



PUBLIC HEALTH EXPOSURE ASSESSMENT AND MITIGATION WORK PLAN

ROOSEVELT IRRIGATION DISTRICT EARLY RESPONSE ACTION

WEST VAN BUREN AREA WATER QUALITY ASSURANCE REVOLVING FUND SITE

1.0 INTRODUCTION

Groundwater in the West Van Buren Area (WVBA) Water Quality Assurance Revolving Fund Site contains hazardous substances, principally volatile organic compounds (VOCs) that have impacted over 20 Roosevelt Irrigation District (RID) production wells. As the principal impacted water provider in the WVBA Site, the Arizona Department of Environmental Quality (ADEQ) acknowledged that the RID wells that extract and discharge VOC-contaminated groundwater to surface water are the major outflow of contamination from the Site¹. It was further noted that water within the RID canal acts as a potential route of surface water [and contaminant] migration downstream of the WVBA.

RID relies on the wells within the WVBA Site to meet critical water supply needs and submitted a Work Plan for conducting an Early Response Action (ERA) to restore a portion of these wells for unrestricted use, including future use as a drinking water source². Although the ERA was designed to capture and treat hazardous substances primarily as a well protection and restoration initiative, the action was also proposed to mitigate exposure pathways associated with the uncontrolled release of VOCs in groundwater pumped by RID from the WVBA Site. ADEQ conditionally approved the ERA Work Plan in a letter dated June 24, 2010. Among other conditions, ADEQ requested that RID provide specific documentation regarding the proposed actions to assess potential public health exposure to VOCs and how these potential exposures will be mitigated during the ERA implementation.

¹ Terranext, October 2008. *Draft Remedial Investigation Report for the West Van Buren Area WQARF Registry Site*, Volume I, page 6-9.

² Montgomery & Associates, February 3, 2010. *Roosevelt Irrigation District Early Response Action Work Plan, West Van Buren Area Water Quality Assurance Revolving Fund Site*, 46 pp.



This Work Plan provides the scope of work to assess exposure pathways to VOC contamination that occurs from RID operations in the WVBA Site and how RID's planned ERA will mitigate this exposure. Although there may be other possible exposure pathways leading to public health hazards, the scope of this Work Plan and the resulting Final Report is limited to the assessment of exposure from VOC releases associated with the RID pumping, surface conveyance, and end use of contaminated groundwater. Furthermore, the assessment proposed in this Work Plan does not constitute a quantitative risk assessment. The analysis and Final Report generated in accordance with this Work Plan will document operational and engineering controls that will limit uncontrolled VOC emissions from the WVBA Site. A groundwater baseline risk assessment may be conducted prior to the WVBA Site Feasibility Study, if required by ADEQ, to quantify potential health and ecological risks and other routes of exposure associated with the impacted groundwater.

2.0 SCOPE OF WORK

This assessment will compile and analyze data and provide specific information to address the following objectives:

- Document existing impacts and routes of public exposure from releases of VOCs in contaminated groundwater impacting RID well operations, water conveyance, and uses; and
- Evaluate how proposed operational and engineering controls of the ERA will mitigate the exposure to VOCs and protect public health and welfare.

The information generated through this Work Plan will be organized into a Final Report following the outline attached to this document. Further definition of the information that will be compiled, analyzed, and included in this assessment is given through annotation of the Final Report outline as follows.

In addition to an **Introduction** section that will specifically define the purpose and objectives of this assessment, the summary report will include a **Background** discussion organized into the following subsections:

Site Location and Physical Characteristics – This section will include a description of the WVBA Site and review of relevant physiographic, demographic, geographic, and hydrogeologic conditions of the Site and surrounding region. This overview will include a summary of the type and distribution of major land and water uses within the WVBA.

History of Contamination – This section will provide a summary of sampling and tabulated results of water quality analyses of RID production wells and graphical depiction of contaminant trends over time. The



summary will include the recent sampling and analyses of RID production wells and canals that occurred in June 2010.

Contaminants of Concern – This section will identify the known chemical contaminants that have been detected in RID production wells and WVBA groundwater monitoring wells and notable chemical and physical properties of the identified contaminants of concern. In addition, this section will discuss environmental standards, requirements, criteria, and limitations that may be applicable or relevant and appropriate requirements related to public exposure routes for the contaminants of concern and planned groundwater response action.

The next section of the Final Report will feature an **Exposure Assessment Based on Existing Conditions** to document the potential public exposure to hazardous substances associated with VOC releases from current RID well operations, water conveyance, and groundwater use in the WVBA Site. This segment will be organized into the following subsections:

Overview of RID Water Operations – This section will provide a summary of RID water operations in the WVBA to document sources of water supply, well construction, registered pumping capacity, historical and current groundwater pumping, locations of open conveyance canals and buried water distribution pipelines, and an overview of the RID water distribution system and well operations. The summary will include records of annual pumping of all RID wells in the WVBA over the past 25 years to document historical groundwater withdrawals and monthly pumpage of the RID wells in the WVBA in the most recent years to illustrate well use and groundwater pumping requirements to meet seasonal water demands.

Contamination Impact on RID Water System – This section will present an estimate of the annual volume of contaminated groundwater pumped from RID production wells in the WVBA Site and the annual VOC mass that is discharged from the contaminated wells into the water distribution system. These estimates will be based on the most recent (e.g. 2008 through 2010) reported RID groundwater pumping data and reported VOC concentrations in the RID production wells.

Routes of Exposure – This section will identify pathways that may lead to public exposure to contaminants of concern by ingestion, skin contact, and inhalation associated with current RID well operations, water conveyance, and groundwater use in the WVBA Site.



Following this assessment of existing public health exposure, the Final Report will analyze the **Exposure Mitigation Provided by the Planned RID Early Response Action**. This segment will be organized into the following subsections:

Key Elements of Planned Early Response Action – This section will provide an overview and rationale of RID’s planned ERA, including proposed well modifications, well head volatilization controls, water conveyance improvements, new pipelines, and a new centralized groundwater treatment facility. A discussion of how these modifications and additional facilities will limit exposure to VOCs in the contaminated groundwater supply will be included.

Groundwater Treatment Engineering Controls – This section will describe how the planned ERA will remove and eliminate VOCs through design, construction, and operation of a centralized groundwater treatment facility. This analysis will include an estimate of the annual volume of contaminated groundwater that will be pumped and the total VOC mass that will be captured and treated by implementation of the ERA.

RID Water Distribution System Engineering Controls – This section will document engineering controls that will be integrated into the well and water distribution system to reduce exposure to VOCs. This assessment will clarify how specific engineering controls will: 1) reduce point source discharges of VOCs to the atmosphere, 2) restrict non-point sources of VOC releases to the environment, and 3) limit exposure resulting from unauthorized public access to the RID canals for bathing, swimming, and drinking.

RID Water System Operational Controls – This section will explain the anticipated operational approach for RID water supply management and well use that will be instituted with the ERA. A summary of RID guidelines for prioritizing well use will be provided. These guidelines will specify how RID will operate their wellfield to meet seasonal water demands, prioritize pumping to maximize groundwater withdrawals from wells tied into the ERA, and limit pumping of peripheral wells in order to improve hydraulic containment of the contaminant plume and enhance VOC mass removal.

The Final Report will provide **Summary and Conclusions** that will quantify and compare the mass of VOCs that are released into the environment from current RID well operations in the WVBA Site and that which would occur upon implementation of the ERA to demonstrate how the planned ERA will reduce VOC releases to the environment to mitigate the associated public health exposure.



3.0 SCHEDULE

A Final Report documenting the results of this assessment will be submitted within 60 days of ADEQ approval of this Work Plan and will include a conceptual schedule for implementation of control measures of the ERA. This schedule will be contingent upon receipt of project funding and ADEQ authorization to proceed.



Attachment 1

PROPOSED OUTLINE FOR SUMMARY REPORT

**PRELIMINARY EXPOSURE ASSESSMENT AND MITIGATION
ROOSEVELT IRRIGATION DISTRICT
PLANNED EARLY RESPONSE ACTION**

- I. INTRODUCTION
 - A. Purpose of Assessment
 - B. Specific Objectives
- II. BACKGROUND
 - A. Site Location and Physical Characteristics
 - B. History of Contamination
 - C. Contaminants of Concern
- III. EXPOSURE ASSESSMENT: EXISTING CONDITIONS
 - A. Overview of RID Water Operations
 - B. Contamination Impact on RID Water System
 - C. Routes of Exposure
- IV. EXPOSURE MITIGATION: EARLY RESPONSE ACTION
 - A. Key Elements of Planned Early Response Action
 - B. Groundwater Treatment Engineering Controls
 - C. RID Water Distribution System Engineering Controls
 - D. RID Water System Operational Controls
- V. SUMMARY AND CONCLUSIONS
- VI. IMPLEMENTATION SCHEDULE