RIO NUEVO FULL SCALE STABILIZATION PROJECT
17-ACRE SITE
ANNUAL REPORT (APRIL 2008-OCTOBER 2009) AND;
FINAL REPORT
VRP SITE CODE: 504075-00

CITY OF TUCSON
ENVIRONMENTAL SERVICES
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CITY OF TUCSON
ENVIRONMENTAL SERVICES

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EXECUTIVE SUMMARY

The City of Tucson, Environmental Services (COT-ES) began operation of the Rio Nuevo Full Scale Stabilization project at the Congress and Nearmont Landfills in 2001 under the Arizona Department of Environmental Quality (ADEQ). The project used air and water circulated within the waste to accelerate degradation of the organic fraction of the waste by aerobic microbes. The project was conducted in stages beginning with a pilot scale plot measuring 50 feet by 50 feet that was operated within the Nearmont Landfill in 2001-2002. A second bioreactor project within 2-acres of the southern portion of the Congress Landfill was operated from 2003-2006. The 17-Acre site began operation in 2007 to bioreact the remaining landfill. The 17-Acre site was scheduled to be completed in the spring of 2009, however due to a shortage of funding; operations were halted in October 2008, and the system was dismantled in April 2009.

The bioreactor process at the 17-Acre site caused a reduction of between 5% and 7% of the total volume of waste. Based on comparison with total waste volume reduction percentages within the 50x50 plot and the 2-Acre site, the process within the 17-Acre site was approximately 60% completed when it was shut down in October 2008.

After the 17-Acre system was shut down, methane concentrations in excess of 50% by volume were recorded within waste at both landfills, indicating that anaerobic degradation is now active in some locations. Methane concentrations within the waste are decreasing as it dries out. Methane has not been detected s at wells and probes set outside of the waste boundary since May 2009.

Most of the dewatering wells located in waste and screened in the perched water zone are now dry. Nine of the twelve perched water zone boundary monitoring wells, which are located outside the waste footprint, are now dry. Water quality within two boundary perched water zone monitoring wells has been impacted by nitrate at levels exceeding the AWQS. However, as the clay unit beneath the waste is continuous, COT-ES does not expect impacts in the perched water wells to affect the regional aquifer. Based on 9 years of quarterly regional groundwater monitoring data from wells located downgradient of the project, COT-ES does not believe the bioreactor operations have impacted the regional aquifer water quality. COT-ES plans to reduce monitoring frequency at the regional monitoring wells. A summary table outlining changes to monitoring and sampling frequency is located in Attachment 9 of this report.

1.0 BACKGROUND

In 1999 voters approved the Rio Nuevo project which was designed to revitalize downtown Tucson with museums and other cultural features to be constructed in an area to the west of downtown. The development is known as the Tucson Origins Heritage Park (TOHP). The TOHP is located in the vicinity of two closed municipal landfills, the Nearmont and Congress landfills (Figure 1). In order to expedite development near the two landfills, the City of Tucson Environmental Services (COT-ES) implemented an in-situ aerobic bioreactor at the Nearmont and Congress landfills. The process uses oxygen and water injected into the waste to accelerate the degradation of the organic refuse, thereby stabilizing the refuse much faster than would occur under anaerobic conditions. Ultimately, the goal of the in-situ aerobic bioreactor is to reduce the amount of organic material present within the waste in order to lower future methane concentrations to levels less than 5% by volume and to minimize future ground surface settlement. For more information about the process and goals of the project, see HGC, Inc, November 2003.

The project area comprises two landfills, the Nearmont landfill, which was active from 1960 to 1967 and the Congress Landfill which was active from 1953 and 1960. Both landfills accepted construction debris and municipal solid waste. The Nearmont landfill was originally approximately 4 acres in size, however 0.78 acres was excavated in preparation for development of the TOHP in 2006 and 2007 (COT-ES, September 2006, COT-ES, February 2008). The Congress landfill originally covered approximately 12 acres, however 3.9 acres was excavated in 2007 for the TOHP (COT-ES, February 2008). Figure 2 shows the 2008 aerial photo of the project site with the original waste boundaries. Figure 3 shows the project site with the adjusted waste boundaries.

Data from well drilling indicates that the top of the refuse within both landfills ranges from 3 to 18 feet below ground surface (bgs) and is between 2 and 32 ft thick. A low permeability clay layer approximately 10 to 15 ft thick lies continuously beneath the refuse (HGC, Inc, November 2003, COT-ES, August 2008). Studies have shown the hydraulic conductivity of the clay layer is approximately 1×10^{-8} centimeters per second (HGC, Inc, November 2003). Perched water

has been encountered in isolated pockets during well installation activities (HGC, Inc November 2003, COT-ES, August 2008).

A pilot test was performed on a 50-foot by 50-foot (50X50) area of the Nearmont Landfill site from June 2001 to February 2002 (Figure 2) (HGC, Inc. January 28, 2004). The pilot test was conducted under Arizona Department of Environmental Quality (ADEQ) Aquifer Protection Permit #502025 (APP). Following evaluation of the data from the 50X50 site, a bioreactor system was constructed in 2003 within 2-acres of the southern portion of the Congress Landfill (Figure 2). A Work Plan was submitted to ADEQ Voluntary Remediation Program (VRP) in November 2003 for operation of the 2-Acre site (HGC, Inc., November 2003). The work plan was approved by VRP in April 2004. The 2-acre system was operated from March 2003 to June 2003 and again from July 2004 to October 2006 (COT-ES, December 2007). A closure report was submitted to ADEQ in December 2007, and a request for a letter of No Further Action (NFA) was submitted by COT-ES in May 2008. ADEQ returned comments regarding the NFA request in December 2008. COT-ES provided response to these comments in a letter dated October 29, 2009.

The bioreactor project was expanded to cover the remaining portions of the Congress and Nearmont Landfills (17-Acre site) in 2007. Details of the construction and operation of the system through April 2008 were reported to ADEQ in the first annual report for the 17-Acre site submitted in August 2008. (COT-ES, August 2008). Due to waste excavation activities associated with the TOHP construction, 59 wells were removed between June and October 2007. At various times during the operation of the system, additional air injection and extraction wells were installed in areas of insufficient air flow as measured by wellhead flow rates, and subsurface landfill gas (LFG) data. Figure 3 shows the well configuration as of October 2008. Table 1 provides well details as of October 2008.

The 17-Acre site was scheduled to be completed in the spring of 2009, however due to a shortage of funding; the project was halted in October 2008 and dismantled in April 2009 (COT-ES, February 2009). This final report provides the data for and a summary of the effectiveness of the operation of the 17-Acre site.

2.0 SYSTEM OPERATION AND PERFORMANCE

The 17-Acre site was operated continuously from startup in April 1, 2007 through June 28, 2007 when operations were stopped in order to relocate the piping, electrical and equipment compound for waste excavation activities associated with the TOHP. The operation was restarted on July 10, 2007 and operated continuously until June 15, 2008 when air extraction and injection was shut down within the Nearmont Landfill for a 2-week period to measure the rebounding concentrations of methane in the wells (rebound test). Air injection and extraction continued within the Congress Landfill during this period. The full system was returned to operation on July 1, 2008 but was shut down at night throughout the months of July – October 2008 to address odor complaints made by residents of the surrounding neighborhood. Operations at the 17-Acre site were terminated on October 9, 2008 in response to the odor complaints. COT-ES determined that there was insufficient funding available to correct the odor problems and continue to operate the system. Therefore, piping, selected wells and other components of the irrigation and vapor extraction/air injection systems were removed in April and August 2009 and the site was re-graded to provide drainage away from areas containing waste. Figure 4 shows the remaining wells and infrastructure within the two landfills as of August 2009.

Monitoring of temperature, landfill gas, flow rates, water delivery and water elevations was conducted weekly as required by the approved Work Plan (HGC, November 2003). Monitoring frequency was reduced in March 2009 before the system was dismantled. COT-ES, notified ADEQ of the reduction in monitoring frequency in a letter dated February 4, 2009.

2.1 Daily Activity Logs

The Daily Activity Logs were maintained by site personnel as required by the approved Work Plan. Copies of the logs for the period April 2008 to March 2009 are provided in Attachment 1.

2.2 Landfill Gas Data

Attachment 2 contains SURFER® plots of weekly landfill gas (methane, carbon dioxide and oxygen) readings collected at extraction wells, injection wells and monitor points within the project boundary through November 2009. Attachment 2 also contains a graph showing methane readings from CM wells, which are set outside the landfill boundary (see Figure 3).

COT-ES has reviewed landfill gas data collected from October 14, 2008 through February 6, 2009 and determined that the readings were likely influenced by a leak in the tubing of the purge pump used to purge air from the wells within the project boundary during weekly gas readings. This purge pump was used after the system was shut down on October 9, 2008 due to long purge times associated with evacuating air from the 2-inch system wells. The oxygen data appears to be increased by approximately 10%, and methane and carbon dioxide data are likely diluted by as much as 10%. The purge pump has not been used since the data collection event on February 6, 2009. The purge pump has never been used to collect data from the CM well network.

As expected, methane levels increased within the project boundary when the system was shut down in October 2008. On February 20, 2009, methane concentrations in excess of 50% by volume were recorded at various locations within both landfills indicating that the waste has been only partially bioreacted, and that conditions within the landfills are now anaerobic and actively degrading. Methane concentrations are decreasing as the waste continues to dry (Attachment 2), but are expected to exceed 10% by volume in some areas within the waste during periods of rain. All of the wells remaining inside the waste boundary are now open to vent to atmosphere. Methane at the CM wells outside the waste boundary has not been detected since May 2009. Changes to methane monitoring schedules are discussed in Section 3.0 of this report.

2.3 Temperature Data

SURFER® plots depicting temperature data recorded for wells within the project boundary from April 2008 through June 2009 are provided in Attachment 3. During system operation, air flow was adjusted to maintain temperatures within the optimum range required for efficient aerobic degradation ($130\ ^{0}$F-180^{0}F) (HGC, Inc., November 2003). However, temperatures exceeded

180^0 F in three wells during and after operation of the system. At wells IC-03 and IC-A6 within the Nearmont Landfill, temperatures were observed above 180^0 F beginning on June 17, 2008, two days after the start of the rebound test. Although water was applied through the wells to the waste in order to cool it, temperatures continued to exceed 180^0 F in these two wells until the air injection/extraction system was restarted within the Nearmont Landfill on July 1, 2008. Temperatures did not exceed 180^0 F during the remainder of the system operation.

Temperatures within the Congress Landfill at well IC-52 exceeded 180^0 F on October 14, 2008 one week after the entire system was shut down (Attachment 2). Although water was added directly to the wells and soil in the surrounding area, the temperatures at IC-52 fluctuated above and below 180^0 F for several weeks due to a lack of air flow to cool the waste. On December 4, 2008 temperatures were measured at 146^0 F and have continued to decrease since that time. All temperatures within the waste are now below 100^0 F.

2.4 Flow Rates

During system operation, flow rates were monitored weekly using a Velocicalc®. SURFER® plots of flow rates are provided in Attachment 4. The data was used to adjust flow rates to evenly circulate air through the landfill, and to site new wells in areas where air flow appeared insufficient.

2.5 Water Application Summary

The 17-Acre site has used reclaimed water since May 2007. Water was not applied during rainfall events in the summer and winter months. A graph of water usage is presented in Attachment 5. From March 2007 through October 2008, over 9.5 million gallons of water were applied to the project. The irrigation lines to the project site were shut off on October 8, 2008 and removed in April 2009.

2.6 Water Level Data

A graph showing measurement of water levels for the perched water monitoring and dewatering wells associated with the 17-Acre site is presented in Attachment 6. Wells CGM-01 and CGM-

3, which were used to monitor water levels and landfill gas for the 2-Acre site, have been incorporated into the monitoring network for the 17-Acre site. The CGM wells are screened in waste. The CM wells installed for the 17-Acre site are outside the waste boundary and are screened above the clay layer that underlies waste throughout the site. Data from the 17-Acre dewatering system (CLW wells) is also included in the graph. The CLW wells are located within the waste boundary and are screened above the clay layer that underlies the waste. Water levels in monitoring and dewatering wells associated with the site did not exceed 2,332 feet AMSL as specified in the approved Work Plan.

In April, May and August 2009, COT-ES used clean soil to backfill and cap all CLW wells that were dry or contained insufficient water to pump (CLW-2, CLW-3, CLW-4, CLW-7, CLW-9, CLW-14, CLW-16, CLW-17, CLW-19, and CLW-20). Water levels are decreasing in the remaining two dewatering wells (CLW-1 and CLW-12). Pumping at these wells will continue daily until there is insufficient water to remove. Wells CM-1, CM-2, CM-3, CM-4, CM-5, CM-6, CM-15, CM-16 and CM-17 are dry. Well CM-14 was destroyed by erosion in January 2010. CM-8, CM-9, and CM-11 contained water when they were installed and are likely located in an isolated perched water pocket. COT-ES is continuing to remove water from CM-9, and CM-11 weekly. CM-8 was obstructed at a depth of 5' below ground surface. COT-ES cleared the obstruction in January 2010 and resumed weekly water removal. Water levels in all wells are decreasing as the project area dries out. Changes to dewatering schedules are discussed in detail in Section 3.0 of this report.

2.7 Perched Water Monitoring

Table 1 provides information on wells associated with the bioreactor system that are screened above the clay layer that underlies waste at the site (denoted CM and CGM). Figure 4 shows the locations of the system wells. Table 3 provides information on Arizona Department of Water Resource (ADWR) registered wells that monitor either perched water or regional groundwater at the site. Figure 5 shows the locations of the ADWR registered perched water and regional groundwater monitoring wells. COT-ES has voluntarily sampled CM wells and ADWR registered perched water monitor wells that contained sufficient water since the project began in April 2007. ADWR registered wells WR-426A and WR-427A, which are located in the

Nearmont Landfill, have not contained enough water to sample between April 2008 and January 2010. WR-425A, which has historically been dry, was abandoned in April 2009.

Attachment 7 contains the laboratory analytical reports and field sampling forms for the CM wells from April 2008 through October 2009. Table 4 contains selected analytical results from sampling at the CM wells. As of October 2009, nitrate exceeded the Aquifer Water Quality Standard (AWQS) of 10 mg/L, at wells CM-9 and CM-11. Xylene exceeded the AWQS of 10 ug/L at well CM-9 in January 2009. This was a one-time detection of xylene, and the parameter has not been detected in the well since January 2009. All other VOCs are below their respective AWQS.

Graphs showing trends in nitrate and chloride concentrations for the CM wells and for the Point of Compliance (POC) wells discussed in the next section are provided as Figure 6. With the exception of well CM-9, concentrations of nitrate and chloride are generally stable or decreasing in the CM wells. Wells CM-1, CM-2, CM-3, CM-4, CM-5, CM-6, CM-15, CM-16 and CM-17 are now dry. CM-14 has been destroyed be erosion. Water levels in wells CM-8, CM-9, and CM-11 are decreasing as the project area dries out. Changes to monitoring and sampling schedules are outlined in Section 3.0 of this report.

2.8 Regional Monitor Well Sampling and Data Verification

As required by the 2004 approved Work Plan, the point of compliance wells (POC) which are screened in the regional aquifer, (WR-350B, WR-351A and WR-429A) were sampled quarterly. The well locations are provided in Figure 5. Well WR-428A, which is screened in the regional aquifer downgradient of the POC wells was also sampled annually. Laboratory data from these wells from April 2008 through October 2009 are located in Attachment 8. Table 5 provides selected analytical results for the POC wells and WR-428A.

Field forms, analytical lab reports, data verification forms and supporting documentation for samples collected from POC wells WR-350B, WR-351A, and WR-429A are also provided in Attachment 8. Data verification was performed only on the parameters required by the approved Work Plan (Tetrachloroethene, Trichloroethene, 1,1-Dichloroethene, Vinyl Chloride and

Nitrate). The POC wells were sampled quarterly; duplicate samples were collected at a 10% frequency; and split samples were collected at 25% frequency as required under the approved Work Plan and Quality Assurance Project Plan (QAPP).

2.8.1 Data Verification for Point of Compliance Wells

This section represents the Data Verification report on analysis of selected VOCs and nitrate for the Congress and Nearmont Landfill regional groundwater POC wells during the period April 2008 through October 2009.

The analytical and field data collected during each sample event were evaluated to determine if all criteria for the comparison to the data quality indicators (DQIs) listed in Section 5.1 of the approved Work Plan and QAPP were met. The data were also evaluated to determine if the collection of this data meets the project data quality objective (DQO) of prevention of negative impacts to the regional groundwater. A discussion of the evaluation of data from each sample event is provided below. Samples were sent to Tucson Water Quality Laboratory (TWQL) or Columbia Analytical Services Laboratory (CAS) for analysis. A list of abbreviations used in TWQL supporting documentation is provided with the data.

Data Verification: April 17, 2008

The samples were collected in accordance with field procedures outlined in the QAPP. The samples were submitted to TWQL for analysis of anions, ammonia, metals and VOCs. Well WR-350B could not be sampled due to a leak in the pump drop pipe. The pipe was repaired and the well sampled on June 4, 2008. The sample field forms, analytical data, data verification form and supporting documentation are located in Attachment 8. There were no anomalies, deficiencies or QC problems identified in the analytical data or supporting documentation. The data met all criteria for the DQIs, and collection of this data fulfills the DQO of prevention of negative impacts to the regional groundwater.

Data Verification: July 28, 2008

The samples were collected in accordance with field procedures outlined in the QAPP. The samples were submitted to TWQL for analysis of anions, ammonia, metals and VOCs. The split sample and duplicate sample were collected from WR-350B. The split sample and a trip blank were submitted to CAS for analysis of nitrate and VOCs. The sample field form, laboratory data

and data verification are located in Attachment 8. There were no anomalies, deficiencies or QC problems identified in the analytical data or supporting documentation. The data met all criteria for the DQIs, and collection and analysis of this data fulfills the DQO of prevention of negative impacts to the regional groundwater.

Data Verification: October 1, 2008

The samples were collected in accordance with field procedures outlined in the QAPP and submitted to TWQL for analysis of VOC, ammonia, metals and anions. The sample field form, laboratory data and verification form are located in Attachment 8. There were no anomalies, deficiencies or QC problems identified in the analytical data or supporting documentation. The data met all criteria for the DQIs, and collection of this data fulfills the DQO of prevention of negative impacts to the regional aquifer.

Data Verification: January 28, 2009

The samples were collected in accordance with field procedures outlined in the QAPP and submitted to TWQL for analysis of VOC, ammonia, metals and anions. The sample field form, laboratory data and verification form are located in Attachment 8. There were no anomalies, deficiencies or QC problems identified in the analytical data or supporting documentation. The data met all criteria for the DQIs, and collection of this data fulfills the DQO of prevention of negative impacts to the regional aquifer.

Data Verification: April 21, 2009

The samples were collected in accordance with field procedures outlined in the QAPP and submitted to TWQL for analysis of VOC, ammonia, metals and anions. The sample field form, laboratory data and verification form are located in Attachment 8. There were no anomalies, deficiencies or QC problems identified in the analytical data or supporting documentation. The data met all criteria for the DQIs, and collection of this data fulfills the DQO of prevention of negative impacts to the regional aquifer.

Data Verification: July 27, 2009

The samples were collected in accordance with field procedures outlined in the QAPP and submitted to TWQL for analysis of VOC, ammonia, metals and anions. A split sample was also collected and sent to Columbia Analytical Services for analysis of nitrate, nitrite and VOCs as required by the Work Plan. The sample field form, laboratory data and verification form are

located in Attachment 8. There were no anomalies, deficiencies or QC problems identified in the analytical data or supporting documentation. The data met all criteria for the DQIs, and collection of this data fulfills the DQO of prevention of negative impacts to the regional aquifer.

Data Verification: October 1, 2009

The samples were collected in accordance with field procedures outlined in the QAPP and submitted to TWQL for analysis of VOC, ammonia, metals and anions. The sample field form, laboratory data and verification form are located in Attachment 8. There were no anomalies, deficiencies or QC problems identified in the analytical data or supporting documentation. The data met all criteria for the DQIs, and collection of this data fulfills the DQO of prevention of negative impacts to the regional aquifer.

2.8.2 Regional Groundwater Analytical Results

Table 5 provides selected analytical results for the monitoring conducted at the POC wells and WR-428A since 2000, before the project began. Analytical results of VOCs, ammonia and anions have not been reported to exceed the AWQS at any of the wells screened in the regional aquifer during the bioreactor project. Figure 6 contains graphs of the results for nitrate and chloride for the POC wells and WR-428A and for the perched water wells. Chloride has been consistently detected above 100 mg/L in the perched water wells; however, chloride levels in the POC wells have been stable between 15 mg/L and 40 mg/L since 2001. Nitrate and nitrite within the perched water wells has varied widely in response to chemical conditions induced by the bioreactor process since 2008. Nitrate has remained stable in the POC wells between 2 mg/L and 4 mg/L since 2000. Based on 9 years of monitoring data, COT-ES does not believe the bioreactor operations have impacted the regional aquifer water quality. Changes to monitoring schedules for the POC wells are discussed in Section 3.0 of this report.

2.9 Settlement Data and Calculations

In December 2006 and February 2007, all of the wells and 100 settlement points (VCP) associated with the 17-Acre bioreactor system were surveyed to establish geodetic coordinates and ground surface elevations. During various excavation activities, 46 VCP points and 59 wells were removed. Figure 3 shows the locations of the remaining wells and VCP points before the

site was dismantled in April 2009 The VCP points were initially spaced in grid fashion approximately 100 ft apart and consisted of a 2.5 ft piece of rebar driven flush with ground level and collared with portland cement.

Additional surveys were conducted in October 2007, July 2008 and February 2009 to monitor elevation changes at the wells and settlement points and to survey locations of new wells installed during operation of the bioreactor. Table 6 provides the initial and final results of the surveys.

The initial and final elevations measured at the well heads and VCP points were used to calculate the average settlement within each landfill. The area of waste (adjusted to reflect the excavations done in July and October 2007) and the thickness of waste as determined from logging during well installation (Table 2) was used with the average settlement to determine the change in total volume of waste during the operation of the bioreactor. Waste degradation, settling due to loading by water or vehicle traffic, and the excavation activities all affected the elevation of the ground surface and are reflected in the final measured elevations. Positive elevation changes (Table 6) are not used in the calculations as they were likely the result of soil backfilling near the wells which was necessary to stabilize areas which showed excessive settlement and cracking. The volume of soil used to backfill is not accounted for in the calculations.

Figure 7 and Figure 8 provide comparisons of the land surface elevations based on data collected during the initial and final elevation surveys for wells and VCP points located in the Congress Landfill east of the sewer, and west of the sewer respectively. Figure 9 provides a similar comparison for Nearmont Landfill. For the calculations, the Congress Landfill was divided into areas east and west of the sewer due to the disturbance caused by excavation equipment west of the sewer (Figure 3). The area of waste and average thickness of waste logged in wells set within each area was used to determine the initial total volume of waste. The average settlement measured at wells and settlement points within each area was subtracted from the initial average thickness to determine the final average thickness of waste. This value was used to calculate the total volume of waste after operations were complete as well as the percentage decrease in waste. The calculated values for each area are shown on the corresponding Figure.

According to these calculations, the bioreactor process at the 17-Acre site reduced approximately 5% of the total volume of waste east of the sewer and 7% of the total volume of waste west of the sewer in the Congress Landfill. Within the Nearmont landfill, the bioreactor process reduced approximately 6% of the total volume of waste. For comparison purposes, the operation of the 50x50 system reduced an average of 15.4% of the total volume of waste (HGC, Inc. January 2004), and operation of the 2-acre site reduced an average of 12.4% of the total volume of waste (COT-ES, December 2007). Based on this comparison, the bioreactor within the 17-Acre site was approximately 60% completed when it was shut down in October 2008.

3.0 MONITORING SCHEDULE CHANGES

Attachment 9 contains a summary table of current and future sampling schedules. Beginning in February 2010, COT-ES will decrease landfill gas monitoring at the boundary wells screened outside the waste from biweekly to monthly for a period of one year. If methane concentrations in the boundary wells do not exceed 5% by volume after that time, methane monitoring frequency at the boundary wells will be decreased to quarterly.

COT-ES will decrease water quality monitoring in the POC wells (WR-350B, WR-351A and WR-429A) from quarterly to semiannually for a period of two years beginning in January 2010. If the regional water quality does not appear to be impacted after that period, samples will be collected annually thereafter. If impacts to the regional water quality from nitrates or VOCs due to the bioreactor process are observed, COT-ES will address assessment requirements in accordance with 40 CFR Part 257.1, through 257.3.

COT-ES will continue to remove accumulated water from the CM and CLW wells as long as sufficient water exists or until water quality in the CM wells improves to meet the AWQS for VOCs, nitrate and nitrite. COT-ES will voluntarily collect and analyze samples for VOCs, nitrate and nitrite from perched water monitor wells with sufficient water semiannually, beginning in February 2010 to determine if the water is still impacted by the bioreactor

operations. If the water quality in the perched wells improves to meet the AWQS for VOCs, nitrate and nitrite, COT-ES will discontinue dewatering and sampling efforts.

4.0 COMMUNITY INVOLVEMENT

Throughout the life of the bioreactor project COT-ES has participated in neighborhood association meetings and distributed project information to the surrounding residences and other concerned entities. These efforts have been detailed in the various annual reports listed in the reference section of this report. During the period April 2008 through July 2009, COT-ES attended a neighborhood association meeting on August 14, 2008 and distributed two flyers describing the progress of the bioreactor in August 2008 and March 2009 (Attachment 10). Downtown Development, the agency responsible for redevelopment in the area attended a neighborhood association meeting on July 9, 2009, to discuss re-grading the site in August 2009. COT-ES has also made various reports available to the public on the internet at http://www.cityoftucson.org/ets/Rio_Nuevo/rio_nuevo.html.

5.0 REFERENCES

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