the data) and the basis for determining that these factors should not invalidate the finding that source control has been achieved.

7.2 Other Lines of Evidence

Describe other evidence that helps demonstrate that contaminant sources will continue to be controlled in the future, such as additional BMPs or SCMs planned for future implementation, regulatory or other tools that will ensure stormwater source control measures will be continued in the future, etc.

SECTION 8: FINDINGS AND CONCLUSIONS

It is recommended that you incorporate the following statements *verbatim* into your SCE report. Each statement should be followed by one or more bullets laying out your basis for determining these conditions have been met. Some suggestions about how to approach this are presented but these may or may not be appropriate for any individual site.

1. **Existing and potential facility-related contaminant sources have been identified and characterized.**
    - Briefly describe the existing and potential sources and the COIs associated with each source.
    - Discuss the lines of evidence used to arrive at the decision that all sources have been identified and characterized (e.g., sampling strategy, cleanout and camera surveys of conveyances, comparison to stormwater data from other industrial sites, etc.).

2. **Contaminant sources are being controlled to the extent feasible.**
    - Describe how each existing or potential source is being controlled.
    - Discuss the relative effectiveness of source control measures and stormwater BMPs at minimizing the contaminant load in stormwater, and the basis of that evaluation.
    - List the contaminants that continue to exceed SLVs in spite of source control measures. Describe their source(s) and indicate why additional SCMs are either not feasible or not expected to achieve better results.

3. **If pre- and post-SCM data was collected, post-SCM data supports the conclusion that the SCM is effective.**
    - Describe how you have interpreted the data and what you have concluded.

4. **Adequate measures are in place to ensure source control and good stormwater management measures occur in the future.**
    - Describe these measures and how the effectiveness of BMPs and other stormwater control measures overall and/or individually will be evaluated as to their effectiveness in the future.

5. **Contaminants in stormwater that continue to exceed SLVs in spite of SCMs and stormwater management measures are not likely to result in sediment contamination in the receiving waterbody or contribute to unacceptable risk.**
    - The following findings, if true for the site, may lend support to this argument:
        - Minimal exceedance of SLVs (e.g., 2x or 3x the SLV).
        - Low levels of suspended solids.
        - Small volume of stormwater discharging from the site relative to the total volume of stormwater discharging from the outfall basin (for sites that discharge to a shared conveyance) and/or in the river.

REFERENCES

LIST OF FIGURES (EXAMPLES)

1. Site Location Map
2. Site Features Map
3. Historic Land Use and Operations
4. Potential Contaminant Source Areas
5. Stormwater System Map
6. Sample Location Map
7. Conceptual Site Model
8. Extent of Soil Contamination
9. Extent of Groundwater Contamination
10. Stormwater Hydrographs
11. Groundwater Elevation Contour Map
12. Conceptual Site Exposure Model

LIST OF TABLES (EXAMPLES)

1. Site Ownership and Property Uses
2. Contaminants of Interest
3. Potential Contaminant Source Areas
4. Sample Locations
5. Analytical Sampling Schedule
6. Groundwater Elevation Data
7. Soil Analytical Data
8. Groundwater Analytical Data Soil Analytical Data
9. Stormwater Solids Analytical Data
10. Stormwater Analytical Data
11. Stormwater Pathway Screening Levels
12. Contaminants above SLVs
13. Source Control Measure Summary

LIST OF APPENDICES (EXAMPLES)

A. Site History (aerial photographs, historical site plans, etc.)
B. Elevation Survey Maps
C. Field Investigation Procedures
   - Drilling Methods
   - Soil Logging
   - Sampling Methods (soil, groundwater, sediment, stormwater, stormwater solids)
   - Analytical Schedule
   - Chain-of-Custody Procedures
   - Decontamination Procedures
   - QA/QC
D. Boring Logs/Well Completion Diagrams (if applicable)
E. Laboratory Data Reports

Example Hydrograph Showing Onset of Flow and Sample Time

Data obtained from http://or.water.usgs.gov/non-usgs/bes/precip.html

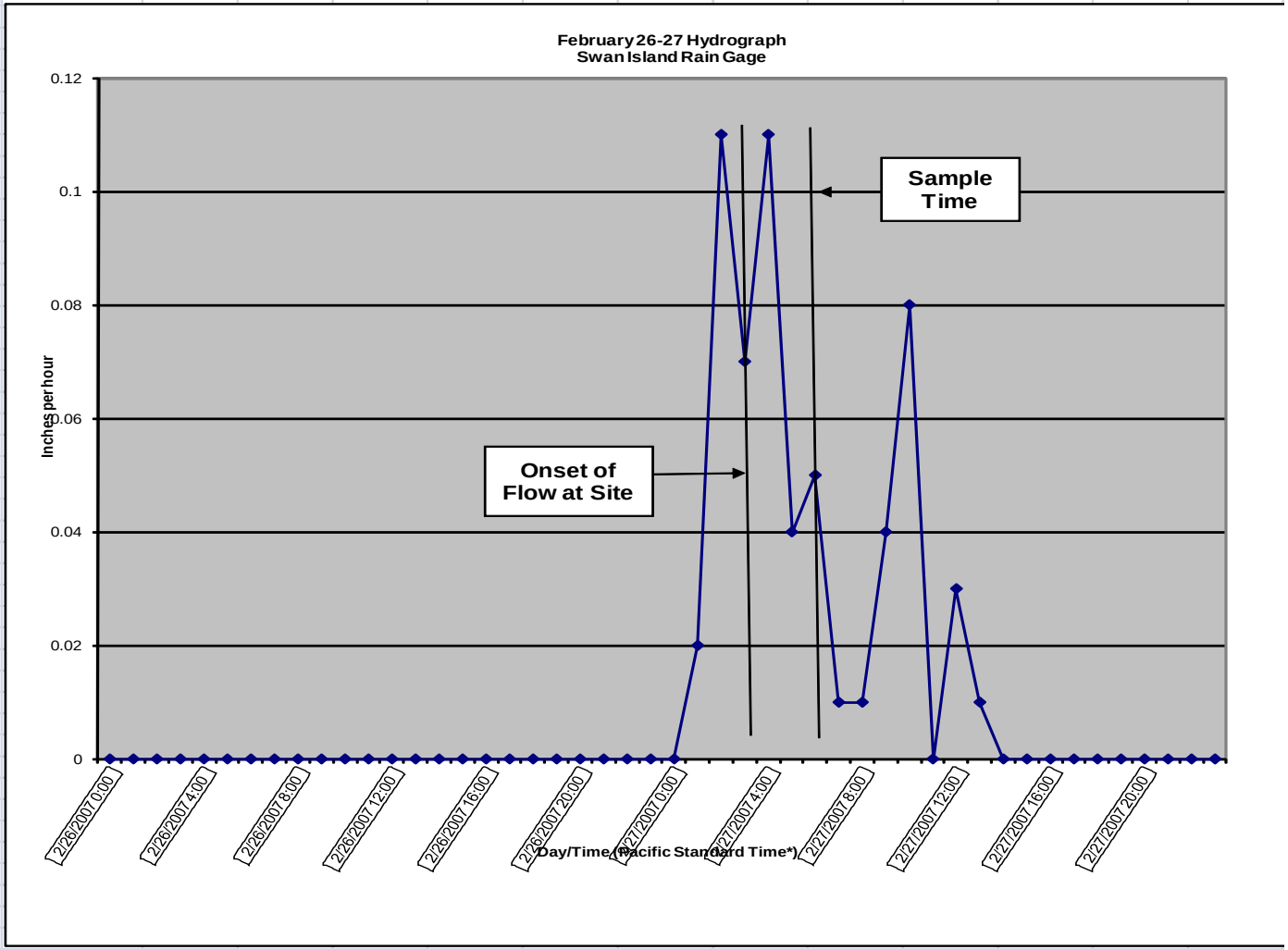
NOTE: To convert the website data into a column in Excel, highlight the data you want to import then copy and paste it into Excel. It will appear in one cell. Select that cell and go to Data, Text to Columns, and select Fixed Width. After completing this step, each data point will now occupy one cell in a row. To convert the row to a column, highlight and copy the data, place the cursor in an empty column, select Paste Special, and click on Transpose.

Date/Time*	# of tips	Inches
2/26/2007 0:00	0	0
2/26/2007 1:00	0	0
2/26/2007 2:00	0	0
2/26/2007 3:00	0	0
2/26/2007 4:00	0	0
2/26/2007 5:00	0	0
2/26/2007 6:00	0	0
2/26/2007 7:00	0	0
2/26/2007 8:00	0	0
2/26/2007 9:00	0	0
2/26/2007 10:00	0	0
2/26/2007 11:00	0	0
2/26/2007 12:00	0	0
2/26/2007 13:00	0	0
2/26/2007 14:00	0	0
2/26/2007 15:00	0	0
2/26/2007 16:00	0	0
2/26/2007 17:00	0	0
2/26/2007 18:00	0	0
2/26/2007 19:00	0	0
2/26/2007 20:00	0	0
2/26/2007 21:00	0	0
2/26/2007 22:00	0	0
2/26/2007 23:00	0	0
2/27/2007 0:00	0	0
2/27/2007 1:00	2	0.02
2/27/2007 2:00	11	0.11
2/27/2007 3:00	7	0.07
2/27/2007 4:00	11	0.11
2/27/2007 5:00	4	0.04
2/27/2007 6:00	5	0.05
2/27/2007 7:00	1	0.01
2/27/2007 8:00	1	0.01
2/27/2007 9:00	4	0.04
2/27/2007 10:00	8	0.08
2/27/2007 11:00	0	0
2/27/2007 12:00	3	0.03
2/27/2007 13:00	1	0.01
2/27/2007 14:00	0	0
2/27/2007 15:00	0	0
2/27/2007 16:00	0	0
2/27/2007 17:00	0	0
2/27/2007 18:00	0	0
2/27/2007 19:00	0	0
2/27/2007 20:00	0	0
2/27/2007 21:00	0	0
2/27/2007 22:00	0	0
2/27/2007 23:00	0	0

Each tip equals 0.01 inches of rainfall

Table and/or graph should provide rainfall data for min. of 24 hours preceeding storm

Onset of flow is generally obtained through observation (may not always be available)



***Note that the website always reports rain gage times in Pacific Standard Time (PST). If samples are collected during Daylight Savings Time (DST), field notes and sampling documentation should note whether sample times are in PST or DST**