Hoeger, Glenn

From: Hoeger, Glenn <Glenn.Hoeger@arcadis-us.com>
Sent: Tuesday, February 10, 2015 11:34 AM
To: Eleanor Wehner
Cc: Brown, Scott
Subject: Revised TPDES Summary Memo
Attachments: TPDES Remediation Summary 02102015.docx; Fig 1_SiteMap_rev1.pdf

Ellie:
Attached is a revised summary for the groundwater extraction system with respect to discharge of clean groundwater to the Rio Grande. The difference between this one and the previous version is that we've introduced the concept of using a pipeline and tank to eliminate evaporation as a potential issue affecting the concentration of COCs in water to be discharged. Using this approach all water that reaches the Rio Grande would have the same concentrations of COCs as reported in the upgradient well location.
Please let me know if you have any questions.
Thank you,
Glenn Hoeger

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TPDES Industrial Discharge Permit Evaluation

Background

Consistent with Section 6.2 of the Remedial Action Work Plan (RAWP – Malcolm Pirnie, 2011), the approach to remediating groundwater within the Parker Brothers Arroyo (PBA) at the Former ASARCO El Paso Smelter site (Site) is based on reducing contamination flux of groundwater through contaminated soil and slag using the permeable reactive barriers (PRBs) and extraction well(s). The PRBs will be used to reduce the flux of existing contaminants in groundwater within the PBA to off-site receptors, while the extraction well(s) will be used to reduce the flow of clean groundwater from upgradient locations into the impacted subsurface within the PBA as depicted in Figure 1. The groundwater extraction well will also serve to reduce groundwater gradient from the PBA to the floodplain of the Rio Grande.

A groundwater extraction well will be located in the North Arroyo on the East Property as illustrated in Figure 1. Hydraulic characterization of the North Arroyo indicates that a total groundwater extraction rate of approximately 25 gallons per minute (gpm) could be sustained from this location. Characterization of the South Arroyo revealed that groundwater is impacted by multiple chemicals of concern (COCs) in the western portion of the arroyo and that wells in the eastern portion of the arroyo are unlikely to sustain any appreciable flow rate. The extracted water from the North Arroyo will be conveyed from the extraction well to the Rio Grande River by a PVC/high-density polyethylene (HDPE) pipeline as shown on Figure 1. The water will be discharged to Stormwater Outfall SW-5. A 10,000-gallon storage tank will be included to allow the option for water use as dust control during on-site construction activities. In this manner, clean groundwater from the North Arroyo east of I-10 will not ever come into contact with impacted subsurface at the site and the groundwater gradient within the PBA will be reduced.

Background Groundwater

Groundwater quality in monitoring wells upgradient from the Site is characterized with water quality data from monitoring wells EP-95 (North Arroyo) and EP-129 (South Arroyo). Background levels of metals in groundwater are further defined by water quality data from monitoring well EP-86, which is located on the La Calavera property as illustrated in Figure 1. Groundwater in the La Calavera area is not hydraulically connected to impacted groundwater in the PBA. Water quality with respect to total metals from these wells in February - March 2014 is summarized below.

	EP-86 (mg/L)	EP-95 (mg/L)	EP-129 (mg/L)	MCL (mg/L)	SWQC (mg/L)
Arsenic	0.0059	0.00751	0.0019	0.01	0.32
Cadmium	<0.000845	<0.000845	<0.000845	0.005	0.0016
Chromium	0.00626	<0.0014	0.00271	0.1	1.0
Copper	0.002	<0.002	<0.002	1.3	0.07
Lead	0.000733	<0.000733	0.00654	0.015	0.009
Mercury	<0.00013	<0.00013	<0.00013	0.002	0.0013
Selenium	**0.0233**	**0.0175**	**0.0259**	0.05	0.005
Zinc	0.0139	0.0175	0.0035	7.3*	1.06

* Based on Tier 1 Residential Groundwater Protective Concentration Level ($^{GW}GW_{Ing}$)

Historically, total concentrations of COCs in groundwater are generally below their respective surface water PCLs with the exception of arsenic and selenium. Surface water PCLs were derived for the Rio Grande based on the lower of human health-based and ecological-based criteria. Reviewing historic groundwater quality data back to 2003 indicates several COCs including cadmium, chromium, copper, mercury, nickel, thallium, zinc, fluoride, and nitrate have single outlier concentrations near or above their respective PCLs that are not representative of the entire background data set. The maximum total concentrations of COCs in groundwater samples from these three background wells since 2003 and their respective surface water PCLs are presented below.

	[SW]SW PCL mg/L	**Maximum Conc. mg/L**
Antimony	0.006	<0.005
Arsenic	0.01	**0.03** (t)
Barium	2	0.033
Cadmium[1]	0.0016	**0.002** (t)
Chromium[1]	0.1	0.0306 (t)
Cobalt	0.007	0.00178
Copper[1]	0.07	**0.133** (t)
Iron	7.2	1.87
Lead	0.009	0.0065 (t)
Mercury[1]	0.0013	0.000446 (t)
Molybdenum	0.122	0.0561
Nickel[1]	0.32	0.0184 (t)
Selenium	0.005	**0.04** (t)
Thallium[2]	0.00012	**0.004** (t)
Zinc[1]	1.05	0.21
Fluoride [1]	8.3	**13.5** (t)
Nitrate[1]	10	9.59
Nitrite	1	<1

Notes:

1 – Maximum concentrations for cadmium, chromium, copper, mercury, nickel, zinc, fluoride, and nitrate are based on a single outlier that is only reading near or above respective surface water PCLs.

2 - Thallium has one detection, rest of data set non-detect with reporting limits at approximately 0.0006 mg/L to 0.0008 mg/L. Thallium surface water PCL based on National Surface Water Quality Criterion for ingestion of aquatic organisms.

(t) – Based on total concentration.

Arsenic in groundwater has historically (2003-2013) exceeded its Surface Water Quality Criterion of 0.01 mg/L on an intermittent basis from upgradient monitoring wells EP-86, EP-95, and EP-129. The concentrations of total arsenic range from 0.0026 mg/L to 0.0256 mg/L. The 95 percent upper predicted limit (95% UPL) for the average arsenic concentration in background wells is 0.02 mg/L. Groundwater quality from the Mesilla Bolson have demonstrated elevated levels of arsenic in groundwater as high as 0.06 mg/L associated with geologic formations in the Franklin Mountains (Reedy *et al*. 2011).Historical

background concentrations of selenium in groundwater from these background wells have consistently ranged from 0.015 mg/L to 0.04 mg/L consistent with the data in the table above. The calculated 95% UPL for selenium in groundwater is 0.035 mg/L.

Proposed Remediation System

Groundwater will be pumped from the North Arroyo on the East Property in vicinity of EP-95 at approximately 25 gpm. The extracted groundwater will likely have arsenic concentrations between 0.007 and 0.02 mg/L and selenium concentrations between 0.017 and 0.03 mg/L. As illustrated in Figure 1, extracted groundwater will be conveyed through an HDPE pipeline approximately 3,600 feet to a 10,000-gallon storage tank on the former plant site. The groundwater pump will provide head to convey the water to the storage tank. The storage tank will provide a source of water for use in on-site construction. Excess water will be piped to the stormwater outfall SW-5 at the PBA for discharge to the Rio Grande. Evaporation of extracted groundwater will be minimized by the closed pipe and storage system; therefore, concentrations of COCs in extracted groundwater will be unaffected by losses of water to evaporation. Groundwater will be discharged to the Rio Grande via SW-5 as illustrated in Figure 1. This approach diverts up to approximately 36,000 gallons of groundwater flow per day, keeping this water from coming into contact with impacted media within the subsurface of the PBA and reducing impacted groundwater flux. The extraction of groundwater from the North Arroyo, east of I-10 will also serve to decrease the groundwater gradient within the PBA.

Permitting Issue

The project team is projecting that the water will have a selenium concentration of approximately 0.02 mg/L), which is below the MCL for selenium of 0.05 mg/L and background concentration in groundwater of 0.035 mg/L, but greater than the surface water quality chronic criteria (SWQC) for aquatic receptors of 0.005 mg/L. Controlling evaporation will prevent concentrations of selenium in groundwater at the outfall from being elevated above background groundwater concentrations.

References

Reedy, R.C., B.R. Scanlon, S. Walden, and G. Strassberg. 2011. Naturally Occurring Groundwater Contamination in Texas. Prepared for the Texas Water Development Board, prepared by Bureau of Economic Geology, University of Texas at Austin. Contract No. 1004831125, October 2011.

Malcolm Pirnie, 2011. Remedial Action Work Plan (RAWP).

EP-129
South Arroyo
North Arroyo
EP-95
Proposed Extraction Well
HDPE Pipeline
EP-86
Parker Brothers Arroyo
10,000 - Gallon Tank
Stormwater Outfall SW-5
Rio Grande
Discharge Location
American Canal

LEGEND:

- Background Wells
- Discharge Location
- Proposed Extraction Well
- Lined Drainage Way
- Historical Arroyo Trace Lines
- Property Boundary
- Historical Drainage Divide
- High-density polyethylene (HDPE) pipeline

N

0 600 1,200 Feet

GRAPHIC SCALE

FORMER EL PASO SMELTER SITE
EL PASO, TEXAS

SITE MAP

MALCOLM PIRNIE

FIGURE 1

CITY: Highlands Ranch DIV/GROUP: GIS DB: BG
Project (Project #)
Path: G:\GIS\ASARCO_ElPaso\GIS\MXD\RI_RevisedFig 1_SiteMap_rev1.mxd Date: 2/10/2015 Time: 9:14:04 AM