PERIODIC REMEDY REVIEW REPORT TEMPLATE

Purpose: The Periodic Remedy Review (PRR) report evaluates and documents the implementation and performance of a groundwater remedy at a Voluntary Remediation Program (VRP) site to determine if the remedy remains effective and protective of human health and the environment.The PRR also identifies any remedy issues or changes found during the review and recommends ways to address them.

Note: This template provides volunteers a recommended outline to prepare a streamlined PRR for VRP review. The Volunteer may adapt this format to be site-specific and include additional information needed for a complete report. Site complexity may warrant extra details. Italicized text indicates recommended language for the PRR. This document may replace an annual or similar progress report for the same period. The VRP encourages Volunteers to work with the VRP project manager to define the scope in advance to avoid unnecessary effort and rework.

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1.0 INTRODUCTION

[Volunteer name] is preparing this [enter number of years]-year review pursuant to the remedial action work plan titled [title] and dated [date]. The remedial action work plan was approved by the VRP on [date]. [List any revisions]

This is the [number] PRR for the [Site name] VRP Site. This PRR has been prepared because [COCs] remain at the Site above [insert applicable standard (Soil Remediation Levels, Groundwater Protection Levels, Aquifer Water Quality Standards, etc.)].

1.1 Site Background

- Provide site background information – may be taken directly from the remedial action work plan.
- Site location map and brief physical description.
- Former, current, and reasonably anticipated zoning and future land use of site and of areas surrounding the site.
- Review period.
- Volunteer's objective (No Further Action [NFA], Conditional NFA, etc.).

1.2 Remedy Summary

- Describe the remedy, including technologies, equipment, operation, and maintenance.
- Describe any institutional controls, such as a Declaration of Environmental Use Restriction (DEUR) or media-specific NFA.
- Describe the performance metrics used to evaluate the remedy.
- List any contingency actions implemented during the reporting period.
- Estimate the time for remedy completion and how it has changed since implementation.

2.0 SITE INSPECTION

The VRP encourages the Volunteer to conduct a site inspection for complex sites. Document the date, parties in attendance, and purpose of the inspection. Include relevant photos. Briefly describe the inspection results , particularly if you observed issues with current and/or future impacts to human health and the environment. Discuss any changes in land use (on-site and adjacent properties), construction, or grading observed at the Site and adjoining property.

3.0 REMEDY EVALUATION SUMMARY

3.1 Data Review

- Summarize the collected data and the metrics used to evaluate it. Focus on the past [number] years of data, unless you need additional historical data to evaluate trends.
- Note that it can be useful to separate data by media and sub-media (e.g., soil, groundwater, sediment, surface water, or soil gas/indoor air).
- Do not include all historical data collected and statistical analyses in this section; instead reference them. Include only the data necessary to answer the technical assessment questions.
- Include information/responses to the following:
    - Contaminants of concern (COC) concentrations and statistical trends (Mann-Kendall, regression, other).

    - Groundwater elevation and flow patterns since last review. Include potentiometric maps of key or representative monitoring rounds. Discuss local, regional or other groundwater elevation changes.
    - Include data relevant to remedy performance and progress towards meeting applicable standards (i.e., Soil Remediation Levels [SRLs], Groundwater Protection Levels, Aquifer Water Quality Standards [AWQS], etc.)
- Briefly summarize:
    - Relevant analytical data trends over the last [number] years, noting groundwater elevations (e.g., measurements in specific well locations for a groundwater cleanup), to evaluate whether the site has achieved or will likely achieve cleanup levels established in the work plan.
    - Data relevant to support engineering performance, such as data related to assessing hydrologic plume capture, extraction rates, calculate mass removal, or support a remedy changed (e.g. from active remediation to Monitored Natural Attenuation).
    - For groundwater remediation, a brief discussion of data related to the short- and long-term site-specific groundwater remedial strategy.
- Use tables, maps, or graphs to help explain the text, or include them in an appendix.
- If you reference a document that includes data, provide a citation and direct the reader to a reference list.

3.2 Technical Assessment

Answer the questions below regarding the remedy. The Volunteer may use the questions as section titles. Summarize the information obtained during the remedy review process. Ensure answers are complete and concise; support a "yes" or "no" answer as described.

3.2.1 - Question 1: Is the remedy functioning as intended by the remedial action work plan? Answer yes/no and include supporting discussion:

3.2.1.1 Remedy Performance

- Whether the remedial action continues to operate and function as designed.
- Whether cleanup levels are being achieved or are on a path to be achieved in a reasonable time frame.
- Whether containment is effective, if applicable.
- Whether opportunities exist to optimize and/or improve the performance and/or reduce costs of monitoring, sampling, and treatment systems.
- Estimate of time to current remedy completion (describe how calculated) with appropriate uncertainty. This should include updates to the groundwater fate and transport modeling and how often the modeling is updated.
- Whether any contingencies were or need to be implemented (e.g. increase extraction rates, installation of additional wells).
- Whether soil controls or remediation conducted as part of the overall remedy remain effective or if additional source controls should be implemented.

3.2.1.2 System Operations/Operations and Maintenance (O&M) (include if appropriate)

- Whether operating procedures, as implemented, are working in a manner that will continue to maintain the effectiveness of the remedy.

- Whether frequent equipment breakdowns or changes indicate a potential issue affecting protectiveness.
- Whether the monitoring program should be reduced, optimized, or modified to meet metrics.

3.2.1.3 Implementation of Institutional Controls (ICs) and Other Measures (include if appropriate)

- Whether ICs are in place and are proving to be effective in preventing exposure.
- Whether access controls (e.g., fencing and warning signs) are in place and are proving to be effective in preventing exposure.
- Whether other actions (e.g., removals) necessary to ensure that immediate threats have been addressed are complete.
- Status on the controls and any repair/replacements made since the last periodic report.

3.2.2 - Question 2: Are the exposure assumptions and toxicity data used at the time of the remedy selection still valid? Answer yes/no and include supporting discussion:

3.2.2.1 Changes in assumptions and requirements

- Review any changes to risk assumptions (toxicity, slope factors, carcinogenic class, etc.) if the remedy is risk-based.
- Summary tables may be added to this section as appropriate.
- Whether other contaminant characteristics have changed in a way that could affect the protectiveness of the remedy.

3.2.2.2 Changes in Exposure Pathways

- Whether human health or ecological routes of exposure or receptors have been newly identified or changed in a way that could affect the protectiveness of the remedy (e.g. new development, re-zoning, installation of new groundwater wells, recharge projects, changes in erosion or drainage patterns, topographic changes that expose soil).
- Whether there are newly identified contaminants or contaminant sources leading to a potential/actual pathway not previously addressed by the remedy.
- Whether there are unanticipated toxic byproducts or decay products of the remedy not previously addressed by the remedial action work plan.
- Whether physical site conditions or the understanding of these conditions have changed in a way that could affect the protectiveness of the remedy.

3.2.2.3 Expected Progress Towards Meeting Remedial Standard(s)

- Whether the remedy is progressing as expected towards meeting remedial standards. If not, what is proposed during the next reporting period to achieve meeting remedial standards.
- Whether new site conditions (e.g., discovery of new contaminants) impact remedial standards and remedy protectiveness.
- Whether or not the remedy needs to be modified to achieve remedial standards (e.g., chemical oxidation to biological injection).

3.2.3 - Question 3: Has any other information come to light that could call into question the protectiveness of the remedy or require VRP assistance to address?

- To avoid unnecessary duplication and redundancies, the information included in Question 3 differs from information already covered in Questions 1 and 2.
- This question may address site changes or vulnerabilities that may be related to impacts not apparent during remedy selection, remedy implementation or O&M.

3.2.4 - Question 4: Are the current performance metrics meeting the project needs; can the metrics be modified or improved?

- Summarize any changes or modifications in the performance metrics that may enhance remedy evaluation.
- Include opportunities to reduce monitoring and operation costs as the remedy proceeds.
- Utilize the statistical evaluations to support changes.

4.0 ISSUES/RECOMMENDATIONS

- Issues/Recommendations for next reporting period

5.0 OTHER FINDINGS

Include any items that are relevant to the PRR but should not be tracked as formal issues and recommendations affecting current and/or future protectiveness.

Recommended text: *In addition, the following are recommendations that were identified during the PRR and may improve performance of the remedy, reduce costs, improve management of O&M, accelerate site close out, but do not affect current and/or future protectiveness:*

- List of items with appropriate context.

6.0 NEXT REVIEW

The next periodic remedy review report for the [Site Name] VRP Site is required in [number] years from the completion date of this review.

7.0 REFERENCES - ALL RELEVANT DOCUMENTS WHICH WERE REVIEWED FOR THIS PRR, SUCH AS O&M REPORTS, OR MONITORING DATA, SHOULD BE INCLUDED HERE.

FIGURES

- Site maps
- Concentration contour maps for COCs throughout report duration (annual snap-shot)
- Capture zone maps
- Cross sections with plume delineation

- Hydrographs and concentration data graphs for pertinent wells and COCs
- Groundwater concentration graphs over time for pertinent wells and COCs
- Linear regression graphs for pertinent wells and COCs

TABLES

- Mass Removal this Review Period, Total, and Remaining Mass
- Metrics, Compliance with Metric, and Contingency Actions

APPENDICES – May include:

- Site inspection checklist and photos
- Photos (only include photos that help inform the remedy protectiveness evaluation)
- Additional data or statistical analyses
- Updated conceptual site model(s)
- Trend Analysis using Mann-Kendall Statistical Analysis for All Years, 5 Years, 15 Years
- Schedule/Timelines for Remediation with End Goals (i.e. SRLs, AWQS, SWQS)
- Progress since Remedial Implementation and Estimates Moving Forward