

**APPENDIX Q**

**REMEDIAL OBJECTIVES REPORT—BROADWAY-PANTANO WQARF  
SITE—LANDFILL OPERABLE UNIT,  
DATED NOVEMBER 15, 2014**

# REMEDIAL OBJECTIVES REPORT

Broadway-Pantano WQARF Site

Landfill Operable Unit

Tucson, Arizona



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February 27, 2015

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## ATTACHMENTS

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## 1.0 INTRODUCTION

The Arizona Department of Environmental Quality prepared this Remedial Objectives (ROs) Report for the Broadway-Pantano Water Quality Assurance Revolving Fund (WQARF) Site (Site) Landfill Operable Unit (LOU). This report is based upon the Broadway-Pantano WQARF Site Land Use Study, which is Appendix A of the Draft LOU Remedial Investigation (RI) Report. A Groundwater Remedial Objectives Report dated June 1, 2012 was appended to the Final Groundwater Operable Unit RI Report (Stantec, 2012). The LOU is composed of the Broadway North Landfill (BNL), the Broadway South Landfill (BSL) and the vadose zone beneath each landfill.

Proposed ROs were developed according to R18-16-406(I) of the Remedy Selection rules of the Arizona Administrative Code (A.C.C.). These rules require that ROs be established for the current and reasonably foreseeable uses of land that have been threatened or are threatened to be affected by the release of a hazardous substance above the regulatory or risk-based standard. The rule specifies that the reasonably foreseeable uses of land are those likely to occur at the site.

According to A.A.C. R18-16-404(I)(4), the RO Report shall state the ROs for each listed use in the following terms:

- a. Protecting against the loss or impairment of each listed use that is threatened to be lost or impaired as a result of a release of a hazardous substance;
- b. Restoring, replacing or otherwise providing for each listed use to the extent that it has been or will be lost or impaired as a result of a release of a hazardous substance;
- c. Time-frames when action is needed to protect against or provide for the impairment or loss of the use; and
- d. The projected duration of the action needed to protect or provide for the use.

On February 20, 2014, ADEQ held a public meeting to obtain community and stakeholder input on the proposed ROs. The Proposed LOU RO Report was issued for a 30-day public comment period from March 5, 2014 through April 3, 2014. Comments from the public, stakeholders, the Broadway-Pantano Community Advisory Board (CAB) and/or other government agencies and ADEQ responses to those comments were incorporated in the LOU RO Report as appropriate. This LOU RO Report is Appendix Q in the Final LOU RI Report.

## **2.0 REMEDIAL OBJECTIVES FOR LAND USE**

### **2.1 CURRENT AND REASONABLY FORESEEABLE USES OF LAND**

The BNL and BSL are located within the City of Tucson (COT) and are under the jurisdiction of COT for zoning and planning purposes. As such, future uses at the LOU are guided by COT's General Plan (2001). In addition, at the BNL, future uses are guided by the Gateway Centre Planned Area Development (PAD) adopted by the Mayor and Council (COT Planning Department, 1983). Future uses at BSL are guided by the Broadway Proper Redevelopment Plan as adopted by the Mayor and Council (COT Planning Department, 1984). Development at both the BNL and BSL must also be conducted in accordance with the COT Landfill Ordinance (Tucson City Code, 2004).

At the BNL, current uses include vacant land, an electrical substation and transmission line, and commercial use (retail goods and services at the Broadway Star Plaza). Future possible uses in the PAD include office, commercial recreation, commercial service, commercial general, residential, research and development, and golf course. The approved COT General Plan allows for residential uses in all of the PAD areas within the BNL. The owner of the vacant BNL parcels plans for mixed development, focusing on multi-family residential and non-industrial commercial development, which is consistent with COT's General Plan. According to the owner of the Broadway Star Plaza, which is located at the BNL just south of the PAD, commercial use is expected to continue at this retail strip mall, which is a consistent use with COT's General Plan.

At the BSL, current uses include a hotel, restaurant, a retirement community, and a COT-owned park (Gollob Park). The future foreseeable uses of the vacant land, according to the Broadway Proper Redevelopment Plan, include office, business, and multi-family residential. The owner of the vacant BSL parcels plans to sell the parcels for development but the owner has not indicated a specific kind of development. Uses at Gollob Park, the hotel, restaurant, and retirement community are not anticipated to change significantly according to information provided to ADEQ by the owners. These uses are consistent with COT's General Plan and the Broadway Proper Redevelopment Plan.

According to A.C.C. R18-16-406(G), the landowner may establish the current and reasonably foreseeable uses of its land, provided that the ROs for the Site are not required to address land uses impaired by properties of materials located on or under the land other than the current or potential exposure to the hazardous substances contained in that material.

Environmental conditions considered in the formulation of ROs for the Site are:

- The approximately 100 acres of subsurface waste at the BNL (excluding the dross site) and approximately 40 acres of subsurface waste at the BSL are composed of mixed wastes—residential, industrial, construction, commercial, landscaping, medical, and other wastes—that cannot feasibly be characterized sufficiently to allow for evaluation of potential risk. These landfill wastes have been determined to be the source of volatile organic compounds (VOCs) detected in the vadose zone and in groundwater below the landfills. Exposure to landfill waste could result in exposures to hazardous substances above acceptable levels.
- A dross disposal site is located at the southern portion of the BNL, partially underneath the Broadway Star Plaza. An investigation conducted in 2000 found that the dross site had soil concentrations of arsenic and lead exceeding the non-residential Soil Remediation Levels (SRLs); soil concentrations of cadmium exceeding the residential SRL; and soil concentrations of cadmium, chromium, and lead exceeding the ADEQ minimum Groundwater Protection Levels (GPLs).
- With the exception of the dross site, investigations of soil and soil gas at the Site do not indicate the presence of hazardous substances above an SRL or GPL.
- The results from modeling soil gas data from a single sampling event at each landfill indicate no unacceptable risk from potential exposure to VOCs in shallow soil gas. However, evaluation of the same soil gas data for the indoor air pathway using an alternate method (assuming an attenuation factor of 0.03 applied to shallow soil gas concentrations) indicate that potential indoor air concentrations for residences adjacent to the BNL exceed the United States Environmental Protection Agency (EPA) Region IX Regional Screening Levels (RSLs) for residential indoor air for trichloroethene; chloroform; 1,4-dichlorobenzene; 1,2-dichloropropane; and naphthalene. A similar evaluation performed for the BSL indicated that potential indoor air concentrations for residences adjacent to the BSL exceeded EPA Region IX RSLs for benzene and chloroform.

## 2.2 REMEDIAL OBJECTIVES

As indicated in section 1.0, ROs need to be proposed for each kind of property use. “Residential” is defined [per Arizona Revised Statute (A.R.S.) § 49-151(6)] as *those uses of remediated property where natural persons are reasonably expected to be in frequent, repeated contact with soil*. “Non-residential” is defined [per A.R.S. § 49-151(3)] as *those uses of properties other than residential uses*. Based on these definitions, the undeveloped LOU properties are considered “non-residential.”

Based upon this information, current and reasonable foreseeable uses at both the BNL and BSL include residential and non-residential use. The following ROs are proposed for the LOU:

**LOU Residential**— The RO for existing and future residential use of LOU properties is to protect against exposure to Contaminants of Concern within or released from the LOU waste. This action is needed at the present time and for as long as the landfill and dross wastes remain at the property.

**LOU Non-Residential**— The RO for existing and future non-residential use of LOU properties is to protect against exposure to Contaminants of Concern within or released from the LOU waste. This action is needed at the present time and for as long as the landfill and dross wastes remain at the property.

A Contaminant of Concern, as defined by Arizona Administrative Code R18-16-401, “means a hazardous substance that results from a release and that has been identified by the Department as the subject of remedial action at a site.” COCs are those contaminants that have been detected with some consistency in groundwater, soil or soil gas at concentrations above regulatory or risk-based levels.

### 3.0 REFERENCES

- City of Tucson Planning Department, 1983. Gateway Centre Planned Area Development, adopted by Mayor and Council – January 17, 1983 – Resolution 12133. <http://cms3.tucsonaz.gov/sites/default/files/imported/plans/redevelopment/gw1.pdf>.
- City of Tucson Planning Department, 1984. Broadway Proper Redevelopment Plan, adopted by Mayor and Council – October 22, 1984 – Resolution 12910. <http://cms3.tucsonaz.gov/sites/default/files/imported/plans/redevelopment/bpall.pdf>.
- City of Tucson, 2001. City of Tucson General Plan, December 6, 2001.
- Stantec, 2012. Remedial Investigation Report, Groundwater Operable Unit, Arizona Department of Environmental Quality Broadway-Pantano Water Quality Assurance Revolving Fund Registry Site, Tucson, Arizona, June 1, 2012.
- Tucson City Code, 2004. Chapter 29, Article IX, Sections 29-20 through 29-29, Ordinance 10037, Adopted September 13, 2004.

**ATTACHMENT Q1**  
**RESPONSIVENESS SUMMARY**



**LANDFILL OPERABLE UNIT  
REMEDIAL OBJECTIVES REPORT**

**RESPONSIVENESS SUMMARY**

**BROADWAY-PANTANO WATER QUALITY  
ASSURANCE REVOLVING FUND  
REGISTRY SITE**

**TUCSON, ARIZONA**

**February 27, 2015**

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# **PROPOSED LANDFILL OPERABLE UNIT REMEDIAL OBJECTIVES REPORT**

## **RESPONSIVENESS SUMMARY**

### **BROADWAY-PANTANO WATER QUALITY ASSURANCE REVOLVING FUND REGISTRY SITE**

#### **TUCSON, ARIZONA**

#### **INTRODUCTION**

Pursuant to the requirements of the Arizona Administrative Code (A.A.C.) R18-16-406(H), the Arizona Department of Environmental Quality (ADEQ) has prepared this comprehensive responsiveness summary for public comment regarding the Broadway-Pantano Water Quality Assurance Revolving Fund (WQARF) Registry Site Proposed Landfill Operable Unit (LOU) Remedial Objectives (ROs) Report. Public comment on the Proposed LOU RO Report was accepted from March 5, 2014 through April 3, 2014. This responsiveness summary also includes public input provided to ADEQ prior to the development of the Proposed LOU RO Report.

**PUBLIC COMMENTS RECEIVED IN RESPONSE TO ADEQ'S SOLICITATION OF INPUT PRIOR TO THE DEVELOPMENT OF THE PROPOSED LOU RO REPORT AND PUBLIC COMMENTS RECEIVED REGARDING ADEQ'S PROPOSED LOU RO REPORT.**

**Comments from the Broadway-Pantano WQARF Site Community Advisory Board**

Input regarding LOU ROs and comments regarding the Draft LOU RI Report were received in a letter from Broadway-Pantano WQARF Site (Site) CAB Co-Chairs Janet Marcus and Bill Petroustson to ADEQ, dated February 20, 2014. The comments (input) in the letter regarding ROs were comments 5, 6, 8, and 9. During the Proposed LOU RO Report public comment period, the CAB provided additional text for comment 5 below. The following section includes the text of comments pertaining to ROs in boldface italics, along with an ADEQ response to address each comment.

**COMMENTS**

- 5. The Broadway South Landfill and the west side of the Broadway North Landfill are not fenced, nor is there warning signage for either of these landfills. Since these landfills contain hazardous substances, they should be completely fenced with appropriate warning signs, cameras, or other appropriate safety devices and at regular intervals [sic] inspected and maintained. These protections are needed because the landfills continue to be used for wildcat dumping, habitation by homeless people, and recreational purposes (dog walking, bicycling, etc.). Is the present property owner responsible for preventing wildcat dumping on his/her property? Is the present property owner liable for not preventing wildcat dumping on his/her property? Who is responsible? [The following text is additional comment provided by the CAB during the March 26, 2014 CAB meeting and is excerpted from the draft March 26, 2014 CAB meeting minutes.] Both landfills should be fenced and include signage indicating the City of Tucson department and phone number to report wildcat dumping.***

Comments regarding the need for fencing and signage are noted. As part of the LOU RI, ADEQ has evaluated onsite potential risk from exposure to volatile organic compounds (VOCs) in soil gas coming up out of the landfill and found no unacceptable risk. With regards to wildcat dumping, the Tucson City Code is as follows:

***Tucson City Code, Chapter 16, Sec. 16-33. Placing refuse upon the property of another or public property; illegal littering or dumping prohibited; persons responsible.***

***(a) No person shall place any refuse upon any private or public property not owned or under the control of that person. In addition to any penalty that may be imposed by this chapter or the Tucson Code, such person***

*shall be liable for all costs for the removal, abatement or enjoining of the refuse.*

*(b) No person shall litter, discard refuse, or allow refuse to be discarded except at the places and in the manner authorized in Chapter 15 of this Code.*

*(c) The following persons are jointly and individually liable for a violation of subsection (b):*

*(1) The resident of the property upon which the debris has been discarded;*

*(2) The person who discarded or allowed the debris to be discarded;*

*(3) The person who owns or maintains a refuse container in which refuse is improperly placed or discarded; and*

*(4) The person who generated the refuse. When an item contained in refuse discarded in violation of this section identifies a person, the item creates a rebuttable presumption that the person so identified generated the refuse.*

*(Ord. No. 9816, § 15, 2-24-03)*

- 6. *The dross site soil cap is being eroded by burrowing animals that are bringing pieces of buried dross up to the surface; therefore, the dross site needs a proper cap installed to prevent human exposure to the dross. Is there a present risk of exposure? What can be done to address this situation in the near-term? Is the property owner responsible for fixing this cap?***

ADEQ has not performed a risk assessment with regards to potential exposure to the very small amount of dross that has been brought up to the surface. The dross site is permanently fenced with warning signs. ADEQ concurs that the final remedy needs to include a permanent remedy, and evaluation of installation of a concrete, asphalt, or similar cap on the dross will be part of the FS.

- 8. *If any development or remediation takes place, mitigations should be implemented to protect adjacent residences/businesses from any increased risk of exposure to hazardous substances (particularly from airborne particulate matter) that might occur due to these activities.***

ADEQ concurs.

- 9. *The site remedy should prevent further migration of hazardous substances from being transported via soil gas to the groundwater below so as to prevent further degradation of groundwater quality.***

ADEQ is periodically monitoring VOCs, particularly chlorinated VOCs, in the BNL vadose zone to confirm that rebound is not occurring. ADEQ plans to perform additional deep nested soil gas sampling at the BSL during the FS. ADEQ will evaluate what remedial activities with regards to PCE and TCE in Broadway North Landfill (BNL) and Broadway South Landfill (BSL) soil gas are warranted for the final remedy.

## Comments from the City of Tucson Environmental Services

Comments regarding the Proposed LOU RO Report were received in a letter from the City of Tucson Environmental Services to ADEQ, dated April 3, 2014. The following section includes the text of comments in boldface italics, along with an ADEQ response to address each comment.

*The City of Tucson, Environmental Services (COT-ES) appreciates the opportunity to provide comments to the above mentioned report. Our comments focus on expanding the language for the remedial objectives (ROs) provided on page 4 of the report. The additions are underlined.*

*LOU Residential—The RO for existing and future residential use LOU properties is to protect against possible exposure to hazardous substances, gases and vapors adjacent to, within or on the LOU properties. This action is needed at the present time and for as long as the landfill and dross waste remains at the property.*

*The RO for existing and future use LOU properties does not cause further degradation of the groundwater and therefore protects for the future use of the groundwater supply by the City of Tucson, (near to and downgradient from the Broadway Pantano WOARF site) by preventing hazardous substances, gases and vapors being mobilized from the landfill and impacting the groundwater.*

*LOU Non-Residential—The RO for existing and future non-residential use LOU properties is to protect against possible exposure to hazardous substances, gases and vapors adjacent to, within or on the LOU properties. This action is needed at the present time and for as long as the landfill and dross waste remains at the property.*

The Final LOU ROs have been revised to read as follows:

*LOU Residential—The RO for existing and future residential use of LOU properties is to protect against exposure to Contaminants of Concern within or released from the LOU waste. This action is needed at the present time and for as long as the landfill and dross wastes remain at the property.*

*LOU Non-Residential—The RO for existing and future non-residential use of LOU properties is to protect against exposure to Contaminants of Concern within or released from the LOU waste. This action is needed at the present time and for as long as the landfill and dross wastes remain at the property.*

A Contaminant of Concern, as defined by Arizona Administrative Code R18-16-401, “means a hazardous substance that results from a release and that has been identified by the Department as the subject of remedial action at a site.” COCs are those contaminants that have been detected with some consistency in groundwater, soil or soil gas at concentrations above regulatory or risk-based levels.

The above language should address the City of Tucson's concern regarding Contaminants of Concern impacting groundwater. During the FS, ADEQ will evaluate the various remedial alternatives to fulfill the LOU ROs for the site. Included in this evaluation will be soil vapor extraction.

## **Comments from Pima County**

Proposed ROs were received in a letter from Pima County to ADEQ, dated February 26, 2014. The following section includes the text of comments in boldface italics, along with an ADEQ response to address each comment.

### **Comment 1:**

Pima County recommends the following groundwater (not LOU) RO: *prevent exposure to contaminated groundwater above acceptable risk levels.*

### **Response 1:**

The groundwater RO that pertains to the nearby water supply wells is “to restore, replace or otherwise provide for the current and future potable use of the regional aquifer threatened or impacted by PCE, TCE, and vinyl chloride emanating from the WQARF Site. [“Potable” is defined here as water which meets state and federal primary drinking water standards (a.k.a. Maximum Contaminant Levels) and Arizona Aquifer Water Quality Standards.] This action is needed for as long as the level of contamination in the groundwater resource prohibits its use as a potable water supply.”

In 2010, ADEQ produced a groundwater fate-and-transport model to be used during the groundwater FS for this site. An important objective of the groundwater part of the FS will be to evaluate the potential impact of this site contamination on the City of Tucson’s nearby water supply wells. The Remedial Action Plan that is chosen for this site will address such potential impact.

### **Comment 2:**

Pima County recommends the following groundwater (not LOU) RO: *prevent further migration of contaminated groundwater.*

### **Response 2:**

During the FS, ADEQ will evaluate the remedial alternative of preventing further migration of contaminated groundwater. The ROs are broadly written to allow ADEQ the flexibility needed to fulfill the requirements of Arizona Revised Statutes § 49-282.06(A) when selecting a Final Remedy:

1. *Assure the protection of public health and welfare and the environment.*
2. *To the extent practicable, provide for the control, management or cleanup of the hazardous substances in order to allow the maximum beneficial use of the waters of the state.*
3. *Be reasonable, necessary, cost-effective and technically feasible.*

**Comment 3:**

Pima County recommends the following LOU RO: *reduce the mass and concentration of CVOCs near suspected sources.*

**Response 3:**

During the FS, ADEQ will evaluate whether remedial technologies that will accomplish reduction of mass at the BSL and additional mass reduction at BNL are warranted.

**Comment 4:**

Pima County recommends the following groundwater RO: *beneficially use treated groundwater.*

**Response 4:**

During the FS, ADEQ plans to work with the City of Tucson to evaluate options which include beneficial use of the treated water.