

Facility-wide Groundwater Remedial Investigation Report Approach

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Purpose of Meeting



- Present the project team
- Give a brief history of the Facility-wide Groundwater Monitoring Program (FWGWMP)
- Discuss goals of the RI Report
- Present the conceptual site model (CSM)
- Discuss major components of the RI Report, such as:
 - Nature and Extent of Contamination
 - Human Health Risk Assessment
 - Ecological Risk Assessment
 - Fate and Transport Modeling
 - RI Conclusions



- Army National Guard (lead agency)
- Ohio Army National Guard
- United States Army Corps of Engineers
- Ohio Environmental Protection Agency
- Leidos (performing contractor)



- Attachment 1. Facility-wide Monitoring Well Network
- Attachment 2. Preliminary Plume Groups per RI Work Plan
- Attachment 3. Summary of Soil and/or Sediment CERCLA Remedial Activities - Conducted
- Attachment 4. Summary of Soil and/or Sediment CERCLA Remedial Activities - Anticipated

Facility-wide Groundwater AOC

Brief History



The first Facility-wide Groundwater Monitoring Program Plan was finalized in September 2004 by Portage Environmental

- Reporting summary since 2004
 - 14 Annual Reports (2005-2018)
 - 42 Semi-Annual Sampling Event Reports
 - Multiple addendums have been submitted to specify the upcoming year groundwater sampling

Remedial Investigation Report

Overall Goals and Objectives



- Establish the Conceptual Site Model.
- Determine the nature and extent of contamination.
- Determine what areas have unacceptable human health or ecological risk and need to be further evaluated within a feasibility study.
- Establish what areas do not pose unacceptable human health or ecological risk or need further assessment.
- Determine extents of COCs requiring evaluation in a feasibility study.
- Evaluate and determine if data gaps exist within the facility-wide groundwater monitoring network.

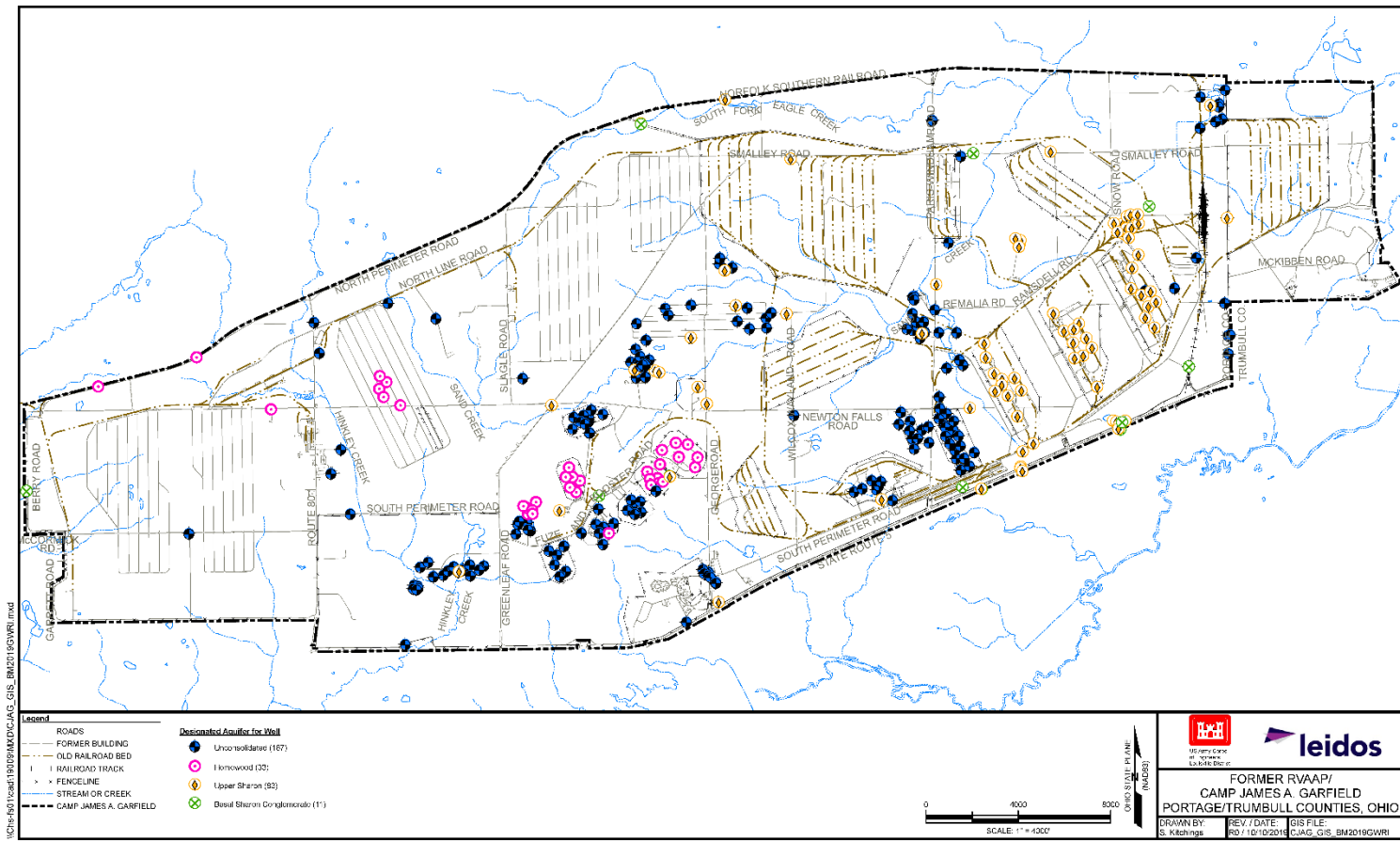
December 2016 – Date of final, approved **Remedial Investigation Work Plan for Groundwater and Environmental Investigation Services for RVAAP-66 Facility-wide Groundwater**

Conceptual Site Model Overview



- **Attachment 1** presents the entirety of CJAG and the monitoring well network.
- Qualitative and quantitative data have been incorporated into the CSM and will continue to be incorporated throughout the RI Process.
- Hypotheses presented by the CSM will also be tested, refined, and modified throughout the FWGW RI.

Conceptual Site Model Monitoring Well Network



Camp James A. Garfield 2019 Facility-wide Groundwater RI

Conceptual Site Model

Plume Groups



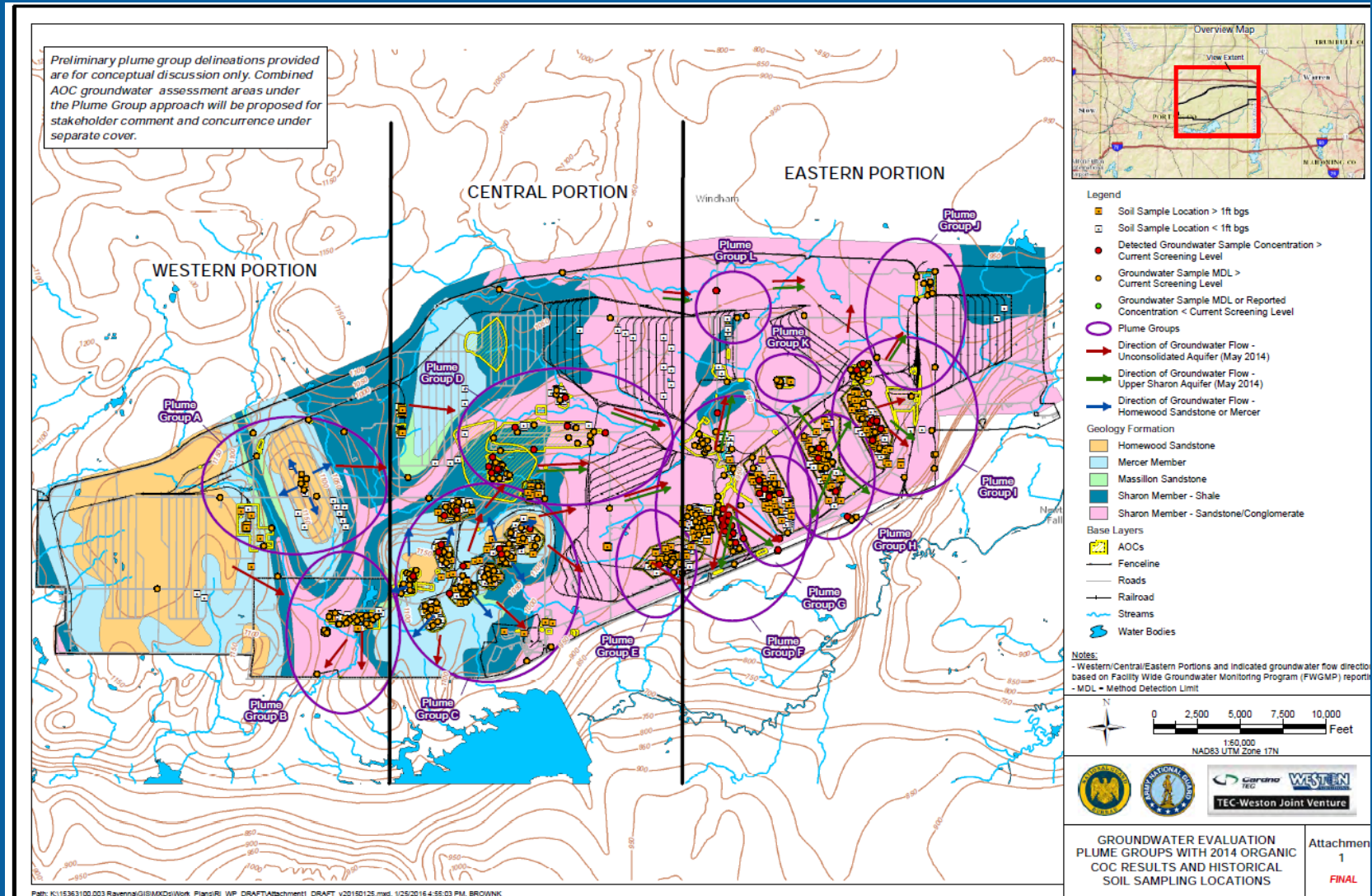
Per the RI Work Plan:

The RI contaminant nature and extent determination and related risk assessment processes will employ the use of “Plume Groups” (co-located restoration sites with overlapping contaminant plumes) to support a holistic, facility-wide determination of residual risk in order to determine if a remedial response is required.

- The 2016 RI Work Plan - identified 12 Preliminary Plume Groups (**see Attachment 2**)
- Final Plume Groups - Using updated data and screening levels, the final plume groups are under evaluation during the development of the RI Report. (Further discussion in HHRA.)

Conceptual Site Model

Plume Groups



GROUNDWATER EVALUATION
 PLUME GROUPS WITH 2014 ORGANIC
 COC RESULTS AND HISTORICAL
 SOIL SAMPLING LOCATIONS

Attachment
 1
FINAL

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Conceptual Site Model

Site Aquifers

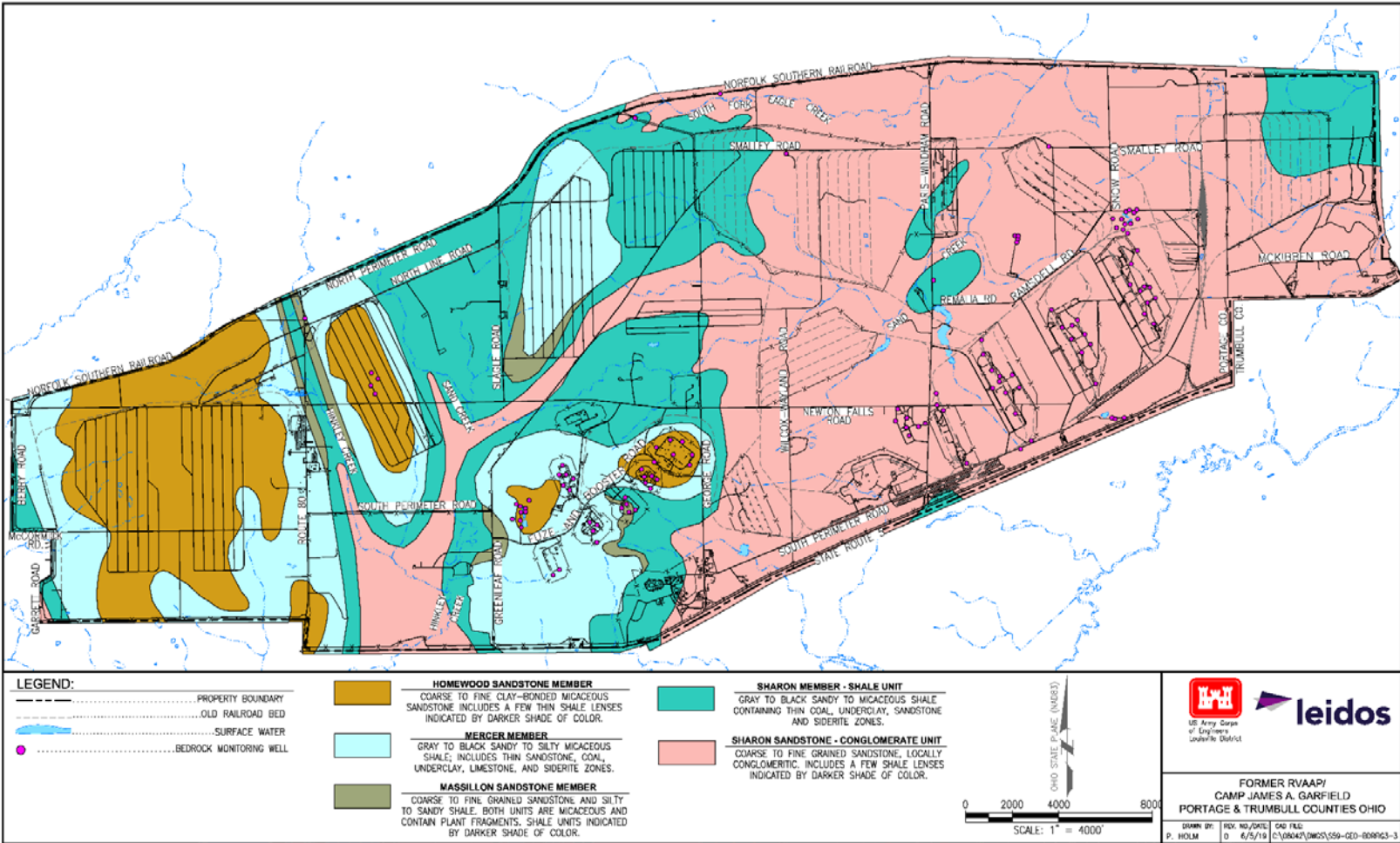


The aquifers evaluated in this RI Report include:

- Unconsolidated – overburden soil
 - Homewood – upper bedrock layer in western portion of the site
 - Upper Sharon – upper bedrock layer in the eastern portion of the site
 - Basal Sharon Conglomerate – basal portion of the bedrock unit throughout CJAG
-
- Monitoring wells are installed and screened in each aquifer throughout the facility.

Conceptual Site Model

Bedrock Formation



Conceptual Site Model

Source Areas



- The 53 areas of concern (AOCs), 17 munitions response sites (MRSs), and 14 compliance restoration sites (CRs) represent the known or suspected contaminant source areas.
- Extents of the source areas have been generally well characterized through the completion of multiple environmental investigations.
- Various remedial activities have been conducted at the former RVAAP to address contamination.
- **Attachment 3** presents summary of soil and/or sediment CERCLA Remedial Actions at the Former RVAAP – Conducted
- **Attachment 4** presents summary of soil and/or sediment CERCLA Remedial Actions at the Former RVAAP - Anticipated

Conceptual Site Model

Data Gaps



- The Remedial Investigation is prioritizing identifying addressing groundwater data gaps.
- The Remedial Investigation Work Plan
 - Provides goals and objectives of each site within CJAG.
 - Identifies data gaps (and/or data gap areas [DGAs]).
- The RI Report will provide:
 - a summary of the data gaps provided in the RI Work Plan,
 - details of activities to address the data gaps, and
 - results of the investigative findings.

Conceptual Site Model

Data Gaps



- Example of filling data gap in October/November 2018
 - Open Demolition Area No. 1
 - Explosives were identified as a potential data gap.
 - One temporary well was installed at Open Demolition Area No. 1.
 - Sampled groundwater from the well had no detections of explosives.
 - Electric Substations No. 3
 - Naphthalene was identified as a potential data gap.
 - Three temporary wells were installed at Electric Substations No. 3.
 - Sampled groundwater from the well had no detections of naphthalene.

Conceptual Site Model

ODA1 Well Installation



Conceptual Site Model

Data Gaps



- Data gaps are continually assessed with newly acquired data.
- Addendums (or Sampling Plans) are developed and submitted once per year. These Addendums:
 - Present an ongoing assessment of nature and extent data gaps,
 - Monitor contaminant levels within specific wells, and
 - Provide annual sampling approach to continue the overall FWGWMP.

Conceptual Site Model

Groundwater to Surface Water



- The potential for groundwater discharge to impact surface water is another potential exposure pathway at CJAG.
- A surface water and sediment investigation is being conducted separately (Leidos 2015). The Final RI concludes:
 - the nature and extent of impacted media has been sufficiently characterized,
 - the fate and transport modeling did not identify sediment contaminant migration chemicals of concern (CMCOCs) requiring further evaluation or remediation to protect groundwater,
 - no CERCLA release-related human health COCs were identified in surface water or sediment requiring evaluation in an FS or remediation, and
 - remedial actions to protect ecological resources are not warranted.
- Current RI Reports addressing soil, sediment, and surface water similarly have shown no COCs requiring remediation in surface water at CJAG.

Nature and Extent of Contamination

Data Availability



- Data Collected
 - Over 300 permanent and temporary wells have been installed.
 - 79 unique sampling events have taken place to analyze groundwater.
 - 350 different chemicals were analyzed in groundwater at the former RVAAP.
 - 6,130 groundwater samples have been collected and over 400,000 analytical results and 17,000 field parameters are currently available in REIMS.

Nature and Extent of Contamination

“New Well” Sampling Protocol



- Each permanent well has an extensive chemical suite and data set.
- Sample suite is not limited to only chemicals that may have been used at the site.
 - Each newly installed permanent well was analyzed for full suite for 4 consecutive quarters.
 - Full suite includes: Metals, explosives/propellants, SVOCs, VOCs, PCBs, pesticides, and cyanide.

Nature and Extent of Contamination

“New Well” Sampling Protocol



Example: Sand Creek Landfill Dump

- The Engineering Evaluation/Cost Analysis (January 2019) identified arsenic and PAHs to require remediation at the site.
- Three new wells were installed at the site. The groundwater within the wells are currently being sampled for 4 quarters and analyzed for Metals, explosives/propellants, SVOCs, VOCs, PCBs, pesticides, and cyanide.
- The RI Report would consider results from each of these chemical groups, not just arsenic and PAHs.

Nature and Extent of Contamination

Sand Creek – Well Install and Sampling



Nature and Extent of Contamination

Presentation within RI Report



- Chemicals will be identified by comparing the MDC of each chemical detected in each plume group to:
 - Background concentration
 - USEPA MCL
 - Most stringent Facility-wide Cleanup Goals
 - The USEPA Residential tap water RSL will be used
- Provide graphical depiction of COPCs and COCs requiring evaluation in an FS.

Nature and Extent of Contamination

Continual Assessment



- The Army continues to update the FWGWMP Plan
 - Annual Addendums provide assessments on a well by well basis.
 - Army will continue to perform semi-annual sampling (continuing during development and review of the RI Report.)
 - For example, 70 wells were sampled in CJAG as recently as September 30-October 9, 2019.

Nature and Extent of Contamination

Background Evaluation



- A background evaluation was performed to assess if chemical concentrations are at naturally occurring concentrations.
- Purpose: To calculate background concentrations for metals within the varying groundwater aquifers to assist in decision making. Four aquifers:
 - Unconsolidated
 - Homewood
 - Upper Sharon
 - Basal Sharon
- Application:
 - Reduce chemicals carried through the quantitative risk assessment process,
 - Simplify and focus the RI on site-related risk drivers, and
 - Allow for use in background in risk management.
- Final Background Study Report, dated 3/21/19

Human Health Risk Assessment Exposure Scenarios



Three human health exposure scenarios will be evaluated

- Unrestricted (Residential) Land Use – Resident Receptor (Adult and Child)
- Commercial/Industrial Land Use – Industrial Receptor (USEPA's Composite Worker)
- Military Training Land Use – National Guard Trainee
- Volatile organic compounds (VOCs) will be evaluated for potential vapor intrusion on existing or potentially new construction/buildings. Chemical concentrations and risk will be assessed to determine if chemicals have unacceptable risk to these receptors.
- If unacceptable risk is identified, a feasibility study will be developed to determine how to address the risk.

Ecological Risk Assessment Overview and Technical Approach



- Ecological Risk Assessment (SLERA)
 - Conducted to address the potential for groundwater discharge to impact surface water.
 - Ensure that groundwater remedial measures will adequately protect ecological receptors in the future.
 - If required, a fate and transport model will be used to predict the COC concentration where groundwater discharges to surface water.

Fate and Transport Modeling

Approach



- Transport modeling results will be utilized by the graphical software
- Generate 3-D plume figures for the primary COCs showing contaminant migration and concentration trend in both horizontal and vertical directions.
- Transport modeling results will be used to support ecological risk screening.
- The monitoring well network will be assessed using the calibrated groundwater flow model and will identify proposed modifications to the network (e.g., well abandonment, new well placement, etc.).
- Identify locations needing additional data to define the nature and extent (horizontal and vertical) of contamination.

Remedial Investigation Report

Conclusions



- Data gaps (if any) will be discussed and presented. These data gaps:
 - may need to be filled to support RI Report.
 - may need to be specified in the FS as part of a remedial alternative.
- Human Health or ecological COCs required to go forward in an FS will be identified.
- Modeling will be used to refine extents of contamination and identify potential data gaps.
- The Conceptual Site Model will be updated.
- Recommendations of a revised monitoring well network will be provided.

Questions?