Remedial Action Report Presentation and Documentation

Dominik Hudyka

Bureau of Inspection & Review

ECCC

These topics were discussed at the ECCC meetings and will be part of the FAQs.

N.J.A.C. 7:26E-5.7 - Remedial Action Report Requirements

7:26E-5.7(b): The person responsible for conducting the remediation shall present and discuss in the remedial action report all of the information identified or collected pursuant to N.J.A.C. 7:26E-5.1 through 5.6, along with all of the following:

N.J.A.C. 7:26E-5.7 - Remedial Action Report Requirements

Main Requirements:

1. Updated Receptor Evaluation
2. Summary of findings and recommendations for each AOC
3. Discussion of remedial actions for each AOC and their effectiveness
4. Submission of remedial action permit application(s), if applicable

AOC Summary

- Summarize investigation and findings of all AOCs, regardless of if they required a remedial action
- For AOCs not requiring a remedial action, reference which remedial phase the AOC investigation was completed

3.1 AOC-1: Aboveground Storage Tank (AST)

During [redacted] SI activities, polycyclic aromatic hydrocarbons (PAHs) and metals were detected in soil within this AOC at concentrations above the NJDEP default Impact to Groundwater Soil Screening Levels (IGWSSLs). In addition, lead was detected at a concentration above its Residential Direct Contact Soil Remediation Standard (RDCSRS). Since the AST was presumed to contain heating oil, analysis of total extractable petroleum hydrocarbons (EPH), naphthalene and 2-methylnaphthalene was performed; however, these concentrations were below applicable soil remediation standards (SRSs). The PAHs and metals detected above standard are attributable to historic fill, and were addressed under AOC-9. Therefore, no further action is necessary for AOC-1.

AOC Summary

- Remedial actions should be summarized for applicable AOCs

3.4 AOC-9: Historic Fill

The NJDEP [redacted] Quad Map of Historic Fill indicates the subject property is located within an area designated as non-native soil. During [redacted] SI activities, historic fill material was identified within soil borings and confirmed via laboratory analytical results.

Analysis of the soil samples identified SVOCs and metal contaminants above standard. Concentrations of these contaminants did not indicate a specific discharge and are attributable to historic fill material.

[redacted] has recorded NJDEP compliant site wide engineering and institutional controls. A Deed Notice was recorded with the [redacted] County Office of Records and a SRAP will be submitted to the NJDEP for approval, which will serve as institutional controls.

The following compounds attributed to historic fill material will be included in the site restrictions: cadmium, lead, mercury, aluminum, zinc, extractable petroleum hydrocarbons, benzo[a]anthracene, benzo[b]fluoranthene, benzo[a]pyrene, indeno[1,2,3-c,d]pyrene, dibenz[a,h]anthracene. These compounds were also detected in excess of standards presumed to impact groundwater, as such, a Classification Exception Area (CEA) restricting the use of groundwater will be submitted to the NJDEP for record as an institutional control.

RAR & Appendices – Historical Investigations & Remediations

What to include:

- All necessary information that the LSRP utilized when implementing and evaluating the effectiveness of a remedial action
- This may include data, tables, figures, appendices, and/or attachments provided in previous reports, as necessary

What not to include:

- If an RIR was recently submitted, only a summary of the investigation/remediation is necessary within the RAR
- It is not necessary to attach the complete RIR report as an appendix if it was submitted after 2018

RAR & Appendices - Historical Investigations & Remediations

Why?

- Historical reports may not be readily available to reviewers
  - May not be in NJEMS
  - We must go through OPRA
- Missing information pertinent to a remedial action will cause a reviewer to issue an NTD or request information from the LSRP
  - Increases overall review time
  - Delays permit approval and RAO issuance
  - Sections of historic reports not referenced in RAR may cause reviewer to look at an entire previous report and find additional issues

RAR & Appendices - Historical Investigations & Remediations - Example

Well data from the RI was utilized to delineate the extent of a groundwater plume. The following should be provided:

- Tables showing historic data
- Figures showing locations of the previous permanent/temporary wells in relation to the current monitoring well network and plume
- Additional pertinent historic information such as field sampling logs, boring logs, well logs, construction details, lab reports, etc., included as appendices

RARs with RAP Applications

Information and data should be consistent across the RAR, RAP Application, and Deed Notices

- Examples:
  - Block/Lot of the restricted area is different on the RAP Application from the Deed Notice
  - RAR details the cap to be asphalt but the Deed Notice has it as soil

Professional Judgment & Lines of Evidence When Varying/Deviating from Rules/Guidance

Documentation of professional judgment for variances and deviations should be in their own section within the RAR, clearly identified in the Table of Contents

4.2 Variances from the Technical Requirements

The work presented in this RAR was conducted in accordance with the requirements outlined in the NJDEP TRSR, the FSPM, and applicable technical guidance documents. No variances (or deviations) were required.

4.5 Deviation from the *Technical Guidance on the Capping of Sites Undergoing Remediation*

[redacted] has prepared the following technical guidance deviation statement as required under N.J.A.C. 7:26C-1.2(a)3ii. This deviation statement pertains to historic fill and the use of a six inch permeable soil cap (geotextile demarcation fabric and topsoil) versus two feet of imported materials as defined in the *Technical Guidance on the Capping of Sites Undergoing Remediation*, Version 1.0, July 14, 2014 (Capping Technical Guidance); Section 3.2.1. Vegetative / Landscape Caps; "Vegetative caps are generally 2 feet thick but can vary based on site specific conditions."

The deviation statement applies to the cap installed for AOC 54/AOC 61 historic fill. As described in **Section 2.7**, the AOC 54/AOC 61 historic fill was capped with six inches of topsoil following the placement of a geotextile demarcation fabric. A seed mixture of fescue, ryegrass, and bluegrass was applied to reestablish vegetation. Straw mulch was placed over the topsoil and new shrubs were planted in the landscaped area. The remaining areas of historic fill are capped with impermeable features, including the building concrete slab, asphalt roadway, and concrete sidewalk.

A description of how the vegetative cap (six inch topsoil cap) deviates from the cited technical guidance:

As described in the Capping Technical Guidance, a vegetative cap is a long-term, self-sustaining cover of plants growing in or over materials that pose environmental risk. The vegetative cap reduces risk to an acceptable level. Vegetative caps are generally two feet thick but can vary based on site specific conditions.

The rationale for deviating from the cited technical guidance:

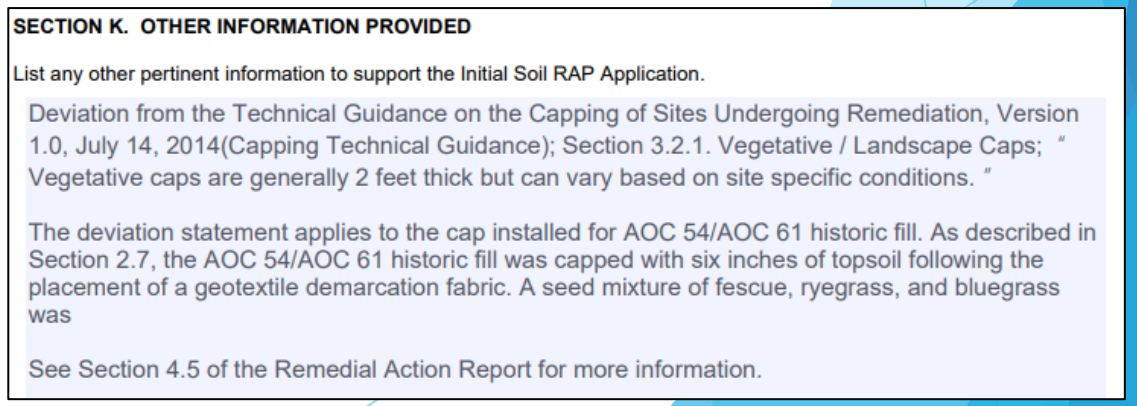
The permeable cap installed at the site as an engineering control for historic fill consists of a six inch topsoil cap with an underlying geotextile demarcation fabric. The geotextile demarcation fabric was placed across the extent of the historic fill capped with topsoil. The topsoil was placed and graded to control storm water ponding. The topsoil imported to the site for cap construction was certified clean fill. The area is enclosed with a six foot fence.

[redacted] is requesting a deviation from the Capping Technical Guidance pertaining to the installation of a six-inch permeable topsoil cap. Based on the information provided, the cap, geotextile, and fence is suitable and protective of receptors based on the industrial use of the site and surrounding properties.

Professional Judgment & Lines of Evidence When Varying/Deviating from Rules/Guidance

For RAPs:

- Use Section K to reference the location in the RAR that supports the variance/deviation for questions in Section G of the RAP Application
- Provide a brief summary of the variance/deviation and professional judgment including lines of evidence in Section K of the RAP application
- The RAR should include much more detail than what's in the RAP Application



SECTION K. OTHER INFORMATION PROVIDED

List any other pertinent information to support the Initial Soil RAP Application.

Deviation from the Technical Guidance on the Capping of Sites Undergoing Remediation, Version 1.0, July 14, 2014(Capping Technical Guidance); Section 3.2.1. Vegetative / Landscape Caps; " Vegetative caps are generally 2 feet thick but can vary based on site specific conditions. "

The deviation statement applies to the cap installed for AOC 54/AOC 61 historic fill. As described in Section 2.7, the AOC 54/AOC 61 historic fill was capped with six inches of topsoil following the placement of a geotextile demarcation fabric. A seed mixture of fescue, ryegrass, and bluegrass was

See Section 4.5 of the Remedial Action Report for more information.

RAR Presentation: Common Issues

- RAR Format: Tables, Figures, & Appendices
- Remedial Action Permit: Referencing section of RAR that supports the variances/deviations and using Section K
- Documentation supporting Professional Judgment and Lines of Evidence

Common Deficiencies Associated with Tables

Historic Ground Water Data Tables not in an easy-to-read format. Should present a summary of all the ground water sampling results by monitoring well (and temporary well point) in tabular format, including **all** historical/current ground water sampling data for contaminants of concern

- Ground water elevation (depth to water) data should be included
- Sampling Method
- Free product/sheen observations should be noted
- Indication of remedial actions should be noted (injections)

Common Deficiencies associated with Tables

Additional Tables not always included in RAR

- Monitoring Well Construction Details tables should be presented with ground water data tables
- Pre/Post-Injection Monitoring Results should be presented as stand-alone tables that include results or additional parameters that require monitoring based on the Permit-By-Rule (PBR) Approval
- Tables for Vapor Intrusion investigation results should be included (even if no additional data was collected since the Remedial Investigation (RI))

Historic Ground Water Data Table Example

- Clearly shows historic data for all current and former on-site wells with relevant contaminants of concern
- Reviewer can easily see concentrations of contaminants over time

Monitoring Well ID	Date Sampled	GW Elevation	Benzene	Toluene	Ethyl Benzene	Total Xylenes	MTBE	TBA	Total TICs
MW-14	6/3/2013	Unable to Access - Covered by Vehicle							
	6/14/2013	100.18	<0.24	<0.23	<0.23	<0.24	<0.16	<1.8	ND
	12/4/2013	99.00	<0.28	<0.44	<0.21	<0.19	<0.29	<1.9	NA
MW-15	6/3/2013	97.45	26.4	0.23 J	1.1	<0.24	<0.16	<1.8	19.4 J
	12/4/2013	97.31	152	0.80 J	<0.21	0.97 J	<0.29	39.6	NA
	5/15/2014	97.65	<0.28	<0.44	<0.21	<0.19	<0.29	<1.9	9.6 J
	11/5/2014	97.08	43.8	0.51 J	<0.40	0.53 J	<0.26	42.9	NA
	5/28/2015	97.33	15.4	0.51 J	0.84 J	0.36 J	<0.24	21.4	NA
	11/11/2015	97.29	2.9	<0.16	<0.27	<0.17	<0.24	43.7	NA
	5/12/2016	97.47	61.0	<0.23	0.45 J	<0.21	<0.34	25.8	350 J
	11/29/2016	97.37	18.6	0.39 J	<0.20	0.47 J	<0.34	48.1	NA
	2/28/2017	97.49	<0.14	NA	NA	NA	NA	NA	6.9 J
	5/15/2017	97.71	0.21 J	<0.23	<0.20	<0.21	<0.34	11.3	ND
	8/7/2017	97.39	7.6	NA	NA	NA	NA	NA	140 J
	11/13/2017	97.17	0.35 J	<0.25	<0.22	<0.22	<0.25	25.3	NA
	2/22/2018	97.64	<0.17	NA	NA	NA	NA	NA	ND
	5/25/2018	97.59	<0.17	<0.25	<0.22	<0.22	6.0	10.1	ND
	8/1/2018	96.67	4.7	<0.53	<0.60	<0.59	<0.51	12.5	5.1 J
	11/28/2018	97.44	<0.43	<0.53	<0.60	<0.59	<0.51	<5.8	NA
	2/26/2019	97.75	<0.43	NA	NA	NA	NA	NA	ND
	6/3/2019	97.61	<0.43	<0.53	<0.60	<0.59	<0.51	<5.8	ND
	7/9/2019	97.63	0.60	NA	NA	NA	NA	NA	ND

Historic Ground Water Data Table Example

Well ID	Date	Top of Casing Elevation (feet)	Depth to Water (feet)	LPH Thickness (feet)	Corrected Groundwater Elevation (feet)	Benzene	Toluene	Ethylbenzene	Total Xylenes	MTBE	TBA	Cis-1,2-DCE	PCE	TCE	Total TICs
GWQS						1	600	700	1,000	70	100	70	1	1	500
VIGWSL						20	330,000	700	8,600	580	NSE	NLE	31	2	NSL
MW-22 Screened 3-12 fbg	1/20/2016	15.83	4.60	ND	11.23	<0.24	<0.16	<0.27	<0.17	<0.24	<2.8	<0.27	<0.4	<0.22	ND
	3/30/2016	15.83	3.70	ND	12.13	<0.24	<0.16	<0.27	<0.17	<0.24	<2.8	1.10	<0.4	0.42 J	ND
	11/15/2016	15.83	5.29	ND	10.54	<0.14	<0.23	0.260 J	0.490 J	<0.34	<3	NA	NA	NA	NA
	1/5/2017	15.83	2.67	ND	13.16	<0.14	<0.23	<0.2	<0.21	0.390 J	<3	NA	NA	NA	NA
	4/14/2017	15.83	-	-	-	Area Flooded, Could Not Sample									
	7/26/2017	15.83	0.90	ND	14.93	<0.17	<0.25	<0.22	<0.22	<0.25	<7	NA	NA	NA	NA
	10/24/2017	15.83	4.05	ND	11.78	<0.17	<0.25	<0.22	<0.22	<0.25	<7	NA	NA	NA	ND
	1/25/2018	15.83	3.60	ND	12.23	<0.17	<0.25	<0.22	<0.22	<0.25	<7	NA	NA	NA	31.2 J
	4/20/2018	15.83	-	-	-	Area Flooded, Could Not Sample									
MW-23 Screened 122-147 fbg	1/20/2016	47.27	42.90	ND	4.37	12.2 J	10.6 J	<13	<8.3	62.40	<140	3,390	96.9	9,720	ND
	3/30/2016	47.27	43.50	ND	3.77	<12	<8.1	<13	<8.3	126	<140	8,750	<20	572	ND
	11/15/2016	47.27	42.03	ND	5.24	6.60	2.90 J	3.20 J	<2.1	75.3	<30	NA	NA	NA	NA
	1/5/2017	47.27	42.60	ND	4.67	6.60	2.40 J	<2	<2.1	136	<30	NA	NA	NA	NA
	4/14/2017	47.27	45.60	ND	1.67	0.190 J	<0.23	<0.2	<0.21	<0.34	<3	NA	NA	NA	NA
	7/26/2017	47.27	42.10	ND	5.17	0.240 J	<0.25	<0.22	<0.22	0.520 J	<7	NA	NA	NA	NA
	10/24/2017	47.27	43.10	ND	4.17	<0.17	<0.25	<0.22	<0.22	<0.25	<7	NA	NA	NA	ND
	1/25/2018	47.27	43.03	ND	4.24	0.260 J	<0.25	<0.22	<0.22	2.30	<7	NA	NA	NA	ND
	4/20/2018	47.27	40.80	ND	6.47	<0.17	<0.25	<0.22	<0.22	0.380 J	<7	NA	NA	NA	NA

Notes:

All concentrations listed are in micrograms per liter; µg/L

GWQS - NJDEP Class II-A Ground Water Quality Standards

MDL - Minimum Detection Limit

cis-1,2-DCE - Cis-1,2-Dichloroethene

PCE - Tetrachloroethene

TCE - Trichloroethene

Common Deficiencies Associated with Figures

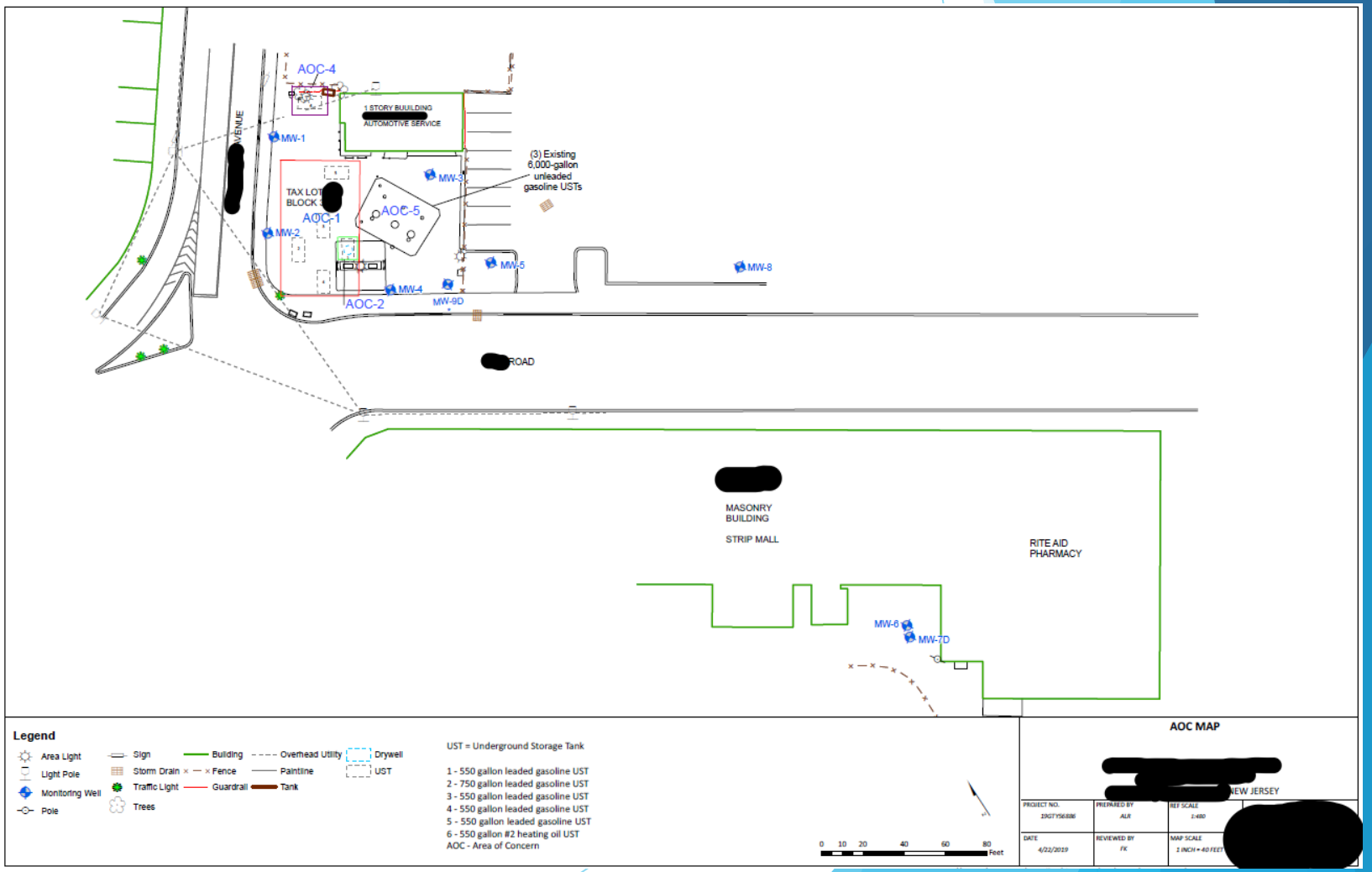
Common Deficiencies associated with RAR Figures:

- Area of Concern (AOC) Map(s) not included
- AOCs where prior remedial actions occurred not identified
- Figures associated with Vapor Intrusion Investigations not included

AOC Map Example

Additional Features to be Considered:

- CEA Boundary with GW flow direction
- Source Removal Area
- Injection Points
- Temporary Well Point Locations
- Underground Utilities



Helpful Hints

- Write the RAR with the assumption that the reviewer has no prior knowledge of the site and its conditions
  - Provide clear information in a logical progression
- When using professional judgment, provide clear, scientific lines of evidence
  - Reference sections in the report which may have additional information
- Variances and deviations should have their own section and should be referenced in Section K of the RAP Application

Helpful Hints

- Provide figures with chemical boxes to assist reviewers in understanding site conditions
- Document missing data, poor quality figures (e.g., due to photocopying), etc. if unavailable to the LSRP
  - Likely that a reviewer will issue an NTD or reach out to the LSRP for missing information/better quality figures otherwise

Questions?